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ECIE 2021

Volume Two

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ISCTE Business School,
Instituto Universitário de Lisboa, Portugal

16-17 September 2021

Edited by
Dr. Florinda Matos, Prof Maria de Fátima Ferreiro, Prof Álvaro Rosa and Prof Isabel Salavisa

Review Process
Papers submitted to this conference have been double-blind peer reviewed before final acceptance to the conference. Initially, abstracts were reviewed for relevance and accessibility and successful authors were invited to submit full papers. Many thanks to the reviewers who helped ensure the quality of all the submissions.

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Contents

ECIE Preface

These proceedings represent the work of contributors to the 16th European Conference on Innovation and Entrepreneurship (ECIE 2021), hosted by Iscte Business School, Instituto Universitário de Lisboa, Portugal on 16-17 September 2021. The Conference Chair is Dr. Florinda Matos and the Programme Co-Chairs are Prof Isabel Salavisa, Prof Álvaro Rosoi and Prof Maria de Fátima Ferreiro all from Instituto Universitário de Lisboa, Portugal.

ECIE is a well-established event on the academic research calendar and now in its 16th year, the key aim remains the opportunity for participants to share ideas and meet the people who hold them. The conference was due to be held at Instituto Universitário de Lisboa, Portugal, but due to the global Covid-19 pandemic it was moved online to be held as a virtual event. The scope of papers will ensure an interesting two days. The subjects covered illustrate the wide range of topics that fall into this important and ever-growing area of research.

The keynote presentation is given by Prof Soumodip Sarkar, Vice-Rector, from University of Évora, Portugal on the topic of Social Intelligence. The second day of the conference will open with an address by Professor Vittorio Loreto, Sapienza University of Rome, Italy, who will talk about Exploring the adjacent possible: play, anticipation, surprise.

With an initial submission of 269 abstracts, after the double blind, peer review process there are 131 Academic research papers, 18 PhD research papers, 4 Masters Research papers and 4 work-in-progress papers published in these Conference Proceedings. These papers represent research from Bahrain, Brazil, Cambodia, Canada, China, Columbia, Croatia, Cyprus, Czech Republic, Denmark, Eesti, Egypt, Estonia, Finland, Germany, Ghana, Greece, Iceland, India, Indonesia, Ireland, Israel, Italy, Japan, Kuwait, Lithuania, México, Norway, Oman, Perú, Poland, Portugal, Qatar, Republic of Ireland, România, Russia, Russian Federation, Singapore, Slovakia, South Africa, Spain, Sweden, Switzerland, Thailand, The Netherlands, Turkey, UAE, UK and USA.

We hope you enjoy the conference.

Dr. Florinda Matos

Instituto Universitário de Lisboa
Portugal
September 2021

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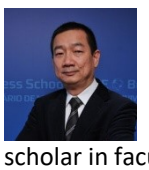
Biographies

Conference and Programme Chairs

Dr. Florinda Matos is the founder and the president of ICAA - Intellectual Capital Association. She holds a PhD in Social Sciences, Organizational Behaviour Studies from the University of Lisbon (Portugal). She teaches in graduate and post-graduate courses at ISCTE – Instituto Universitário de Lisboa and in several other higher education institutions. She is an associate research fellow of DINÂMIA'CET-IUL - Centre for Socioeconomic and Territorial Studies. Currently, she is leading the project "KM3D - Knowledge Management in Additive Manufacturing: Designing New Business Models". She is a member of the New Club of Paris. As a Knowledge Management expert, she is the ambassador for Europe of the International Conference on Knowledge and Innovation (CIKI) and member of the Observatory on Knowledge Management and Innovation in Public Administration, from IPEA - Institute for Applied Economic Research of Brazilian Government. She has more than 30 published academic articles and scientific papers, book chapters and books. Her main research interests are Intellectual Capital, Knowledge Management, Digital transformation and Sustainability.

Prof Maria de Fátima Ferreiro is Associate Professor with Habilitation at Iscte - Instituto Universitário de Lisboa, in Lisbon. Her research is conducted at DINAMIA'CET-Iscte, Centre for Socioeconomic and Territorial Studies, in the subjects of territory, food system and transitions towards sustainability, and social innovation. Currently the research is developed within the European Project RurAction, Social Innovation and Entrepreneurship in Rural Regions, funding by the European Union's Horizon 2020 Research and Innovation Programme under the Marie Sklodowska-Curie grant agreement; and project SPLACH - Spatial Planning for Change (2017-2020) – funded by Compete 2020. Teaching activity in the areas of economic ideas, territory, and sustainability. Publications in the areas of social innovation, territory and governance, food system and transitions towards sustainability. Supervision of master and PhD thesis. Referee of indexed national and international journals. Dean of the School of Social Sciences and previous director of the Department of Political Economy at Iscte



Prof Álvaro Rosa is associate professor (with Habilitation) at ISCTE Business School. Currently is the director of the Master of International Management at Iscte - Instituto Universitário de Lisboa and member of Scientific Committee of Iscte Doctoral Programme on Applied Management. His research interests are strategy, qaulity and cross-cultural management. He is a regular visiting scholar in faculties in China, Brazil, UK, and Slovenia.

Prof Isabel Salavisa is Full Professor of Economics at Iscte - Instituto Universitário de Lisboa, in Lisbon. Her research is conducted at DINAMIA'CET-Iscte, Centre for Socioeconomic and Territorial Studies, of which she has been Director (2004-2013) and is joint coordinator of the Research Group 'Innovation and Labour'. She has been working on the research project SPLACH - Spatial Planning for Change (2017-2020) – funded by Compete 2020. She is advisor to the Jean Monet Centre of Excellence on "Labour, Welfare and Social Rights in Europe" (2018-2021). Her research subjects comprise economics of innovation; sustainability transitions of large sociotechnical systems, such as energy and food; and Welfare State policies in Europe. She coordinated and participated in a large number of projects. She wrote, edited and contributed to a number of books, published articles and presented papers at a great deal of conferences. She has supervised PhD. dissertations and taught mostly Economics of Innovation, Economics and Policies of the EU, and Sustainability Policies. She is a member of international associations and networks and referee of several international journals.

Keynote Speakers

Vittorio Loreto is a Full Professor of Physics of Complex Systems at Sapienza University of Rome and the Faculty of the Complexity Science Hub Vienna. He is currently directing the SONY Computer Science Lab in Paris where he also leads the team on "Innovation, Creativity and Artificial Intelligence". His scientific activity is mainly focused on the statistical physics of complex systems and its interdisciplinary applications. He coordinated several project at both EU and Italian levels. More recently he coordinated the Templeton-funded KREYON project devoted to unfolding the dynamics of innovation and creativity. Loreto has published over 180 papers in internationally refereed journals and conference proceedings and chaired several workshops and conferences. He is member of the executive committee of the Complex Systems Society.

Soumodip Sarkar is the Vice-Rector of the University of Évora, Portugal. He is a Full Professor at the Department of Management, University of Évora, Portugal and a researcher at CEFAGE-UE. He is currently also a Non-resident Fellow of the Asia Center at Harvard University. Prof. Sarkar was the first Dean of the pioneering Doctoral School in the country (2010-2014). He is also the executive president of the Science Park of the region (PACT). His current research interests include innovation (especially related to implications of AI, and the rise of China), entrepreneurship and sustainability. His recent research has been published in high impact journals. He has published four books on entrepreneurship and innovation, and his most recent book, EntreSutra was published by Bloomsbury in April 2019. He has been featured in national and international media, including the Economist and BBC.

Mini Track Chairs

Dr Nasser Abouzakhar is the director of Anzar Property Group which was founded in 2017. Between 2004 and 2019, he worked at different universities in the UK as an academic, teaching and researching different technology-related subjects. He has a good understanding of the property investment business and finances. Nasser has firm relationships with professionals in banking, legal, accounting, and valuation which assist with his responsibility as the company director. He leads a highly professional and experienced management team.

Dr Nikolaos Apostolopoulos, PhD, is an Assistant Professor in Entrepreneurship and Innovation at Neapolis University Pafos. He also acts as a Scientific Advisor at the Labour Institute (INE-GSEE). Moreover, he is a key researcher of the Jean Monnet Centre of Excellence on Governance at the University of Peloponnese. He is co-editor of the edited volume entitled Universities and Entrepreneurship: Meeting the Educational and Social Challenges and the edited volume entitled Entrepreneurship and the Sustainable Development Goals.

Fraser Bruce is a senior design academic at the University of Dundee with over 20 years of teaching, research and consultancy experience. He is currently the Programme Director for the MSc Product Design course where he delivers specialist lectures and workshops on design thinking, service design and innovation. His research interests lie in the integration of biomimetic design with the practice of product design and innovation management. He has also

conducted research that explores the impact of digital technologies and the use of big data in the creative industries.

Dr Alexandros Kakouris, MsC, PhD, is an adjunct lecturer in entrepreneurship and innovation at the University of Peloponnese, at the Hellenic Open University and at the National and Kapodistrian University of Athens. He holds PhD in Physics, PhD in Entrepreneurship and a MSc in Adult Education. His special interest concerns fostering entrepreneurship and innovation to science graduates and the support of youth entrepreneurship through teaching and counselling as well as nascent entrepreneurship, transformative and experiential learning.

Sharifa Latter is lecturer and Programme Director of the interdisciplinary MSc Design for Business at the University of Dundee. Her industry experience in business and marketing includes positions held in account management, project and campaign management for international brands in various industries. Her research in this field focuses on the exploration of user/customer-centric innovation as well as consumers' attachments and interactions with design solutions throughout product lifecycles.

Dr Ruslan Pavlov is a senior researcher at the Central Economics and Mathematics Institute of the Russian Academy of Sciences, and post graduated from the same institution. His research interests include the diversification of business and big cycles, as well as the social responsibility of business and social entrepreneurship.

Professor Cezar Scarlat is with the Department of Entrepreneurship & Management and PhD supervisor at Doctoral School of Entrepreneurship, Business Engineering & Management from University "Politehnica" of Bucharest. He is currently teaching Technology Entrepreneurship and related courses at universities in Romania and abroad. Cezar holds a Master degrees in Engineering and International business, PhD degree in Management & industrial engineering. He has over two-decade-experience in business management consulting and international projects. Cezar has published more than twenty books and about two hundred scientific reports and articles. He is a member of professional organizations and scientific/editorial boards of academic publishers and international journals (IMDS, ESWA, ABSRJ among others).

Dr Andreas Walmsley, PhD, is Associate Professor in Entrepreneurship at the International Centre for Transformational Entrepreneurship, Coventry University. He conducts research in entrepreneurship, especially entrepreneurship education, graduate entrepreneurship and responsible entrepreneurship. He is on the editorial boards of the journals Entrepreneurship Education and Pedagogy and the International Journal of Entrepreneurial Behaviour and Research.

Dr Birgitte Wraae, PhD, is an Associate Professor in Entrepreneurship at the Faculty of Business and Technology and the Department of Applied Business Research at UCL University College Denmark. Her research interests are in entrepreneurship, especially entrepreneurship education: identity formation, emancipation, and employability. She excels in doing research in connection with the entrepreneurial learning space. She is the co-developer of Teachers Games that puts entrepreneurial learning approaches into practice.

Biographies of Contributing Authors

Nasser Abouzakhar is the director of Anzar Property Investors Limited which was founded in 2017 and author of Real Estate Investment book. Between 2000-2019, he worked at different universities in the UK as an academic. Nasser has a good understanding of property investment and finance and developed firm relationships with stakeholders in banking, legal, and accounting."

Emma Agusita is Senior Lecturer in Digital and Cultural Production and in Media Culture and Communications at University West England. Emma's previous research includes work on the Creative Citizen's research project, a multi-institution project funded by the RCUK Connected Communities scheme.

Noora Albastiki believes that investing in students today will ensure the prosperity of the leaders of the future. Noora is a member of the Ministry of education in the Kingdom of Bahrain for 9 years as a developer of career guidance programs for technical and vocational students.

Susana Aldeia is a full-time Assistant Professor at the ISAG/EBS European Business School. She holds a Phd in Taxation and a DEA from the Vigo University (Spain) in Tax Law; a postgraduation in Taxation from the IPCA and a degree in Accounting, also from the IPCA.

Mariam Hareb Humaid Belhaymah Aldhaheri , CFP,CFI, CFT, AFHEA. Over 15 years of experience in financial services, academic and consulting. Dr. Mariam brings a wealth of expertise with particular strengths in areas such Corporate Strategic planning, Future Foresight, Innovation and Entrepreneurship.

Rui Alves Attending the PHD course in Informatics at the university of Minho, Rui Alves is currently a programmer and Software Tester at the company Techwelf and in parallel is a visiting teacher at the Polytechnic Institute of Bragança. Passionate about knowledge, Rui Alves loves to create new ideas to solve everyday common problems.

Maher Alzyadat is a PhD student in Engineering Management, Department of electronic engineering at the University of York, UK. He holds an MSC in Engineering management, His main research areas are Intrapreneurship and innovation in technology SMEs.

John Amoah is a PhD student at the Tomas Bata University, Zlin Czech Republic at the faculty of Management and Economic Department. He holds a master's degree in Marketing from the Pentecost University of Ghana. His main research area is on SMEs development, Social media analysis, Service marketing in developing countries. He has also presented at numerous international conferences.

Gunnar Andersson is an Associate Professor at Østfold University College in Norway. He is head of the Innovation Research Group with a special focus on better understanding of innovation as it unfolds in organizations and networks of organizations. He specialises in how process improvement methodologies, such as Lean. He holds a PhD in Industrial Economy and Technology Management.

Paula Anzola-Román is an Assistant Professor from the Public University of Navarre with PhD in Economics, Business Science and Law. Her research interest is in the field of innovation management. More recently, her work has focused on developing and studying entrepreneurship.

S**otiris Apostolopoulos** studied administration of health & welfare units (BSc) at Technological Institute of Peloponnese and holds two master degrees (MSc) in health services management & in finance. Currently he is a Phd candidate at University of Peloponnese, School of Management, Department of Accounting and Finance.

Márbia Araújo Universidade Federal de Ouro , reto (UFOP), Brazil. Master student in Production Engineering with an emphasis in Production Management at UFOP.

Yuliya Asaturova, PhD (Econ.), Peter the Great Saint-Petersburg Polytechnic University, Russia. Currently employed as associate professor for Higher School of Economics and Engeneering. Presently the research is focused on Financial management, innovative models, digital economy. Yuliya teaches Economics, Financial Management, Financial Analysis, Economics of enterprise.

Mr Olusegun Matthew Awotunde is a PhD candidate at the University of KwaZulu-Natal, South Africa. He is a team member of the SHAPE research lab. His research focus includes human capital and youth entrepreneurship development through action learning.

Salma Azzahra. Affiliation: Institut Teknologi Bandung, Indonesia. Member of Research team School of Business and Management, Institut Teknologi Bandung.

Yulia **Balycheva**, PhD, is a senior research associate of the Central Economics and Mathematics Institute of RAS. Her research areas are the innovative behaviour of firms.

Francisco Banha holds a PhD in Economics and Management Sciences from the University of Algarve, where he is a guest assistant professor. He is also a researcher at CinTurs - University of Algarve and member of the Centre for Advanced Studies in Management and Economics from the University of Évora

Raphael Bar-El is Professor Emeritus at Ben Gurion University and faculty member of the of the Applied Economics Department at the Sapir Academic College. He specializes in regional economic development and innovation policy.

Ivana Barišić is an associate professor of accounting at Faculty of Economics and Business, University of Zagreb, Croatia. She received her PhD in accounting from Faculty of Economics, University of Split in 2013. She teaches courses on accounting and internal auditing. Her main research interests are accounting, accounting education and internal auditing.

Negalegn A. Bekele studied MSC in Industrial Engineering at Addis Ababa University, Ethiopia in 2011. From 2011-2019, he worked as a lecturer and researcher at Debre Markos University, Ethiopia. Currently, he is working as full-time researcher at Padova University, Italy in the area of consumer Internet of Things and startups.

Anji Benhamed Holds a PhD from University of Paris 13, Sorbonne, Paris City, in the area of Management and Entrepreneurship with a high level of distinction, currently a faculty member at the College of Business at Higher College of Technology (HCT). Dr Anji is a business consultant, coach-trainer, and mentor in entrepreneurship and Innovation.

Benedetta Diegoli is a 2nd year master student at Catholic University of Milan in Pedagogy and Social Science. During her bachelor education, she studied at the University of Bologna in the course of Educational Sciences. She did research for her thesis project in Sevilla. The thesis insisted on the inclusion of Gipsy culture in the traditions of Andalusia.

Marcin Bielicki – research project manager at Poznan University of Economics and Business (Poland) and Fulbright Fellow from Texas Christian University (USA). His research interests are related to entrepreneurship, including above all business pre-incubation and problem-based learning.

Sarah Louisa Birchley is a Professor in the Faculty of Business Administration, Toyo Gakuen University, Tokyo, Japan. Her research is concentrated on diaspora entrepreneurship, including direct diaspora investment, and diaspora mentoring with a focus on Japan and Wales.

Lukáš Blažek. PhD. - University of Economics in Prague. Practice: IT operates in the financial sector, especially in the field of corporate finance, investment and business development support. Academic activity: University of Finance and Administration. - Department of Economics and Management Focus on: strategic business management, change and innovation management and issues of circular and shared economy.

James Bourne is a third year PhD student at Swansea University in Wales. This is his second conference, where they have both been at the ECIE. His area of research is Knowledge and Technology Transfer within the context of South West Wales.

Tiina Brandt is a researcher at Haaga-Helia University of Applied Sciences. She received his PhD of Management at 2005 and she has published over 100 papers of the areas of leadership, teams, personality and entrepreneurship. She is interested of international cooperation especially in field of entrepreneurship and leadership both in research and development projects (e.g Horizon, Erasmus+).

Angelo Cavallo, Ph.D. Assistant Professor at Politecnico di Milano, Italy. His main research areas include Strategic Management, Entrepreneurship and Digital Transformation. He is author of journal articles (appearing in outlets such as Journal of Business Research, Technological Forecasting and Social Change and International Entrepreneurship and Management Journal), book chapters and conference proceedings. He is Core Faculty

member at MIP Politecnico di Milano - Graduate School of Business. He is also Codirector of the Space Economy Observatory – Digital Innovation Observatories

Martin Cepel, Ph.D., DBA is an Assistant Professor at the Faculty of Economics, Pan-European University in Bratislava, Slovakia. His research and research activities focus on Entrepreneurship, Entrepreneurial Economics, Financial Risk Management, Business Administration and Marketing. He is the author of many scientific articles in international journals and proceedings of international scientific conferences indexed in Web of Science and Scopus.

Elena Chernyshkova is an expert in philanthropy and education management. She is the Director of the Philanthropy Research Center at the Ural Federal University, Russia and a phD student at the Navarra University, Spain. Elena works in charity foundations leadership since 2003. Her main research interests are global trends in philanthropy development and higher education transformation.

Crispen Chipunza is a full-professor of human resource management in South Africa, with more than 30 published articles and supervised at least 20 masters and five PhD students. He mostly applies quantitative research methods in research areas such as human resource management, organisational behaviour, intra-psychological issues in small businesses, the corporate and the public sector.

Vasiliki Chronaki (MSc) PhD Candidate at E-Business Research Center (ELTRUN) of Athens University of Economics and Business. Works as Communications Officer for Athens Center for Entrepreneurship and Innovation (ACEin) facilitated in Athens University of Economics and Business. Master degree in Management Science and Technology (MSc) from Athens University of Economics and Business, and degree in Financial Management and Engineering from University of Aegean. Worked as Project Manager Intern for Intermetal S.A.; prior to master studies worked as Communications Manager for Orama Group.

Eunice Oluwakemi Chukwuma-Nwuba is a lecturer of enterprise and entrepreneurship at Coventry university, United Kingdom. Kemi holds a PhD in Entrepreneurship from the university of Northampton, United Kingdom. She is a Fellow of Higher Education Academy and a member of the British Academy of Management among others. Her research interests include entrepreneurship, entrepreneurship education and entrepreneurial intentions.

Irene Ciccarino lecture at the Polytechnic Institute of Leiria, Portugal. She received her PhD in business management from Pontifical Catholic University of Rio de Janeiro in 2020. Her main research areas are social entrepreneurship, social innovation, strategy, and public policy. She has several papers published on these subjects and has worked in social economy as project manager and as consultant for more than 10 years.

Federica Cirilli is project manager at Fondazione Politecnico di Milano. Her core competences are ICT driven business process reengineering, ICT strategy and eHealth. Her main activities regard the management of ICT-driven innovation

Luís Coelho is Assistant Professor (with Aggregation) in Finance at The School of Economics – University of the Algarve, where he takes on the roles of Director of Postgraduate Studies, Director of the MSc in Corporate Finance and Director of the B.A. in Business Management. He is also a member of the Centre for Advanced Studies in Management and Economics from the University of Évora.

Oscarina Conceição is Professor at Polytechnic Institute of Cáva (IPCA) and researcher at Dinâmia'CET-IUL (Instituto Universitário de Lisboa). She has a Master's degree in Industrial Economics and Business and a PhD in Economics, both from University of Minho (Braga, Portugal). Her research interests include the following topics: innovation process and their socio-economic effects; knowledge transfer; knowledge and innovation networks; entrepreneurship; Blue EConomy.

Stefano D'Angelo is a PhD Candidate in Management Engineering at Politecnico di Milano. His main research interest includes: Corporate Entrepreneurship, Digital Entrepreneurship and Experiment-based Approaches to Entrepreneurship. He also works at Startup Intelligence Observatory of Politecnico di Milano.

Edoardo De Paolis Graduated at Harvard Business School and worked in corporate finance in Ria Grant Thornton spa (2015-2018) supervised by CEO Maurizio Finicelli. Researches innovation & shared value. Previous research in regional industrial strategy for local growth prosperity. Researched under Prof. Riccardo Cappellin at Tor Vergata University who worked at the Warton Business School under Prof. Noble Prize L. Klein. Interests are innovation led demand, shared value, policy industry, healthcare, new industrial strategy to re- lunch the sectors led demand

Marius Deilen obtained a Bachelor of Arts in International Management from the University of Osnabrück, Germany and Tecnologico de Monterrey, Mexico. He received his Master of Science in Entrepreneurship at the University of Liechtenstein and is currently enrolled as a PhD Student at the Technical University of Dortmund in Germany. His research areas are strategic innovations in platform ecosystems and entrepreneurship.

Linh Duong is a doctoral candidate at Åbo Akademi University. Her topic is gender construction at start-up pitching sessions. She wants to gain more knowledge how gender is understood and practiced in various organization-related contexts. She also wants to apply the findings to contribute to the diversity practices for both start-ups and organizations.

Smile Dzisi is an academic with over twenty years of experience in teaching and research and tertiary level education management. Her research areas include entrepreneurship, innovation and small business, female education, eLearning, and technical and vocational education. She is the President of Data Link Institute of Business and Technology. Prof

Tiit Elenurm is the entrepreneurship professor at the Estonian Business School, business angel and mentor for start-up entrepreneurs. Ph. D. in 1980 for the dissertation “Management of the Process of Implementation of New Organizational Structures”. Author of more than 130 research publications. Research interests include knowledge management, innovative entrepreneurship and cross-border networking.

Hadia Fakhreldin is Professor of International Business at the BUE. She is the Vice Dean for Teaching and Learning at the Faculty of Business, Economics and Political Science. She obtained her BA in Economics from the American University in Cairo and her Ph.D. from Cairo University. Her research interest is in the areas of SME development, internationalization, sustainability and cross-cultural management.

Tribowo Rachmat Fauzan, S.T.P. is a graduate student of Master of Science Management (MSM) School of Business and Management, Institut Teknologi Bandung (ITB). He graduated from Universitas Padjadjaran majoring in Food Industrial Technology in 2016. Now he joined Entrepreneurship and Technology Management Research Group under supervision of Prof. Wawan Dhewanto, PhD.

Florian Fengel is a Research Associate and Doctoral Candidate of Innovation Management at TU Dortmund University, Germany. His research focuses on the implications of digitalization in established and young companies, especially with regards to organizational success factors, innovation outcomes and networking behaviors. He gained practical experience in a leading management consulting firm.

Júlio César Fernandes is Master student in Production Engineering with an emphasis in Production Management at UFOP.

Francesco Ferrati School of Entrepreneurship (SCENT), Department of Industrial Engineering, University of Padova, Padova, Italy Postdoctoral researcher in Entrepreneurship at the University of Padova, Italy. He holds a PhD in Management Engineering. His research activity deals with the analysis of the startup companies’ success factors and the design and implementation of machine learning models to support equity investors in their decision-making process.

Adão Flores holds a PhD in management from the University of the Algarve, where he is Assistant Professor. He is also a researcher at CinTurs - University of Algarve.

Rui Fragoso, holds a PhD in Business Management and Habilitation in Management from the University of Évora, where currently is Associate Professor, teaching courses in Operations Management, Entrepreneurship and

Agribusiness. He is a full member of CEFAGE, has participated in several research projects and is author of environ 40 papers published in journals indexed in ISI and SCOPUS.

Casper Friberg is assistant professor at Engineering department, VIA University College in Horsens, Denmark. He teaches within Management, Project Management and Entrepreneurship based on his industry experience within Change Management, Intrapreneurship, SCM, Environment, Work Environment in both Manufacturing, Food and electronics industries. His research focus is on Entrepreneurship and Education.

Yuan Gao is a PhD student of XJTLU. He obtained a M.S. degree in Management in 2019 from the university of Liverpool. Dr. Liu is Assistant Professor in the Institute of Leadership and Education Advanced Development (ILEAD) at XJTLU. Her research interest includes the impact of college on students, college student success, and diversity in higher education.

Darie Gavriluț graduated 'Babes-Bolyai' University of Cluj-Napoca, Faculty of Economic Sciences and Business Administration. He is currently a Ph.D. student at University of Oradea. His doctoral research is focused on business innovation, company development and start-up development.

Kevin Giorgis graduated from the University of Bologna and of California Riverside and then took his Master's at the University of St. Gallen. He wrote a thesis on the intrinsic and extrinsic factors of motivation and how and when to assess engagement. He also worked in several corporates and startups in Europe and the US

Miriam A. Gleason Rodríguez Masters Degree in Administration of Educational Institutions from Tecnológico de Monterrey. Teaching experience at the elementary, middle and high school levels. Currently a professor at the Tecnológico de Monterrey Campus Ciudad de México. Example of publication: Validación De Un Modelo De Competencias Docentes En Una Universidad Privada Mexicana in Revista Digital de Investigación en Docencia Universitaria.

Oleg Golichenko Doctor of Economic Sciences. Chief research associate at Central Economics and Mathematics Institute of the Russian Academy of Sciences and professor at Moscow Institute of Physics and Technology. Research interests are related to the investigation of innovation development and design of public policy.

Olga Gordienko is a Master Student at HSE University. Her main research areas are resistance to change and collective resilience.

Ken Grant is the Chair of the Department of Entrepreneurship and Strategy in the Ted Rogers School of Management at Ryerson University, Toronto. With research interests in entrepreneurial ecosystems, angel investment, youth and diversity issues in entrepreneurship and in pedagogy, he teaches in entrepreneurship, strategy and management consulting.

Ekaterina Grosheva is an Assistant of the Department of Applied and Business informatics, Penza Cossack Institute of Technologies (branch) of K. G. Razumovsky Moscow State University of Technologies and Management (the First Cossack University). Her main research areas are instrumental methods of economics, digitalization, digital transformation, business analytics.

Stefanie Gube is a research associate at the Technical University of Applied Sciences (TH) Wildau. She is the operational manager of the project described in the paper. She obtained her BA in business administration in 2020. Her research focuses on information security and awareness raising using game-based and experiential learning scenarios.

Dagmar Halová is a student of Economics and Management doctoral programme at Palacky University in Olomouc, Czech Republic. Her main research areas are human resources, specifically employer branding and personnel marketing, communication between employers and job applicants and bridging the generation gaps.

Angela Hamouda is a lecturer of Entrepreneurship, Creativity and Innovation. Her research interests include; entrepreneurship education, female entrepreneurship and social enterprise. Her main objective is that of driving the entrepreneurship agenda. Her commitment to teaching excellence was rewarded in being the winner of the

prestigious international Innovation and Entrepreneurship Teaching Excellence Awards in Aveiro, Portugal (2018).

Robert Hanák is an associate professor at University of Economics in Bratislava, Slovakia. In his research activity he investigates decision making of early stage investors such as business angels and venture capitalists, working on decision models, based on latest scientific data with aim to improve decision outcomes.

Janina Harasim is a professor of economics at the University of Economics in Katowice. She is the author of 9 monographs and over 150 research papers. Her research focuses on retail banking, retail payments market, payment innovations as well as alternative financial services and digitalization in the financial industry (including FinTechs and BigTechs).

Victoria Harrison-Mirauer is Professor of Practice and faculty lead for Innovation at Hult Ashridge Executive Education. Victoria has led global innovation programs for a range of blue chips and spent 7 years in the MENA region as Head of Digital Strategy for the Abu Dhabi F1. Victoria commences her PHD at Cambridge University in 2021.

Hala Hattab Associate Professor of Entrepreneurship at British University in Egypt. Special interest in issues related to entrepreneurship including entrepreneurship education, social entrepreneurship and youth and women entrepreneurship. Member of editorial boards of different journals a regular reviewer for entrepreneurship-specialised journals and conferences. Founding member of Middle East Council for Small Businesses and Entrepreneurship.

Ines Holstein is a student of the master's program in online communication at the Anhalt University of Applied Sciences in Bernburg, Germany.

Yanzhi Huang is a Ph.D. student from the Engineering Management Research Group, University of York. Prior to her Ph.D., she obtained her MSc degree in Engineering Management from the University of York in 2018. Her main research interests are in the fields of entrepreneurship and risk strategy and management in the Chinese high-tech market.

Oluseye O. Jegede is a Researcher at the South African Research Chair in Entrepreneurship Education, University of Johannesburg. He is also an Honorary Research Associate at Human Science Research Council (HSRC), South Africa. His main areas of research include economics of innovation, economics of entrepreneurship, innovation system, entrepreneurial ecosystem, and entrepreneurship education.

Sanna Joensuu-Salo is Principle Lecturer at Seinäjoki University of Applied Sciences, Finland. She has 20 years of work experience in higher education, teaching and research in the field of entrepreneurship. Her research areas are entrepreneurial intentions, market orientation in the context of growth firms, entrepreneurship education, digitalization-driven firm growth, hybrid entrepreneurship and business transfers.

Verena Karlsdottir is a doctoral student at the School of Business University of Iceland. She received her Master's degree in Strategic Management from the University of Iceland and works as a sessional teacher at the same university. Her research interests are in academic entrepreneurship, regional development, innovation in tourism, and societal impact of universities.

Virginia Katsimpiri, is a certified translator & business strategist with over 15 years of experience. She holds an MA in Translation, Ionian University, DFLTI & an executive MBA, University of the Aegean. For the MBA thesis Virginia ran a qualitative research study on "Client Acquisition Strategies for Language Professionals". Currently Virginia studies the factors that affect translators/interpreters' business performance at a PhD level at the Ionian University, Department of Foreign Languages, Translation & Interpreting.

Caroline Kettner is a Research Associate at the Chair of Technology Management at TU Dortmund University, Germany, where she focuses on innovation in established companies, especially with regards to entrepreneurial thinking, business model innovation, and customer involvement. She presented her research at the Annual Meeting of the Academy of Management.

Florian Kidschun is a researcher at Fraunhofer Institute for Production Systems and Design Technology (IPK), Division Corporate Management in Berlin, Germany. He studied Business Engineering at Technical University of Berlin and Dresden. Since joining Fraunhofer in 2015, he conducted international research & consulting projects in Europe and Brazil with project responsibility on Strategic Business Development, Benchmarking and Business Impact Analyses.

Monika Klimontowicz is aProfessor at University of Economics in Katowice, Department of Banking and Financial Markets. Her scientific interests focus on business strategy, banking innovations, creating value for customers, knowledge and intellectual capital, and competition on banking market. She is an author of over 60 scientific publications including 5 monographs. The results of her research are the topic of lectures delivered at the domestic and foreign universities in among others Finland, France, Spain, Portugal, Germany.

Cristina Ledro is a PhD student in Management Engineering and Real Estate Economics at the Department of Management and Engineering of the University of Padova, Italy. Her research and consulting interests lie in digital strategy, digital transformation, value creation and performance measurement, with specific expertise in the customer relationship/experience management field.

Gerasimos Lianos is assistant professor at the Higher Colleges of Technology (UAE), previously at the University of Miami (USA), Southwestern University of Finance and Economics (China) and has studied at the Athens University of Economics and Business (Greece), London School of Economics and Political Science (UK) and Universidad Carlos III de Madrid (Spain).

Panagiotis Liargovas is a professor of economics at the University of Peloponnese. He holds PhD in Economics from the Clark University, Worcester MA, and has also been a Fulbright Scholar, a Bakalas Foundation Scholar, a Teaching Assistant Scholar (Clark University) and a European Commission trainee (Brussels). He is former Head of the Parliamentary Budget Office at the Hellenic Parliament. He is currently president of The Greek Centre of Planning and Economic Research.

JoAnne Yong-Kwan Lim is currently a Senior Lecturer at the Singapore University of Social Sciences (SUSS). She has taught in the United States and France. She has published in Entrepreneurship Theory and Practice, Journal of Small Business Management, Information and Organization and Sex Roles: Journal of Research, and has papers accepted at reputable conferences including ICIS, AOM, PACIS and JAIS Theory Development Workshop.

Matthew Lynch is an Associate professor at the Norwegian University of Life Sciences, and the Østfold University College. His research focusses on entrepreneurial mindset. The other main focus of his research is entrepreneurship education using design thinking as a pedagogy. He has taught design thinking for public and private organisations for the past 6 years.

Beverlley Madzikanda is an MBA candidate. Her research area is entrepreneurial studies in developing economies, focusing on the entrepreneurship and social issues nexus. She has ongoing projects in entrepreneurial ecosystems as well as the role of entrepreneurship in different socio-cultural settings.

Ekaterina Malevskaia-Malevich is an associate professor of economics at Peter the Great Saint-Petersburg Polytechnic University, Russia. He received his PhD in economics from Saint-Petersburg state university of economics in 2013. Her main research areas are corporate finance, financial management, risk management.

Rauf Mammadov is a DBA student at the IE Business School, Spain. His research focuses on the influence of mega sporting events on the entrepreneurial ecosystems and policies in host nations. Prior to the DBA studies, in 2007, he received the Master's degree in Public Administration from Harvard University. In addition to the DBA studies, Rauf is the Advisor to CEO of Qatar Development Bank where he is responsible for several initiatives related to promotion and development of the entrepreneurship.

Anneli Manninen is Master of Arts (Education), Business Administration and Science. She has long experience in education policy and regional development from municipal, ministerial and employer organizations as well as universities. She is currently grant researcher in University of Oulu and PhD student in Estonian Business School.

Jacopo Manotti is a Ph.D. candidate in strategic management and entrepreneurship at the School of Management of Politecnico di Milano, where he also collaborates as a researcher in the Space Economy and Hi-Tech Startups Observatories. His main research interests encompass innovation and validation in business model, with particular focus on these processes taking place in nascent industries.

Stefano Marchese is a 2nd year PhD student at Politecnico di Milano in the field of Innovation Management and Organization Design. He previously graduated from the University of Milan and RFH Köln, worked for about 5 years as an HR consultant in a multinational company and has been active in the startup world since 2017.

Stelios Marneros is Assistant Professor in Hospitality Management at the Department of Management and Marketing at European University Cyprus. He is a member of SYSTEMA Research Center at European University. His research interest is focus on Hospitality Education, Hospitality Management Competencies, Hotel Management Pedagogy and Hospitality Management Programmes.

Carlos Martins PhD in Management in 2012 by Lusiada University - Lisbon; Master in Management in 1993 by ISEG – University of Lisbon, and Degree in Management and Public Administration in 1984 by ISCSP (Lisbon - Portugal). He is an Assistant Professor at Universidade Lusíada Porto, and at the Polytechnic Institute of Maia.

Daniela Marzavan is a PhD candidate at the Bauhaus-University Weimar, Germany. She holds an M.A. in Politology, Psychology and Gender Studies. She co-founded two companies and has gained industry reputation applying Design Thinking in large corporations and for governmental development agencies. She is lecturer on Innovation and Design Thinking in Spain and Germany.

Filipa Marušić, mag.oec. is Split based expert in tourism and hospitality and lecturer on Aspira University College. She is a CEO of Hotel Peristil and owner of Sol Travel tour company. Her area of research is tourism management with focus on hotel management, digital marketing, and cultural heritage in tourism.

Michael Mazur is a PhD student at the Institute of Entrepreneurship Prof. Dr. David Bendig at the Westfälische-Wilhelms-University Muenster, Germany. During his PhD studies, he focuses on entrepreneurship and institutional topics across nations. He has been attending various international conferences.

Ronan McArt is a lecturer in Marketing, Management & Entrepreneurship in the School of Home Economics at St Angela's College, Sligo. Ronan is currently a part-time PhD student in the School of Education in the National University of Ireland, Galway. Research interests include Entrepreneurship, Social Entrepreneurship, Entrepreneurial Self-Efficacy, Entrepreneurial Intention and Entrepreneurship Education.

Simona Mihai-Yiannaki is an associate professor of finance at European University Cyprus. She is the Director of EUC-PEAK Innovation Center, an Editor of GBER on the economics and finance section. She has coordinated numerous Erasmus+ projects in the area of innovation and entrepreneurship, and has presented in numerous conferences in Cyprus and abroad.

Andreea Maria Gabriela Militaru is a PhD student in the first year at university Politehnica of Bucharest, Faculty of Entrepreneurship, Engineering and Business Management (FAIMA). Graduated the master program in 2019 at the same university. I currently am a teaching assistant in FAIMA and a part-time employee at the ERASMUS+ Office in charge with counselling incoming and outgoing students.

Benoit Mougenot, Ph.D. in economics from the Université Paris-Saclay (France), Master in economics and society from the Université Lumière Lyon II (France), currently research professor of economics at the Faculty of Business Sciences of the Universidad San Ignacio de Loyola (Peru).

Róbert Mudroň is a student of Master`s degree program Business Management at Masaryk University, Faculty of Economics and Administration. His Master`s thesis examines behavioral aspects of organizational strategic decision-making. He further focuses on behavioral fallacies and constraints of the decision-making process and the impact of Business Intelligence on the decision-making process and organizational performance.

Elena B. Mudrova is Associate Professor of Institute of Industrial Management Economics and Trade at Peter the Great St.Petersburg Polytechnic University, Russia. She received his Ph.D. in Economics from St.Petersburg

state university of economics in 2007. Her main research areas are state and municipal management, HR-management, public-private partnership in tourism sector, education management.

Trudie Murray is a lecturer in Entrepreneurship and researcher with The Hincks Centre for Entrepreneurship Excellence at Munster Technological University. Trudie's research interests include entrepreneurship education, minority entrepreneurship, family business and innovation. Trudie is currently undertaking PhD research examining how early childhood educators can foster an entrepreneurial mind-set in the early child education and care setting.

Subrahmanian Muthuraman Ph.D is an Assistant Professor in the Faculty of Business Studies at Arab Open University, Oman with over two decades of experience offers a blend of teaching, research, and training. He has authored and edited 11 books and numerous highly cited journal publications. He is the recipient of "Global Knowledge Management Researcher Award".

Olga S. Nadezhina is a PhD in Economics, associate professor of the Graduate School of industrial Economics, Peter the Great St. Petersburg Polytechnic University, Saint-Petersburg, Russia. She received her PhD in management of national economy (regional economy; labor market, human capital) in 2006. Her main research arears are regional economy, SMB, human capital, economic security.

Anupama Nair is a Business Faculty in Higher Colleges of Technology in the United Arab Emirates. Her 20 years of career is a blend of 10 years of corporate experience and 10 years of teaching in Higher Education. She earned her PhD in Human Resource Management and holds SHRM-CP and CIPD Professional Certifications. She has published research papers as author and co-author in peer reviewed journals and presented research papers in International Conferences.

Annette Naudin is Associate Professor for Learning and Teaching at Birmingham City University. Annette is member of the Birmingham Centre for Media and Cultural Research (BCMCR). Annette's research is concerned with inequalities in the cultural workforce as a focus for interrogating local cultural policies and as it relates to Higher Education.

Tatyana P. Nekrasova is a doctor of Economics. She works as a full professor at the Higher school of engineering and economics of Peter the Great St. Petersburg Polytechnic University. Her research interests include innovative management, taxation, economics of high-tech industries, knowledge management.

Yamkela Nhleko is a postgraduate student who graduated her full research masters degree *cum laude*. Her research interests are entrepreneurship education, work-readiness and technology in learning and teaching.

Cornel Nieuwenhuizen. DHET-NRF SARChI Chair in Entrepreneurship Education, University of Johannesburg. Specialisation: Entrepreneurship, Innovation, Business Management. PhD Business Management and Honorary from Doctorate Krakow University of Economics. Published 90 peer reviewed articles and conference papers, three Best Paper Awards. 1489 citations and a Google Scholar h-index of 18. Supervised multiple Doctorates and Master students.

Ana Novak is an associate professor at Faculty of Economics and Business, University of Zagreb, Croatia. She received her PhD in accounting from Faculty of Economics, University of Zagreb in 2012. She is co-author of many scientific and professional papers. Her main research interests are accounting, accounting information systems, and accounting education.

Willard Nyamubarwa is a Lecturer in Human Resource Management at Great Zimbabwe University. He received his Doctorate in Human Resource Management from Central University of Technology, Free State (South Africa) in 2020. His main research areas are Human Resource Management practices in small family-owned firms.

Lea Oksanen hold a position Junior Research at LUT University where is currently pursuing her Ph.D. degree. She coordinates the EntreCompEdu teacher's professionalization programme in entrepreneurship education, while dwelling into the scientific research on entrepreneurship. Lea's academic background is in humanities. Her long international career builds up on coordinating multiple educational programmes worldwide.

Michael Olumekor is a PhD student in economics at Ural Federal University, Russia. His research interests are elderly economics, economic psychology, digital economy and consumer behaviour.

Aidene O'Mahony is a Master's student, in the Accounting & Information Systems department at Munster Technological University. After completing her Bachelor's in Business Information Systems, Aidene decided to pursue a Master's by Research, investigating the use of design thinking training to develop innovation capabilities.

Ana Pacheco is visiting professor at the Polytechnic Institute of Tomar. Her academic background includes a Ph.D. in Management and a Master's degree in Management studies. Her research interests include entrepreneurship, knowledge management and innovation.

Boontarika Paphawasit is a lecturer in the College of Arts, Media and Technology at Chiang Mai University, where she has been a college member since 2017. Boontarika completed her Ph.D. at Brunel University London and undergraduate studies at Thammasat University. Her research interests lie in the area of quantitative analysis, particularly econometrics on financial problems.

Vikram Parmar works as an Innovation Leader at the Faculty of Medicine and Health at NTNU, Norway. He is involved in converting high impact research into commercially viable ventures and integrate innovation within the educational curriculum. He has worked in India, the Netherlands, and African countries in the domain of health, sanitation, water, and circular economy.

Tor Helge Pedersen is an associate professor at Inland Business School, at Inland University College of Applied Sciences, Lillehammer, Norway. He received his PhD in political science from University of Tromsø in 2009. His main research areas are within public administration, organization and innovation.

Aura Pedraza-Avella is a professor at School of Business and Industrial Studies at Universidad Industrial de Santander, Colombia. She received her PhD in economic in 2010. She has been co-author of more than 20 scientific papers and has participated in about 15 international conferences. Her main research areas are entrepreneurship and labour economics.

Adriana Perez-Encinas is assistant professor in the Department of Business Organisations at Universidad Autónoma de Madrid, Spain. Adriana's main research interests focus on internationalization of higher education, university management & services, student mobility, employability and entrepreneurship.

Alexander Popov graduated from Moscow Institute of Physics and Technology with MSc in Economy of Innovations. He is a PhD student at the Central Economics and Mathematics Institute of the Russian Academy of Sciences.

Beata Poteralska, Assoc Prof, head of the Research Group on Innovation Management in the Łukasiewicz Research Network – Institute for Sustainable Technologies, Poland. Research interests: innovation management, foresight, technology transfer. Co-ordinator, executor and expert in 60 international and national projects (Horizon 2020, EIT Climate-KIC, FP7, FP5, COST, ERASMUS+, INTERREG). Author and co-author of 100 publications.

Sara Proença Pro-President of Polytechnic Institute of Coimbra for Innovation & Entrepreneurship. Adjunct professor at ESAC/Polytechnic Institute of Coimbra. Integrated member of CERNAS – Research Center for Natural Resources, Environment and Society. Ph.D. in Economics, ISEG/University of Lisbon, Portugal, 2013 M.Sc. in Applied Economics and Degree in Economics, Faculty of Economics/University of Coimbra, Portugal.

Andrey Pushkarev works as a senior lecturer at the Department of Economics and a researcher in UrFU. His research mainly focuses on innovations and productivity of firms in Russia. Apart from that, his scientific interests include agglomeration effects, econometrics and data analysis.

Ranvir S. Rai is an Associate Professor in Innovation and Entrepreneurship at Kristiania University College. He holds a PhD from BI Norwegian Business School. His research interests concern innovation processes, disruptive

innovation and use of design thinking as organizational capability. He has published in international journals; such as Information & Management and Service Industries Journal.

Frode Ramstad Johansen is an Associate Professor at Østfold University College in Norway. He heads the Uniped Research Group conducting research on education, learning and teaching at a university college level. His research aims at understanding how innovation processes unfold across organizational boundaries, he research spans sectors such as IT, energy, food industry, creative industries, municipal services and the health sector.

Maria Madalena Raptopoulos PhD Candidate and Research Assistant in Management – Strategy and Entrepreneurship at BRU/Iscte, MSc in Business Administration and MBA in Finance. Professional with large experience in public, private and Third Sector organizations in Management, Finance, Accounting, Auditing, Controllership, Strategy, Entrepreneurship, Governance and Leadership areas. She is interested in Third Sector, Social Economy and Corporate Social Responsibility.

António Rocha holds a PhD in Industrial and Systems Engineering and is an invited professor at IPCA – Polytechnic Institute of Cávado and Ave where he taught Project management, Logistics and Quality management. He has been an invited lecturer at other higher education institutons and a project and quality manager in industrial companies.

Dmitriy Rodionov, Doctor of Economics, Professor, the Director of the Graduate School of Industrial Economics, Peter the Great St. Petersburg Polytechnic University, Saint Petersburg, Russian Federation. The main interests - Regional Innovation Systems; Innovation Networks; Intellectual Capital.

Elena Rogova holds Doctor of Economics degree. Currently, she is a professor of Finance and a Dean of Saint Petersburg school of Economics and Management in Saint-Petersburg campus of National Research University Higher School of Economics (HSE University – Saint Petersburg). Her main research interests are in corporate finance, mergers and acquisitions, innovation, and venture capital.

Mag. Cristhian Rojas Suárez is a professor of academic research in marketing at Peruvian University of Applied Sciences, Peru. He received his magister degree in political science and a bachelor degree in communications from the Pontifical Catholic University of Peru in 2016 and 2010, respectively. Also has developed research on political communication, political participation and digital communication, being part of conferences at the national and international level.

Nikola Rosecká is Ph.D. student at the Department of Strategy, Faculty of Business Administration, Prague University of Economics and Business, with focus on non-family managers in family businesses.

Nibedita Saha , MBA, Ph.D working at University Institute, Tomas Bata University in Zlin as a Project Manager for EU projects and e-COST Action since 2012 and also associated as Lecturer at Faculty of Management & Economics (FaME). Associated with e-COST Action- CA 15216, CA 18236 and HRS4R Project. She published 39 research articles.

Svetlana Samovoleva, PhD, is a lead research associate at the Central Economics and Mathematics Institute of RAS. Her research subjects comprise innovation policy, knowledge diffusion, technology transfer and absorptive capacity. Her current research interests include machine learning with Python.

Navjot Sandhu is an Associate Professor within the Birmingham City Business School has extensive research publication within the domain of financing marginal farmers. Dr Sandhu is a peer referee for various international journals and served as an assistant Editor for JSBED (Journal of Small Business and Enterprise Development) for eight years. Currently, she is Finance subject group leading, managing, teaching at both undergraduate and postgraduate level courses, research active and also supervising PhDs

Juha Saukkonen, Dr.Sc. (Econ.), is a Senior lecturer of Management in the Business School of JAMK University of Applied Sciences in Jyväskylä, Finland. Saukkonen has published both individually and as part of multinational research teams in journals and conferences on topics of Foresight, Knowledge Management Anticipation and Entrepreneurial Learning and Education.

Olukemi Sawyerr, Ph.D., is the associate vice president of Academic Innovation and professor in the Management and Human Resources Department at California State Polytechnic University, Pomona, U.S.A. where she has founded multiple experiential learning entrepreneurship programs. Her recent research has focused on the impact of entrepreneurship education on learners.

Emelie Schwill is a Master's student at the University of Applied Sciences in Zwickau. She graduated with a Bachelor's degree in Public Utilities Management in 2019. She is also a research associate at Zwickau University of Applied Sciences in an international project for the development of a Master's degree programme.

Alessandra Scroccaro is a Post Doc researcher in challenge-based learning and entrepreneurship education at the Department of Economics and Management of the University of Trento, IT. She received his co-tutored PhD in geography and space management from Montpellier University and University of Padua in 2012.

Anca Șerban is an assistant professor at Lucian Blaga University of Sibiu, Romania. She has a PhD in Management from the same university. She has been involved in different projects regarding higher education and entrepreneurship, her areas of research being entrepreneurship, management, and investments.

Tebogo Sethibe is an IT professional with over 20 years' experience in ICT and Management Consulting. He is currently Group Executive: Information Systems at the Agriculture Research Council (ARC). In addition, Dr Sethibe is a part-time faculty member at the Unisa School of Business Leadership (SBL) and the Wits Business School (WBS).

Tereza Šímová is a PhD candidate at University of Life Science in Prague (CZU). She is also Open Science specialist at the Institute of Philosophy of the Czech Academy of Sciences. At the same time, she works in the Library CZU. Her main research areas are virtual teams, bibliometrics, meta-analysis and the reproducibility of science.

Katrin Singer is a research associate at the Division Corporate Management of Fraunhofer IPK, Berlin. She has experience in Business Model Development in the Aerospace industry with focus on start up's in space business incubators and with Latin American innovation networks. Her previous research focused on competence development in the area of digital entrepreneurship.

Mamta Singh (Prof) is an educationist by profession associated with Chandragupt Institute of Management Patna and worked as a corporate trainer as well . She holds a PhD. Degree from IIT Dhanbad. in Human Resource Management. Mamta is passionate about working for the upliftment of lower strata of society.

Pavlína Široká is a master-level student at Masaryk University, Department of Corporate Economy. She has been studying in the field of Business economics and Management for the past five years and focused on behavioral strategy in her thesis.

Yamuna V Sithambalam is an Instructor at American University of Phnom Penh, Cambodia. She received her MBA from UTM (Malaysia) in 2003 and is currently a doctorate candidate in Social/Sustainable Entrepreneurship field. Her main research areas are sustainable and social entrepreneurship, and presently analyzing the success of such business models in Cambodia.

Gudrun Socher Full professor at Hochschule München and head of the Munich Center for Digital Sciences and AI (Germany). She worked at tech companies including Yahoo!Inc. in the US and Germany. She holds a Ph.D. from Bielefeld University (Germany) with research at the California Institute of Technology and graduated in computer science from KIT Karlsruhe (Germany) and Grenoble University (France).

Maria Sotirakoglou is a PhD candidate in the Department of Balkan, Slavic, and Oriental Studies at University of Macedonia. She holds a B.A. in Social Policy and a second B.A. in Law. She also holds a M.A. in Continuing Education. Her research areas are entrepreneurship competences and migration.

Ingrid Souza holds a Master in Engineering Project Management and is a PhD student in Industrial Engineering and Systems. She has worked with logistics, planning and control of oil projects, and communication in project management and PMO in the automotive industry. She has several professional certifications including KMP II, Lean Six Sigma Green Belt, OKR.

Giulia Sparisci graduated from the University of Firenze and worked as a language teacher in Spain. She is now a student in Lifelong Learning and Adult Education at the University of Bologna and she is writing her thesis on the assessment of the university teaching quality. Furthermore, she works at the Department of Education of the University of Bologna.

Pankom Sriboonlue is a full-time lecturer of Management at Mahasarakham Business School, Mahasarakham University, Thailand. His area of expertise is entrepreneurship development in Small to Medium Enterprises (SMEs). His is particularly interested in research into strategic entrepreneurial awareness and its impact on business performance.

Gabriela Doina Stănciulescu is a PhD student at Doctoral School of Entrepreneurship, Business Engineering and Management, University 'Politehnica' of Bucharest. She has a Bachelor's Degree in Electronics, Telecommunication and Information Technology and a Master's Degree in Entrepreneurship, Business Engineering & Management, obtained within the same university.

Michele Stasa is Ph.D. student at the Department of Strategy, Faculty of Business Administration, Prague University of Economics and Business, with focus on social capital in family businesses.

Audrey Stolze Head of Entrepreneurship Research at Strascheg Center for Entrepreneurship and international program manager at Hochschule München (Germany). She received her Doctoral degree from University of Hohenheim (Germany) and graduated in business management from Hochschule Osnabrück (Germany) and Universidade Feevale (Brazil). She worked in Brazil, England and Germany with market research, international business development and founded two startups.

Mariette Strydom is a senior lecturer in the Department of Life and Consumer Sciences at the University of South Africa. Her research focus is apparel product design and development with special interest in small-scale apparel design and production and sustainable apparel entrepreneurship. She is passionate about empowering women for sustainable entrepreneurship opportunities in the apparel industry of emerging economies.

Sebastian Stümpfle obtained a Bachelor of Science in Business Administration from the University of Liechtenstein. Depside his studies in Liechtenstein he also gained academic experience in Spain and Taiwan. During his studies he founded an e-commerce start-up and is currently focusing on his venture. His research focuses on entrepreneurial intention and entrepreneurial role models.

Christian Sturm is a research associate at the accadis Institute of Entrepreneurship, Bad Homburg, Germany. Here, he is research is focusing on projects regarding social and female entrepreneurship. He is also a PhD Student at Northumbria University, Great Britain. His PhD is focused on innovation strategies in the pharmaceutical industry.

Jaume Teodoro is a professor of Entrepreneurship & Innovation at Tecnocampus (Universitat Pompeu Fabra-Barcelona). He is Telecom Engineer (Universitat Politècnica de Catalunya) and PhD in economics from Universitat de Girona. Also postgraduate in Design Thinking at University of California-Berkeley. His main research areas are in entrepreneurship determinants and entrepreneurship competencies.

Alison Theaker, 3rd Year PT PhD student at the University of Bath. Member of the Federation of Small Businesses (FSB) Taskforce for Women Entrepreneurs. Founder of ***The Spark***, providing coaching and mentoring for small businesses in the UK. Editor of the *Public Relations Handbook*, (6th edn 2020), co-author of the *PR Strategic Toolkit(2nd edn* 2017).

Kamila Tislerova is both University lecturer and companies' consultant in the field of Marketing and Business Development. The Eco issues have become important in business strategies and that is why Kamila is involved – to help companies to find their competition advantage (and students to be ready to do this).

Stephen Treacy is a lecturer of business information systems at Cork University Business School, Ireland. He received his PhD from University College Cork in 2016. His work has been published in several outlets including the Journal of Information Technology (JIT). His main research areas are open innovation, data compliance, and digital entrepreneurial ecosystems.

Şahika Burçin Tulukçu (Tatar, formerly). In 2009, I graduated from the department of Business Administration at Anadolu University. In studied my master and Ph.D. in Production Management and Marketing at Marmara University and I got my Ph.D. degree in 2018. Since then, I have been teaching marketing and production courses in both bachelor and master degrees.

Dr Thea van der Westhuizen (PhD; CPRP) Academic leader, Management and Entrepreneurship discipline at University of KwaZulu-Natal. Chairperson of Entrepreneurship Development in Higher Education (EDHE)'s community of practice for entrepreneurship learning and teaching. Multiple awards for Entrepreneurial /academic projects, locally/internationally. Founding director, Garden Route Tourism Academy, Tesen Tourism Planning & Paddle for Planet. Founded SHAPE (Shifting Hope Activating Potential Entrepreneurship), social technology for systemic action learning & action research. 20 years+ teaching experience in several countries.

Chanté van Tonder is young, passionate lecturer from the University of Johannesburg within the Department of Business Management and a PhD candidate completing a joint PhD degree with the University of Johannesburg and Vrije Universiteit, Amsterdam, with her thesis titled, Digitalisation of SMEs Business Models. Chanté is passionate about lecturing, specialising in entrepreneurship, business management, technology and innovation.

Zahra Vaslehchi. Born in 1983, in Tehran. Graduated with a master's degree in information technology management. I have been working in the field of information technology since 2011. I was a software project manager for 5 years and since 2016 I have been working in the field of innovation and entrepreneurship. So far, I have been the executive director and mentors of more than 10 online and in-person entrepreneur and more specialized mentors of student entrepreneur over the past two years.

Anna Veretennikova In 2008 the author graduated from the Ural State Technical University with the specialty "Management of Innovations". In 2013 Anna received PhD of Economics. Nowadays Anna conducts research in institutional economics in the sector of public goods, social innovations, sharing economy.

Marcia Villasana Ph.D. Tecnologico de Monterrey is full-time faculty at the Management and Leadership Department, School of Business, at Tecnologico de Monterrey (ITESM). She holds a Ph.D. in Public Policy from the School in Government and Public Transformation at ITESM. She is part of the National Researchers System in Mexico. Her research interests are in entrepreneurship, university-industry interactions, and innovation ecosystems.

Maxim Vlasov Assistant Professor, Ural Federal University, Ekaterinburg, Russia. Institute of Economics, Ural Branch of the Russian Academy of Sciences, Ekaterinburg, Russia

Marzena Walasik, PhD, director of finance and head of Commercialisation Department in the Łukasiewicz Research Network – Institute for Sustainable Technologies, Poland. Deals with finance, commercialisation and marketing activities. Research interests: transfer of knowledge and commercialisation of scientific research results. Finance co-ordinator, executor and expert in 20 projects, author and co-author of ca 20 publications.

Andreas Walkenhorst is the Head of the accadis Institute of Entrepreneurship. His research is focused on social and female entrepreneurship. In addition, he teaches entrepreneurship and supervises various research projects as well as Bachelor and Master Thesis at the accadis University of Applied Sciences.

Isaac Wanasika is a strategy professor and Management Chair, Monfort College of Business, University of Northern Colorado. Isaac's Ph.D. is in Strategy is from New Mexico State University. Prior to that he worked with Royal Dutch/Shell Oil. His book, Snapshots of Great Leadership, was recently published by Routledge. He has published in major research journals in the areas of strategy, innovation and strategic leadership.

Ignasius Heri Satrya Wangsa is a research fellow at the Management Department, Faculty of Business and Accountancy, Universitas Katolik Musi Charitas, Palembang - Indonesia www.ukmc.ac.id. His research interest is in consumer learning experience. He can be approached anytime at ig_heri@ukmc.ac.id.

Knut Ingar Westeren has been a Professor of Economics at Nord University in Norway since 2001. He teaches knowledge management, knowledge and competitiveness and public economics at Nord University. He has

numerous books and publications dealing with aspects of knowledge and competitiveness, the public sector and regional development.

Lynne Whelan's work in the innovation space has resulted in the creation of strategic frameworks for growth & innovation for senior management teams across multiple sectors. Lynne holds a master's degree in Design Driven Innovation and is currently undertaking a PhD in Strategic Design Processes for Innovation in University of Limerick.

Kira Willems is a student of the master's program in online communication at the Anhalt University of Applied Sciences in Bernburg, Germany.

Kazuko Yokoyama Professor Yokoyama is a Special Professor in the Faculty of Business Administration, Toyo Gakuen University, Tokyo, Japan. Her research is concentrated on Japanese Self-Initiated Expatriate Entrepreneurs and Human Resource Management.

Stig Ytterstad is a Senior Lecturer at BI The Norwegian Business School. He gives lectures in Leadership Development, Transformational Leadership, Coaching, and Change Management. Research focus is leadership development, transformational leadership and Learning styles. During the years he has been involved as a consultant in inhouse leadership development programs.

Volume Two

A Critical Evaluation of Contemporary Tools on Developing Innovative Thinking Competencies for Entrepreneurship

George Papageorgiou, Simona Mihai Yiannaki and Despina Varnava-Marouchou
European University Cyprus, Nicosia, Cyprus
g.papageorgiou@euc.ac.cy
S.Mihai@euc.ac.cy
D.Marouchou@external.euc.ac.cy
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Abstract: Multiple tools for supporting and enhancing entrepreneurial activity have been developed over the years. However, such tools tend to postulate a static view of the business environment, which is rather unrealistic and not particularly effective for evaluating ideas and identifying opportunities. To tackle this issue, a dynamic approach is proposed to support entrepreneurs in building a realistic future vision of their business. This is done by exploring present and future interrelationships among the most important business entities and their direct and indirect effects on business performance. The proposed approach is based on the work done on developing innovative thinking competences for Creative Arts entrepreneurship, which is a European project co-funded by the Erasmus + programme. The approach is comprised of several tools originating from systems theory which include Rich Pictures, Concept Maps, Systems Maps, Influence Diagrams and Causal Loop Models. These tools provide the opportunity for contemporary widely applied techniques to be enriched and supported by a dynamic and holistic analysis of the business environment. In this way a broader range of entrepreneurial competencies may be developed to fully support the European Entrepreneurship Competence Framework (EntreComp) leading to Innovative Thinking.

Keywords: innovation and entrepreneurship, business planning, creativity, entrepreneurship education, business dynamics, system dynamics, strategic management

1. Introduction

Entrepreneurial activity is a complex process that requires a multiplicity of skills and competencies. Especially effective entrepreneurship becomes quite challenging when considering the particularities of specific industries, such as those of providing creative arts products and services. Due to the complexity of the business environment, a number of tools have been developed through the years that support entrepreneurs to make their mental models explicit in order to generate and share their ideas. Such tools include the widely applied Business Model Canvas (BMC); Political, Economic, Social, Technological, Legal, Ecological (PESTLE) Analysis; the Porter's five forces model for assessing industry profitability, Value Chain Analysis, Strengths Weaknesses Opportunities, Threats (SWOT) Analysis. These tools are described in more detail and they are critically evaluated in the.

Despite their wide applicability, such tools present a static view of the business world, which is rather unrealistic and prone to an erroneous depiction of the entrepreneurial environment. For example, the Business Model Canvas (BMC) provide a reductionist view of the current business environment, which fails to consider the complex interrelationships among key business entities. Ignoring such relationships creates a naïve view of the marketplace, which would negatively influence effective entrepreneurial decision making. This may lead to wasting resources, fads development and business failure. Hence, it would be crucial for entrepreneurs to be able to explore relationships between key partners, activities, resources and customer segments before making any business decisions.

Even though the BMC and other contemporary tools provide a good starting point in analysing the business environment they restrict entrepreneurial thinking to a reductionist view of the business world. They look at the business environmental elements as separate entities, while the real business world is a complex web of interrelationships. Further the BMC and other tools are heavily influenced by the past and present instead of the future in developing a viable vision for the business. As a result, currently widely applied entrepreneurial tools do not really help in identifying unexpected events or changes that are bound to exist in a free market economy. In spite of the fact that contemporary tools are good in identifying some of the most important business entities, they fail to explore business interrelationships, which could be very significant for innovative thinking and the development of a successful entrepreneurial venture.

The next section provides a critical evaluation of the main tools for supporting innovative thinking in Entrepreneurship and Business Planning. This is followed by a suggestion to remedy the inadequacies identified, which is based on ideas from deep learning and a systems approach to support innovative entrepreneurial thinking. Finally, the implications for entrepreneurs are discussed and conclusions are drawn.

2. Review on current tools for supporting entrepreneurship

Many tools have been developed through the years to support entrepreneurs for better understanding their own business and evaluating the business environment. The most widely world known tools include PESTLE, Porter's five forces, Value Chain Analysis, SWOT analysis, and the Business Model Canvas. These are reviewed on their effectiveness in the following subsections.

2.1 Traditional tools for business analysis

2.1.1 PESTLE analysis

Political, Economic, Social, Technological, Legal, Ecological (PESTLE) Analysis (Christodoulou & Cullinane 2019) is a tool used for analysing and monitoring external environmental factors which might have a significant indirect effect on the entrepreneurial venture. PESTLE analysis aims at identifying business opportunities and threats for adapting the business to market changes in a timely manner. Indirectly, the results of PESTLE analysis indicate opportunities and threats, which may later be addressed in SWOT analysis, as one of the basic tools (Kolios & Read, 2013) for defining organizational strategy (Marinovic & Matovic, 2020).

PESTLE is simple and easy to understand and use. On the other hand, it allows its users to over-simplify the data that is used and thereby it is quite possible to miss important information. PESTLE generally helps in understanding the business environment and identify to some extend business opportunities and possible threats. However, PESTLE analysis needs to be updated regularly to be effective. The requirement for continuous access to a variety of updated data sources could be time consuming and expensive. Further, PESTLE depends on many assumptions which may not necessarily be true. The most important criticism arises from the fact that the business environment is changing drastically. Thus, it is becoming increasingly difficult to have an accurate picture of the real world and to anticipate developments.

2.1.2 SWOT analysis

SWOT (Humphrey, 2005) refers to Strengths, Opportunities, Weaknesses and Threats for the entrepreneurial venture operating in a competitive business environment. The framework is used to reinforce any business' strategy by evaluating the strengths and weaknesses, and identifying the potential opportunities and threats within the business's marketplace.

Despite, the universal use of this approach, there are several limitations regarding its effectiveness, which are related to the reductionist view that is also present in the PESTLE analysis. As a result, there would be failure in realistically portraying the external business environment and the internals of the entrepreneurial venture. Missing the overall picture and the web of business interrelationships which includes cause/effect feedback loops among business entities would lead to a view that is too simplistic and of no particular value.

2.1.3 Porter's five forces model

Porter's five forces (2008) refers to rivalry between existing competitors, threat of new entrants, power of suppliers and buyers, substitute products and services. The framework is based on the perception that a business strategy should encounter the opportunities and threats in the organization's external setting. A competitive strategy should then rest on an understanding of industry structures and the way they change. Porter argues that the aim of the strategist is to recognize and handle a competitive environment by directly looking at competitors, or to contemplate a broader perspective that competes against the organization.

Porter's five forces model seems to offer valuable suggestions as to where the challenges and threats to for a business are most likely to occur through an examination of substitutes. However, Porter's model has a difficulty in integrating the complexities of today's markets with the highly frequent inter-relationships among business entities. Further, the multiplicity of product lines requires a holistic approach for analysing the business environment. If the entrepreneurial venture defines its market segment too narrowly to fit into the Porter's

model there is a risk that key business elements may be overlooked. Despite this, Porters Five Forces model has a role to play in helping management to evaluate and assess their current market environment. It provides a foundation for the further research and intelligence gathering needed to formulate an organization's future strategy.

2.1.4 Value chain analysis

Porter gave us also another important tool for internal business analysis. The value chain model separates primary business activities from support activities. Concentrating on Primary activities would allow the company as a whole to gain competitive advantage. Secondary activities which in some cases are wasteful may create unnecessary bureaucracy and high cost hindering the company from getting a lead in the market. Porter thus suggests that by focusing on the value-creating activities would be a source of completive advantage in multiple areas such as a lower cost of manufacturing and thereby create the opportunity to charge higher prices. Moreover, focusing on primary activities would create a better brand name and a faster response to environmental changes. However, there is problem of too much focus on the value chain model. Specifically, a company's overall strategy and vision is lost in the 'reductionist approach' of braking down the main operations/activities into multiple segments. Further, conducting this type of analysis would require many assumptions which are not necessarily true.

2.1.5 Business model canvas and lean start-ups

Probably the most widely used tool for entrepreneurs in recent years is the Business Model Canvas and its variant the Lean Business Model Canvas. The BMC suggest that the entrepreneur examines: Key Partners, Key Activities, Key Resources, Value Propositions, Customer Relationships, Customer Segments, Channels, and Cost Structure. The BMC have been recently updated in Business Model Change (Balocco et al., 2019).

The Lean Start-Up concept (Bocken, & Snihur, 2020) has also introduced a common vocabulary for discussing start-up activity, and has provided a number of useful tools and concepts, including the business model canvas, the minimum viable product, customer development, validation, and pivoting. The business model canvas is closely linked to the concept of a business model (Chesbrough, 2010; Massa et al., 2017). However, the BMC lacks specificity in helping start-ups create plausible competitive strategies.

Despite its universal use the BMC like the other tools do not account for the complex interrelationships which exist among the main business entities. Never the less it is a comprehensive approach, which helps the entrepreneur in concentrating on the most important elements of the business environment. Hence, it can be used as a starting point that would require further analysis. The BMC can thus be enhanced with an alternative to the reductionist approach which is offered by systems thinking and system dynamics tools discussed in the subsequent sections. In this way entrepreneurial thinking would become more realistic and innovative leading to spotting valuable ideas and opportunities. Such competencies are also part of the European entrepreneurship Competence (EntreComp) Framework, discussed next.

2.1.6 The Entrecomp entrepreneurship competence framework

Worthwhile of consideration is a European Union framework for Entrepreneurship, the so called EntreComp. The European Commission has developed EntreComp in 2011, as the European Entrepreneurship Competence Framework, which became a reference framework to describe in an organised way what entails an entrepreneurial mind set (Bacigalupo et al, 2016). The EntreComp framework, presents synthetically and under a progressive method, the advancement on three main categories of competences, grouped under: ideas and opportunities, resources and 'into action'. These categories include fifteen competences which can be adapted and tailored depending on the business characteristics and demands.

EntreComp's aim is to stimulate and support the understanding and development of the most important competences in any particular entrepreneurial environment or setting. Moreover, the framework has been in use since 2016 to define and enhance both policy and practices in various sectors. The main objective is to lead further innovation, economic prosperity triggered by higher employability, interactive and lifelong learning, active citizenship, inclusion and equal opportunities.

There are 5 key building blocks to understanding EntreComp: definition, areas, competences, threads and progression levels. The learning process can go through multiple levels: foundation, intermediate, advanced and expert level. The benefit of applying the framework is that it can support the education system by monitoring the degree of entrepreneurship skills accumulated in various learning activities. However, the choice of tools to be used in developing the key competencies would be of primary importance for an effective application of the EntreComp framework. The main suggestion in this paper that the traditional 'reductionist' tools are replaced or enriched with holistic systemic tools. This would contribute to innovative entrepreneurial thinking and develop many of the required competencies of the EntreComp framework.

2.1.7 Synopsis

Traditional tools in evaluating an entrepreneurial problem situation have been in use for many decades but they merely support a static view of the business world. As shown above, the range of competencies that EntreComp promotes cannot be fully acquired by merely utilizing the currently widely applied tools. Unless emphasis is given on understanding the web of interrelationships present in any entrepreneurial venture it would be difficult to develop a set of really valuable competencies. Such an approach demands holistic systems thinking which is not very much supported by current tools.

Despite their popularity, these tools have significant limitations as shown in the above subsections. Specifically, all the aforementioned tools fail to capture the interrelationships among important business entities and also fail to see things as they develop in the future. Therefore, a new approach is necessary for analysing the entrepreneurial landscape. This approach is developed and discussed in the next section.

3. A systems approach for innovative entrepreneurial thinking

An alternative to the reductionist approach, which is more or less common to the traditional analysis tools discussed in the previous section, is to take a holistic systems viewpoint in order to explore the entrepreneurial landscape. One of the most prominent methodologies that would overcome some of the drawbacks of the traditional tools reviewed above is Systems Thinking or more specifically the System Dynamics approach.

The System Dynamics (SD) modelling approach was introduced by Jay Forrester, in the mid 1950s, and it was described as a method that uses 'computer simulation models to illustrate how known structures often produce unexpected behaviours' (Forrester, 1996). SD offers participants an opportunity to practice their communication and leadership skill, and in doing so gain a deeper understanding of a given situation. Based on the experience with previous projects (Papageorgiou and Demetriou, 2020; Papageorgiou, 2010), the system dynamics modelling approach offers great support in identifying business opportunities and testing plausible strategies prior to implementation. Entrepreneurs can be greatly supported in trying out new ideas via causal feedback loops modelling or even through a simulated experimentation process. This would significantly reduce the high failure rate of start-ups and the wasteful creation of fads.

3.1.1 Systems thinking and system dynamics in entrepreneurship education

Over the decades, System Dynamics has been proven to be a powerful method not only in research and in decision making, but also in the area of education. More recently, System Dynamics has been even used as a teaching tool assisting teachers and students alike, to better understand the dynamic behaviour involved in the process of developing skills (Mäntylä, 2011). In fact, most people think in linear, static and non-feedback way, which is not what is actually happening in reality. For example, when people need to solve a particular problem, they decide on an action, expect a result, and believe that is the end of the problem. A far more realistic perception would be one in which a problem leads to action which produces a result that creates future concerns and actions. In other words, there is no beginning or end. This approach requires a nonlinear way of thinking and a method of teaching by enabling connections and feedback between the parts of the whole system under investigation. Moreover, this nonlinear way of thinking requires students to be actively participating during the learning process by creating explicit diagrammatic models of reality.

As Seel (2018) suggested, SD is "making thinking visible" and in doing so it enhances advance learning by encouraging students to create their own visual representations of a specific issue. Seel cites research involving students who created system dynamic visualizations of their mental models for a science project. It was proven that the students who used SD visualisations outperformed students who created merely static visualizations based on traditional tools. This shows the effectiveness of the SD approach.

This implies, SD is particularly suitable for the development of entrepreneurships skills for several reasons. Firstly, SD requires learners to present their entrepreneurship ideas using different visual representation models. This gives students a holistic view of what is required by newly formed entrepreneurial ventures. Secondly, the standard systems analysis and design approaches are often unable to deal with the socio-political factors that could be the source of a given problem situation (Checkland, 1981). Thirdly, the use of these models makes it possible to identify the interconnections between important business entities using graphical displays.

3.1.2 Learning approaches and their relevance to the proposed dynamic approach to entrepreneurship

Citing Ausubel's (1968) famous quotation "Ascertain what the learner already knows and teach him accordingly", Mintzes, (1998) states that graphic representation models can help to achieve both of these objectives; they can assist in establishing what the learner already knows, and they can help organize and extend that knowledge in a visual representation. This fits well with Kolb's experimental learning theory.

It seems that System Dynamics is very much related to Kolb's experimental learning theory and Bruner's method of discovery learning. Kolb's experimental learning theory (1984) suggested a learning process which is presented over time through a learning cycle. The learning cycle begins with a particular action and by observing the effects of this action, the activity leads to a much deeper learning of a given situation.

Bruner's discovery learning (1961) is a method that encourages self-guided learning behaviour. As argued by Bruner, students interact with their environment by discovery and through debates, they are able to perform their own investigation. Discovery learning takes place in situations where problem solving is required. Both Kolb's experimental learning theory and Bruner's discovery learning theory led to the later theory of Deep learning initiated by Marton and Sljo (1984) and by Trigwell and Prosser, (1999), who have demonstrated that students learning approaches can be categorised as surface or deep learning. Deep learning approaches are characterised by the intention to seek meaning and to establish relationships between areas of knowledge, whereas surface learning approaches aimed only to memorise and reproduce knowledge. Only deep learning approaches have been found to lead to high quality learning. Students can be encouraged to assume a deep learning approach if the contextual factors are associated with a student-centred approach.

4. Discussion - conclusion

The high complexity involved when engaging in entrepreneurship demand new tools that promote innovative thinking and thus increase the chances for successful entrepreneurial ventures. It seems to be impossible to understand and effectively teach entrepreneurship by merely using traditional tools of the reductionist approach. A way of dealing with the multiple interrelationships found in any entrepreneurial problem situation is to use is to use systems thinking and system dynamics. Such a way of thinking would promote innovative entrepreneurial thinking and the effective development of key entrepreneurial competencies e.g. spotting real opportunities and evaluating new ideas. Further, a systems approach would facilitate deep learning and effective teaching.

Deep learning is often associated with student – centred learning which is also a key component of System dynamics. It is specifically suited to making mental models explicit via modelling and simulation. When students construct their own models, they can learn at their own pace and develop their own rules to simulate ideas and discussions. Entrepreneurship students would be actively encouraged to place their pieces of information they learn, into a framework of several graphical models and apply it, while modelling, thinking and reflecting at the same time. Thus, the proposed systems approach can facilitate deep learning.

The proposed approach would be comprised of several tools originating from systems theory which include Rich Pictures, Concept Maps, Systems Maps, Influence Diagrams and Causal Loop Models. The approach is described in detail and applied in the case of the creative arts industry and specifically for organizing an International Film Festival in a second article by the authors which is presented in this conference. Further work on applying system dynamics tools is to be carried out for other similar entrepreneurial ventures dealing with creativity related businesses.

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References

Ausubel, D. P., (1968) Educational psychology: A cognitive view. New York: Holt, Rinehart & Winston.

Bacigalupo, M., Kampylis, P., Punie, Y. and Van den Brande, G. (2016). EntreComp: The entrepreneurship competence framework. Luxembourg: Publication Office of the European Union, 10, 593884.

Balocco, R., Cavallo, A., Ghezzi, A. and Berbegal-Mirabent, J. (2019) "Lean business models change process in digital entrepreneurship", Business Process Management Journal, Vol. 25 No. 7, pp. 1520-1542.

Bocken, N., and Snihur, Y. (2020) Lean Startup and the business model: Experimenting for novelty and impact. Long Range Planning, Vol 53, No. 4, 101 953.

Bruner, J. S. (1961) The act of discovery. Harvard Educational Review, No. 31, pp21–32.

Checkland, P. (1981) Systems Thinking, Systems Practice. Wiley.

Chesbrough, H. (2010) Business Model Innovation: Opportunities and Barriers, Long Range Planning Vol. 43, Issue 2–3, April–June 2010, pp.354-363.

Christodoulou, A. and Cullinane, K. (2019) Identifying the main opportunities and challenges from the implementation of a port energy management system: A SWOT/PESTLE analysis. Sustainability, Vol 11, No. 21, pp 60-75.

Humphrey, A. S. (2005) SWOT analysis. Long Range Planning, Vol 30, No. 1, pp 46-52.

Kolb, D. A. (1984). Experimental learning experience as the source of learning and development. Englewood Cliffs: Prentice-Hall.

Kolios, A., Read, G. (2013) "A Political, Economic, Social, Technology, Legal and Environmental (PESTLE) Approach for Risk Identification of the Tidal Industry in the United Kingdom." Energies Vol 6, No. 10, pp 5023- 5045

Mäntylä, T. (2011) Didactical Reconstruction of Processes in Knowledge Construction: Pre-service Physics Teachers Learning the Law of Electromagnetic Induction. Research in Science Education, DOI 10.1007/s11165-011-9217-6.

Marton, F. and Saljo R. (1984) "Approaches to learning", in Marton, F., Hounsell, D.J., and Entwistle, N. J. (eds.), The Experience of Learning. Edinburgh: Scottish Academic Press, pp. 36-5

Massa L., Tucci, C.L., Afuah A. (2017) A Critical Assessment of Business Model Research, Academy of Management Annals, Vol. 11, No. 1, pp 73-104

Papageorgiou, G. (2010) Toward a system dynamics modelling framework for effective political organization management strategies. Journal of Political Marketing, Vol 9, No 1-2, pp 55-72

Papageorgiou, G., and Demetriou, G. (2019) Investigating learning and diffusion strategies for sustainable mobility. Smart and Sustainable Built Environment, Vol 9, No. 1, pp 1-16.

Porter, M.E. (2008). The five competitive forces that shape strategy. Harvard Business Review, Vol 86, No 1, pp 25-40.

Seel, N. M. (2012) Learning Through Creating. In: (eds) Encyclopedia of the Sciences of Learning. Springer, Boston

Trigwell, K. and Prosser, M. (1999) "Relations between teachers' approaches to teaching and students' approaches to learning." Higher Education Vol 37, pp 57- 70.

A System Dynamics Approach to Entrepreneurship Applied to the Case of the Creative Arts Industry

George Papageorgiou, Simona Mihai Yiannaki, Despina Varnava-Marouchou, Tasos Anastasiades, Sofia Hadjipapa-Gee and Demetra Englezou
European University Cyprus, Nicosia, Cyprus
g.papageorgiou@euc.ac.cy
S.Mihai@euc.ac.cy
D.Marouchou@external.euc.ac.cy
t.anastasiades@euc.ac.cy
s.hadjipapa@euc.ac.cy
d.englezou@euc.ac.cy
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Abstract: This paper presents a new approach for innovative entrepreneurial thinking by integrating a number system thinking and system dynamics tools. The proposed approach is applied in the case of the creative arts industry, where it is demonstrated how from a static picture provided by a traditional tool such as the Business Model Canvas (BMC) we can get to a dynamic model with causal feedback loops among the main elements of the business environment. Such a system dynamics model would significantly support spotting opportunities, enhancing creativity, and valuing ideas in order to promote innovation and differentiation. This is in line with the work done on developing innovative thinking competencies for Creative Arts entrepreneurship, which is a European project co-funded by the Erasmus + programme. Such innovative thinking competencies would also support the European Entrepreneurial Competencies Framework (Entrecomp). As a result new business strategies may be formulated and explored on their future effectiveness prior to implementation. Further, the proposed approach would be useful for finding ways to accelerate the diffusion of innovation by configuring important variables, such as advertising and promotion expenditure, as well as investing on building a brand name via good reputation. Such a systemic configuration would increase product/service adoption rate, which in turn would increase the chances for survival and prosperity of the entrepreneurial venture.

Keywords: innovation and entrepreneurship, creative arts industry, entrepreneurship education, business dynamics, system dynamics, strategic management

1. Introduction

Contemporary tools for entrepreneurial thinking and business analysis tend to postulate a static and over simplistic view to the highly complex entrepreneurial problem situation. This issue is investigated in another article presented by the authors in this conference. Despite the popularity of tools such as PESTLE analysis, the five forces model, SWOT analysis or even the Business Model Canvas (BMC) fail to capture the web of interrelationships and non-linear feedback loops present in the entrepreneurial landscape.

In order to overcome some of the limitations of contemporary tools, this paper proposes a systems approach whereby a set of tools is incorporated in a framework suitable for promoting innovative entrepreneurial thinking. Such an approach would significantly support the wider development of entrepreneurial competencies such as spotting opportunities, enhancing creativity, developing a vision, and valuing ideas according to the European Entrepreneurship Competence Framework (EntreComp) (Bacigalupo et al., 2016).

The proposed approach is applied for the case of the creative arts industry, where we test its effectiveness via the testimonials of experts and educators in the field. Specifically, the approach is applied in the case of an International Motion/Film Festival (IMF), where a series of systems thinking models are created for innovative entrepreneurial thinking. These models include Rich Pictures, Concept Maps, Systems Maps, Association Maps and Influence Diagrams. This is part of the work done on developing innovative thinking competences for Creative Art entrepreneurship, which is a European project co-funded by the Erasmus + programme.

The next section provides a description of the proposed Entrepreneurship system dynamics approach/framework. Next the framework is applied for the case of the creative arts industry, where a variety of models are created, providing a more realistic view of the entrepreneurial system problem situation. Finally, a discussion is carried out on the prospects and implications of the proposed approach to entrepreneurship.

Specifically, the usefulness of the proposed entrepreneurial tools are explored based on educators and experts' opinions from the creative arts industry, where their experiences from applying the framework are presented.

2. The proposed method: The system business dynamics approach for entrepreneurship

As discussed above Systems Thinking and System Dynamics could substantially support entrepreneurial thinking. Notably, a systemic approach would be beneficial not only for entrepreneurs and the business venture but also for the environment and sustainability due to its holistic nature. Thus, opportunities related to social entrepreneurship may be identified that would generally be ignored by other methods of analysing the business environment. System dynamics would support the understanding of complex issues and facilitate synthesizing holistic solutions to business problems. Thus a System Dynamics approach may prove to be useful in overcoming some of the limitations of traditional tools, such as the BMC.

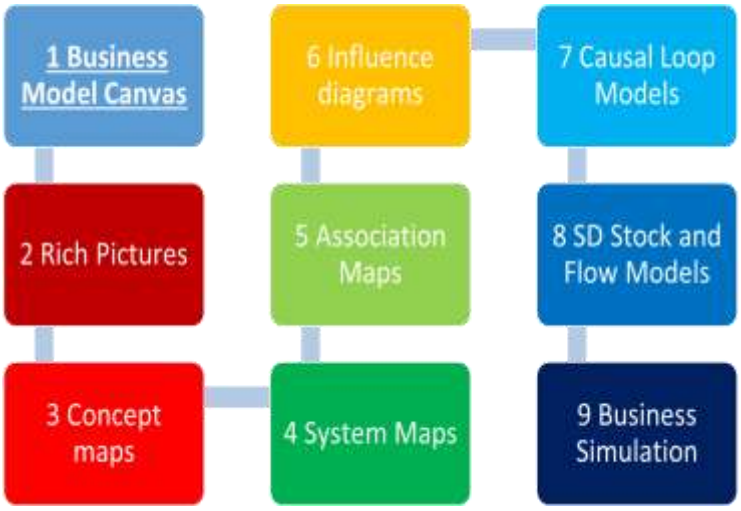

Figure 1: The proposed entrepreneurship business system dynamics approach

It is worth noting that previous projects carried out by the authors (Papageorgiou and Demetriou, 2020; Papageorgiou, 2010) have been used as a basis for the development of the proposed approach. Particularly, a framework is proposed in this paper comprising of nine steps, which are shown in Figure 1. The proposed framework starts with Step 1 by collecting the available information from traditional approaches such as the BMC. The second step takes this information one level further to show interrelationships among the main elements of the BMC using Rich Pictures. Next, concept maps provide some structure in the information that can be drawn from the rich pictures. Going further, a systems map will clarify the domain of interest by putting a boundary on the variables that are most important for the entrepreneurial venture. Next, association maps would show which variables are mostly related. Taking this a step further, influence diagrams would show cause and effect relationships. To create a more realistic model, Step 7 makes use of causal loop diagrams to identify feedback that is created as a result of the most important interrelationships among business entities. For further clarification of the variables associated in our business model, Step 8 distinguishes among stocks and flows. Stocks accumulate over time, such as the number of customers, while flows have an effect on this accumulation. The final step makes use of business simulation where strategies may be tested prior to implementation in a computerized environment. The nine steps of the proposed framework are explained in more detail in the following section where it is applied in case of the creative arts industry.

3. Applying the proposed system dynamics approach in the creative arts industry

In this section the proposed method is applied for the case of the creative arts industry. Specifically, the first six steps of the proposed approach are implemented for an International Film Festival, which takes place in Cyprus every year. Such venture falls in the sector of the Creative Arts Industry which is explained next.

3.1 The creative arts industry

According to UNESCO (2012), Cultural and Creative Industries refers to "the creation, industrial reproduction and mass distribution of cultural works". Through the years ways of creating, producing and distributing cultural products have drastically changed and the Cultural industries have "incorporated, in addition to adapting to

technological advances and the evolving place of media in society, sophisticated production processes and large-scale distribution methods to reach global markets"(UNESCO, 2012).

In the 1990s, this concept developed as "the creative economy", in the UK and Australia, which presents creativity as "the engine of innovation, technological change and as a comparative advantage in business development" (UNESCO, 2012). These industries were defined in the United Kingdom as "those industries which have their origin in individual creativity, skill and talent which have a potential for job and wealth creation through the generation and exploitation of intellectual property" ('Creative Industries Mapping Document', DCMS, 2001).

Even though the term changes in time or in various countries depending on the cultural polices, all of these concepts have in common the theme of creativity and copyright. Human creativity is the source of cultural and creative industries goods and services.

The DCMS (2017) definition recognizes nine creative sectors, namely:

- Advertising and marketing
- Architecture
- Crafts
- Design: product, graphic and fashion design
- Film, TV, video, radio and photography
- IT, software and computer services (if they produce copyrighted material, such as apps)
- Publishing
- Museums, galleries and libraries
- Music, performing and visual arts

Therefore, the term is not limited to only the output of human creativity and industrial reproduction but includes other activities that contribute to the creation and distribution of cultural and creative products.

3.2 Case in point: The International Film Festival of Cyprus

The International Motion Festival (IMF, 2021) is organized by the Department of Arts of the European University Cyprus in Nicosia, Cyprus, and it is a biannual International Event. The IMF 2019 hosted 15 speakers and 4 masterclasses and workshops from Europe, USA, Canada and Cyprus. The IMF aims to open a forum for the presentation of the most contemporary and most creative work in the world of motion and thus to be established as the Pioneering Festival that promotes innovative and cutting-edge work.

It is a platform for showcasing innovative motion art videos, spanning from motion graphics, to 2D and 3D animation, video art, and shorts. The IMF welcomes productions from all over the world and Prizes are awarded to the best entry in each of the 4 competition categories:

- Go with the Flow (Motion Graphics, Music Videos, Commercials, Opening Titles, 3D Mapping, virtual museums and archives, Computer Generated Imagery, Broadcast Design)
- Animatropics & Animesh (2D & 3D Animation, manual or computer aided, ranging from hand drawn, sand and glass animation, digital, retro, etc)
- Short & Sweet (New and awarded short films, ranging from drama, comedy, social commentary, and experimental film)
- The Single Channel Show (Video Art presented with single channel works. Experiments pushing the limits of the moving image)

The European Union has awarded the International Motion Festival the EFFE label, three times in a row, including it among the European festivals "that stand for artistic quality and have a significant impact on the local, national and international level". Organizing successfully the IMF is an entrepreneurial venture itself that requires a good understanding of the business environment. This will only be achieved by the enhancement that the proposed

approach provides by adding the dimensions business relationships, dynamicity and feedback to the static view that we get from the traditional entrepreneurial tools such as the Business Model Canvas.

3.3 Rich pictures - towards a dynamic analysis of the business environment

Initially the business environment of the International Film Festival, was analysed by using the Business Model Canvas. This preliminary analysis provided a source of initial static information to be later enhanced by the proposed systems thinking tools. Specifically Rich Pictures are the first interactive models to be used in the System Business Dynamics Approach for Creative Arts Entrepreneurship. Rich Pictures, were introduced by Checkland (1981) as part of Soft Systems Methodology. They are now a well established systems development tool, but has not yet been extensively used in teaching or entrepreneurship. We use the Rich Picture (RP) as the initial tool because the RP will enable entrepreneurs to reflect as much of what's going on in a problem/opportunity situation presuming a particular point of view. In a rich picture entrepreneurs could simply place anything that comes into their minds.

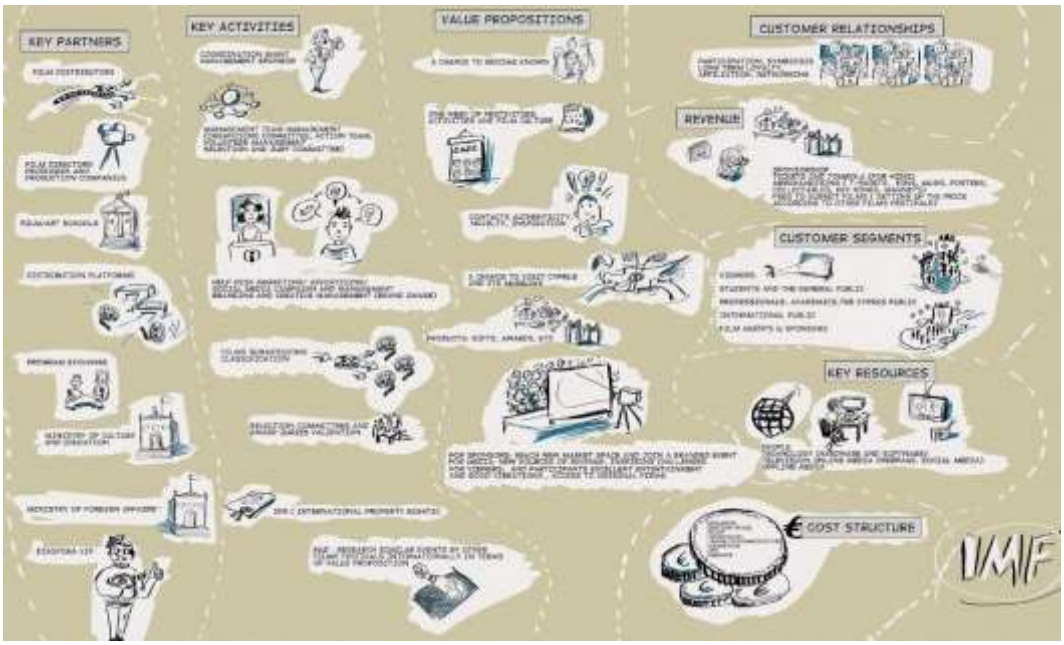

Figure 2: A Rich Picture for the International Film Festival as an enhancement to the business model canvas

An example of a Rich Picture shown on Figure 2. The previous static view provided by the BMC becomes now more interesting. The rich picture shows now prospective interrelationships among business entities and the element of movement and dynamicity is now more explicit. Entrepreneurs can start with an initial version of Rich Picture by simply relying on the information they get from the BMC. The Rich Picture can be further enriched by crossing the artificial boundaries imposed by the BMC. In this way areas of concern may be identified and the most important elements of the business environment may be highlighted. There is no need to worry about any structure when drawing a rich picture. The structure to the entrepreneurial system will come from the concept mapping step, which specifies a hierarchical relationship among the most important business entities.

3.4 Concept maps

The use of concept maps has indicated that numerus benefits can be achieved by applying visual techniques which foster the graphic re-construction of knowledge, (Novak, 1991). Its basic characteristics, make it an ideal tool for entrepreneurs especially during the idea generation and idea valuation stages. Concept maps were the result of a research undertaken in the 1970s at Cornell University by Joseph Novak – an American Educator and Research Scientist who found the concept mapping as an effective way of learning. Over the years Concept mapping has proven to be highly successful in business analysis and is specifically suitable for start-ups and entrepreneurs. This is because, like Rich Pictures, Concept maps are self-explanatory and are able to present information in an organized manner.

Figure 3: A concept map for the International Film Festival providing some structure to the Rich Picture Model

An example of Concept map is shown in Figure 3 where some structure is imposed on the previously created Rich Picture. Further, the hierarchical relationships are depicted among the most important elements of the international film festival venture. Note that we can now have a better understanding of the complexity involved in the entrepreneurial landscape.

3.5 Systems and association maps

Further to concept maps, systems maps filter the main business entities that worth more consideration and clarify the boundary between endogenous and exogenous elements. A system map shows the components and boundaries of a system and the components of the environment at a point in time. A system map is basically a list of components in a graphical form separated by a dotted line which signifies the boundary of the entrepreneurial venture. Such a graphical representation is easier to be assimilated and shared within a group than just a bunch of text. As a result, systems maps are helpful to structure a system and communicate the result to others. An example of a system map is shown in Figure 4, where the most important business entities are depicted as Blobs. Further the dotted line signifies the boundary between endogenous and exogenous variables.

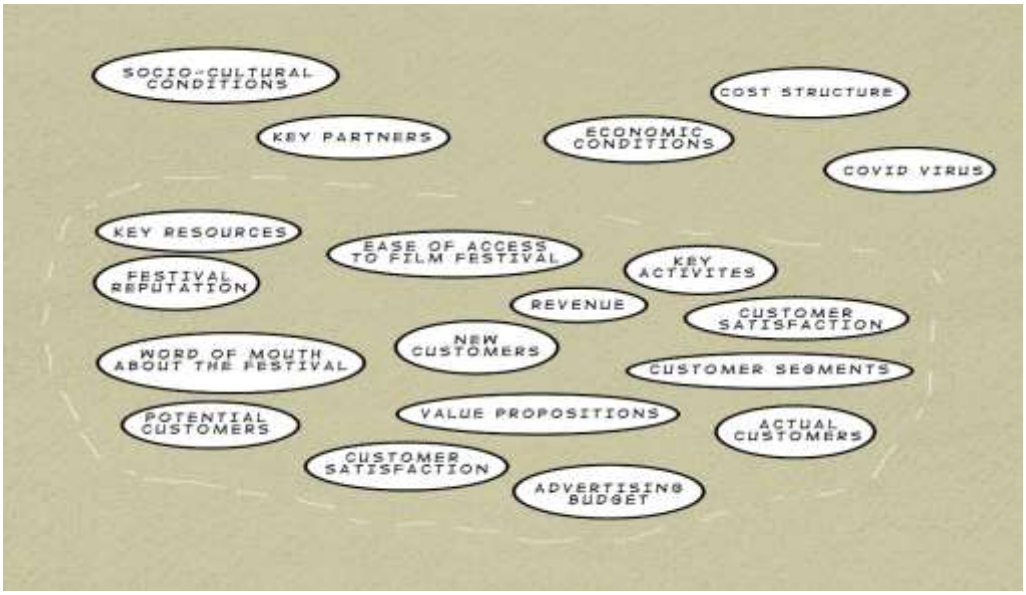

Figure 4: A systems map for the International Film Festival venture providing some structure to the Rich Picture model

Systems maps allows for clarifying thoughts at an early stage of business analysis. They could also help entrepreneurs decide upon the main business structural elements, experiment with boundaries, decide on the level of interest, and communicate to others the basic structure of the system. The elements of systems maps are text descriptions of the main business entities which are enclosed in blobs. Linking between the elements of the system under investigation is carried out in the next step using association maps (Elsawah et al., 2017). Figure 5 shows such an association map for the international film festival where the main relationships between the main business entities are depicted using straight lines.

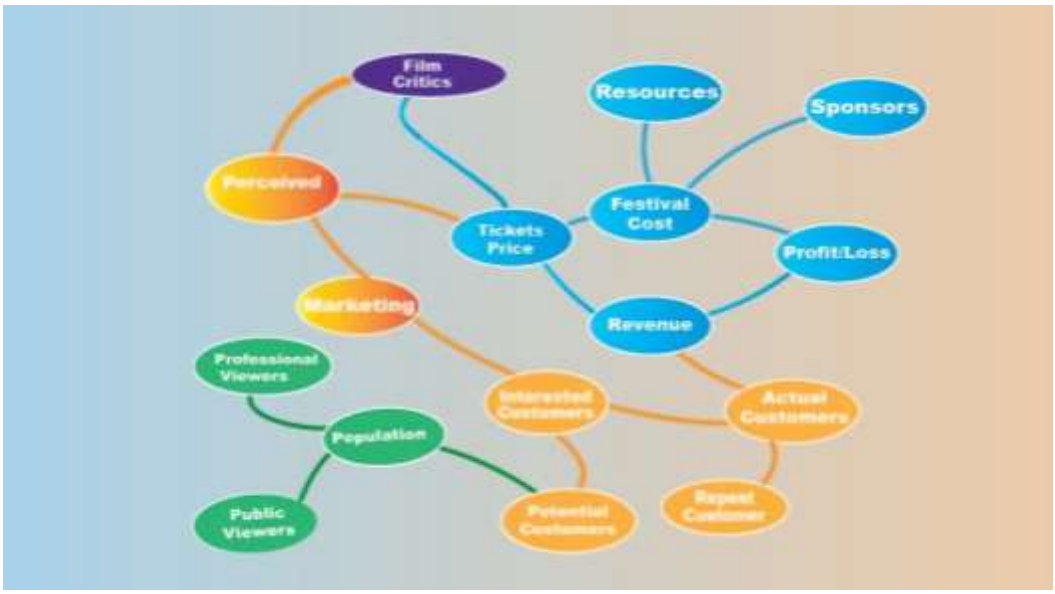

Figure 5: An association map for the International Film Festival showing the main interrelated business entities

3.6 Influence diagrams

Influence diagrams also called a relevance diagrams, decision diagrams or a decision networks are a compact graphical and mathematical representation of a decision situation. It is a generalization of a Bayesian network in which not only probabilistic inference problems but also decision making problems (following the maximum expected utility criterion) can be modelled and solved. It is now adopted widely and becoming an alternative to the decision tree which typically suffers from exponential growth in number of branches with each variable modelled. An Influence Diagram is suitable for team decision analysis, since it allows incomplete sharing of information among team members to be modelled and solved explicitly. Extensions of Influence Diagrams also find their use in game theory as an alternative representation of the game tree.

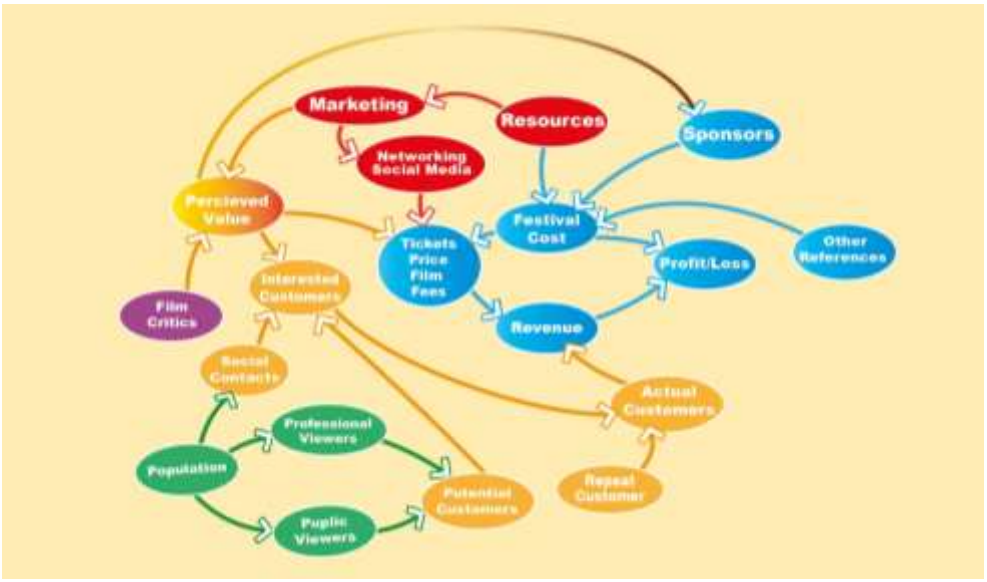

Figure 6: An influence diagram for the International Film Festival showing plausible causes and effects

An influence diagram for the International Film Festival is depicted in Figure 6. The influence diagram distinguishes the cause effect relationships among important elements of the entrepreneurial system under investigation. For example we can see in the diagram that marketing is bound to influence perceived value which in turn would create interest and actual customers. These would the drive up revenue and ultimately profits. In similar fashion we see other sequences of cause and effect relationships related available resources, sponsorship and other system entities.

3.7 Causal loop diagrams, stock and flow diagrams and business simulation

Further to the influence diagram, the Causal loop model, is a visual representation that emphasizes dynamics rather than static equilibrium conditions of entrepreneurship. By using this model the structure of entrepreneurship is explained more effectively by reinforcing and counteracting casual loops. This is achieved by specifying whether there is a positive or negative relationship between the entrepreneurial system elements. Moreover, the influence diagrams and causal loop models may be further refined using differential equations lead to a stock-and-flow model, which would form the basis for business simulation.

Applying these tools for the case of the International Film Festival was left for future research. Note that the usefulness of the proposed approach has already been proven by the application of Rich Pictures, Concept Maps, System Maps, Association Maps, and Influence Diagrams. The next section discusses the experiences from applying these tools for the case of creative arts industry regarding their effectiveness to support the creation of innovative thinking competences for entrepreneurs.

4. Discussion - conclusions

The proposed Systems Dynamics approach proves to be an effective tool for better understanding the entrepreneurial landscape and the multiple interrelationships among the main business entities. Specifically, for the creative Arts Industry it appears to be an appropriate tool for designer entrepreneurs and artists that are accustomed to think visually and spatially. In effect, the modelling of real life situations is very close to the creative process of artists and designers that use sketches and roughs to test their ideas, improve and modify them before they proceed to the creation of final works, something very similar to what the models in the proposed approach suggest. In effect, the whole design process involves problem solving, and it usually starts with brainstorming, that is to put all the components, aspects, on the paper and then gradually, find the connections between these components. This is how we proceeded with the rich picture creation, where in effect we brainstormed in a group, deciding on the components of the rich picture, the different parts, we drew them first in roughs, then we refined them, we eliminated some, kept some and added new ones, and in a later stage we also forged the connections between them.

Another important aspect is the fact that the visual depiction of variables, not only clarifies a situation but also is part of the exploring, learning process. Artists and designers can learn about business and entrepreneurship, concepts that are perhaps foreign to them. While creating the association map for the International Motion Festival we had a chance to create a strategic plan for the marketing of the festival by finding the links between various factors. By drawing association maps, young artist entrepreneurs can visually clarify and create their brand equity, which will offer them a firm competitive advantage.

When developing the influence diagrams and causal loop models for the International Motion Festival we went one step further to determine which of the linked components creates a positive and which one a negative feedback loop, based on the kind of marketing strategy implemented for the festival. It became apparent that negative feedback loops are also necessary to stabilize the production process. Positive feedback loops create exponential growth and can ultimately lead to oscillations causing the collapse of the entrepreneurial venture. For example, if the advertising budget is set as appropriation of sales, then as sales increase advertising increases as well. In this case the degenerative cumulative cycle will continue until maybe the depletion of the customer pool will put an end to commercial activity. Thus, in many cases a negative feedback loop should be at work and repercussion on the factors entering decisions should be investigated, because the effect might not be unidirectional.

The proposed dynamic approach to explore the entrepreneurial landscape clearly proves to have important advantages over the traditional tools discussed in the literature review. Notably, the non–linear, multidimensional approach of looking at the entrepreneurial problem situation provides a great enhancement

on contemporary tools such as the Business Model Canvas. Applying the proposed System Dynamics approach in the case of the International Motion Festival brought about clarity and realism to it that would not have been possible otherwise.

The next step is to try out the proposed approach in other contexts and cases in order to further validate its effectiveness. Specifically, we are currently working on developing system dynamics models for creativity related businesses. The final aim is to design a course for entrepreneurs based on the proposed System Dynamics approach. In developing an Entrepreneurship curriculum, SD presents itself as a unique and innovative teaching route by developing a mixed graphical model visualisations which combines a sequence of 9-step models as follows: Rich pictures, Concept maps, Systems maps, Association Maps, Influence diagrams, Causal loop model, Stock and Flow Models and Business Simulation. The proposed tools have multiple benefits and provide instructors with a unique opportunity to incorporate entrepreneurial learning with the individual students' reflection on their own learning.

Acknowledgements

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References

Ausubel, D.P. (1968) "Educational psychology: A cognitive view". New York: Holt, Rinehart & Winston

Bacigalupo, M., Kampylis, P., Punie, Y., & Van den Brande, G. (2016) EntreComp: "The entrepreneurship competence framework". Luxembourg: Publication Office of the European Union, 10, 593884.

Checkland, P. (1981) Systems Thinking, Systems Practice. Wiley.

DCMS (2001) "Creative Industries Mapping Document 2001", Department for Culture Media and Sport, London https://www.a-n.co.uk/research/dcms-creative-industries-mapping-documents-2001/ (Accessed 27 July, 2021)

DCMS (2017) "Creative Industries Mapping Document 2017" Department for Culture Media and Sport, London https://www.london.gov.uk/sites/default/files/londons_creative_industries_-_2017_update.pdf (Accessed 27 July, 2021)

Elsawah, S., Pierce, S.A., Hamilton, S.H., Van Delden, H., Haase, D., Elmahdi, A. and Jakeman, A.J. (2017) "An overview of the system dynamics process for integrated modelling of socio-ecological systems: Lessons on good modelling practice from five case studies". Environmental Modelling & Software, 93, pp.127-145.

IMF (2021) International Motion Festival http://motionfestivalcyprus.com/

Novak, J. (1991) "Clarify with concept maps". The Science Teacher, Vol 58, No. 7, p.44.

Papageorgiou, G. (2010). Toward a system dynamics modeling framework for effective political organization management strategies. Journal of Political Marketing, 9(1-2), 55-72.

Papageorgiou, G., & Demetriou, G. (2019). Investigating learning and diffusion strategies for sustainable mobility. Smart and Sustainable Built Environment, 9(1), 1-16.

UNESCO (2012). Measuring the Economic Contribution of Cultural Industries. Geneva: UNESCO. UNESCO. http://www.lacult.unesco.org/docc/2012_Measuring_economic_contribution_cult_ndustries_UNESCO.pdf (Accessed 27 July, 2021)

Successful Entrepreneurship in Family Owned Small to Medium Sized Enterprises (SMEs): The Case of the Hospitality and Tourism Industry

George Papageorgiou, Stelios Marneros and Andreas Efstathiades
Department of Management and Marketing, SYSTEMA Research Centre, School of Business Administration, European University Cyprus
g.papageorgiou@euc.ac.cy
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Abstract: Family businesses, in many areas around the world, form the foundation of innovation and entrepreneurship. Such businesses have many particularities that should be investigated in understanding their business model, nature and the entrepreneurial purpose. For example, regarding the Hospitality and Tourism industry, family businesses are usually established to satisfy the aspiration, needs and preferences of the owners and their families. In many cases these needs and preferences differ from the traditionally widely held goals of profit maximization and business growth. In the case of the Cyprus tourism industry family businesses tend to focus more on the quality of customer service and building close long-term social relationships with their customers. Such an entrepreneurial approach leads to repeat sales and a robust sustainable tourism industry. It is important to note that the tourism industry in Cyprus consists of a plethora of such Small to Medium Sized Enterprises (SMEs), which are family owned. One might claim that it is due to these family SMEs that Cyprus became a significant tourist destination during the last decades. Thus, it would be quite interesting to carry out an investigation on these business in order to explore their particularities and analyze their key success factors. This paper carries out such an investigation by examining entrepreneurial aspirations, business models and pros and cons of running a family owned hospitality and tourism business. Specifically, an analysis is carried out on the challenges, issues that family businesses face as well as their strengths and how they become successful. For this purpose a series of interviews were conducted with owners and family members of prominent Small to Medium Sized Enterprises in the Cyprus Hospitality/Tourism Industry. As a result, innovative ways and tactics are derived and recommendations are given in order to survive and prosper in the highly competitive environment of the Hospitality/Tourism industry.

Keywords: entrepreneurship, family business, small to medium sized enterprises (SMEs), key success factors, hospitality and tourism

1. Introduction

A family owned business may be defined as any business in which two or more family members are involved and the majority of ownership or control lies within a family. Family owned businesses may be the oldest form of business organization. For example, farms were an early form of family business. In a family business environment, private life and work life seem to be intertwined. This makes family businesses particularly interesting and worth of study. This is the case especially in the hospitality industry where this interrelationship between private and work life is more explicit.

Hence, it was decided to carry out research and collect data from "family-owned" hospitality and tourism businesses in Cyprus on their strategies and tactics in today's competitive environment. Specifically the aim was to identify the challenges and analyze the issues that family businesses face. Further, through the study we aim to derive opportunities and discover new ways and strategies that family businesses can use in order to create a competitive edge. Following an investigation via interviews on selected family Small to Medium Sized Enterprises (SMEs) key success factors are derived for survival and prosperity in the highly competitive environment of the hospitality/tourism industry. Key success factors can be understood as an activity, skill or resource that a business can invest in, in the market that business is operating in, that can explain a major part of the observable differences in perceived value and/or relative costs.

Note, that most family owned businesses in the hospitality industry they belong to the category of Small and Medium Enterprises (SMEs). It is generally accepted that SMEs play a significant role for economic growth (Naser 1999). Small companies need to find new ways of competing with large businesses (Mele 2015). SMEs should be thinking and acting globally, competing with rivals of all sizes and investing aggressively in technology to improve operations and make themselves more nimble (Oxford Economics 2013).

The role of entrepreneurship for the successful creation and development of family owned SMEs is highly important. As Chang (2011) identified, especially hospitality and tourism businesses is quite common to be initiated and run by entrepreneurs. However, research on the subject of entrepreneurship in tourism and hospitality is rather limited. Considering their contribution to economic growth and overall development to a country, research on critical factors for building and maintaining a successful SME is increasingly pertinent and necessary.

2. Literature review

Family owned businesses can be defined in many ways. Some of the definitions for a family business are discussed below. A family owned business is any business in which two or more family members are involved and the majority of ownership or control lies within a family. At the most basic level, a family business can be defined as "an enterprise which, in practice, is controlled by members of a single family" (Getz & Carlsen, 2005). This definition can encompasses businesses that involve only one owner, often called "sole proprietorship" firms. Definitional complications arise when non-family members are involved in management or ownership (such as a partnership), or when a family firm "goes public" with a share offering. Other definitions stress the degree of family involvement, whether or not the business has been or will be kept in the family across more than one generation, or a mix of criteria (Westhead & Cowling, 1998).

A Business Longitudinal survey (BLS) involving about 9000 businesses in Australia has found the characteristics of family businesses to be 'somewhat elusive', but the three main elements were said to be: succession (ownership remaining within the family); employment of family members (with or without management involvement); and share management responsibilities (family members are jointly responsible for running the business). Family-owned and operated businesses have become one indispensable component in tourism, and often such businesses are passed down in families from one generation to the next.

As a service sector, it is widely accepted that the hospitality industry is highly dynamic and labour-intensive. The human element is directly related to service quality, customer satisfaction and loyalty, competitive advantage and overall organisational performance *(Kusluvan* et al*, 2010).* Within the fiercely competitive tourism and hospitality environment, consumers are continuously being offered more information and options. In efforts to meet the changing demands and expectations of current and prospective consumers, it is especially important for hospitality enterprises to be represented by suitably motivated, well-trained and qualified personnel who can deliver the service promises that organisations make.

Chung & Green (2018) examined talent management (TM) practices in small- and medium-sized enterprises (SMEs) within the hospitality industry. Specifically, the views of SME owner-managers in the hotel and restaurant sector are examined. There appears to be challenges unique to SMEs within this sector (e.g. resource constraints and poor reputation) that can potentially result in a loss of competitive advantage. Therefore, research aligned within this context is an issue of importance. An inductive thematic analysis identified main themes that emerged from the interview data. Findings revealed that there is a clear commitment towards training and development for employees; however, this initiative is primarily driven by employees identifying their own training needs. The *ad hoc* TM practices are largely influenced by day-to-day business pressures because of the nature of the hospitality industry. The absence of formalised TM practices, however, does not imply the lack of strategies in place for people management and development.

2.1 Success of small and medium-sized enterprises

Entrepreneurship plays a very important role in the earlier stages of tourism development, particularly in rural and ethnic communities where multinational firms and international hotel chains are less likely to invest in light of the relatively small size of the potential market. Many questions should be addressed related to the key success factors for SME entrepreneurship in tourism and hospitality, and the role of the public sector in supporting SMEs family owned businesses.

A study by Motwani et al (2006) provides insight into the barriers to the application of best practices in hospitality and tourism small- and medium-sized enterprises (SMEs) in the UK. Results suggest a model identifying seven key capabilities that underlie the adoption of best practices and six barriers to their implementation. The seven key capabilities for hospitality and tourism SMEs are customer focused goals, planning and control, partnering and networking, internal and external communication, achieving consistent

standards, strategic workforce management, cash flow and performance management. The six barriers to implementing best practices were identified as changing demand, limited resources, lack of skilled labor, lifestyle, lack of competitive benchmarking and location, all of which could create turbulence in the operational environment.

Further, Alfoqahaa (2018) investigates the success of small and medium enterprises (SMEs) in Palestine which is near Cyprus, contributing to the existing knowledge on the critical success factors (CSFs) of SMEs in the Palestinian context, especially in the West Bank. The results show that brand reputation, excellence of customer of services and reliable delivery strongly influence SME success, while innovation is weakly associated with SME success. These results imply that success is tied to customers and competition more than to production, structures or finance. That is, reputable brands, excellent customer service and reliable delivery are means to success according to the results of this research. The study emphasizes the need for Palestinian SMEs to maintain and develop their brand reputation, institutionalize customer service and develop its logistical systems and practices. Generally, the study suggests that there are specific investment areas for SMEs that can contribute to achieving success. Specifically, excellence in customer service was found to be the factor most linked to the success of SMEs, followed by reliable delivery and then by brand reputation and innovation.

2.2 Key success factors for tourism and hospitality SMEs

Key success factors can be understood as an activity, skill or resource that a business can invest in, in the market that business is operating in, that can explain a major part of the observable differences in perceived value and/or relative costs. Key or Critical Success Factors (CSFs) imply a causal relationship between a skill or resource and perceived value and/or relative costs (Alfoqahaa 2018). Considering their contribution to economic growth and overall development of a country, research on critical factors for building and maintaining a successful SME is increasingly pertinent and necessary. A framework for developing key success factors is depicted in Figure 1.

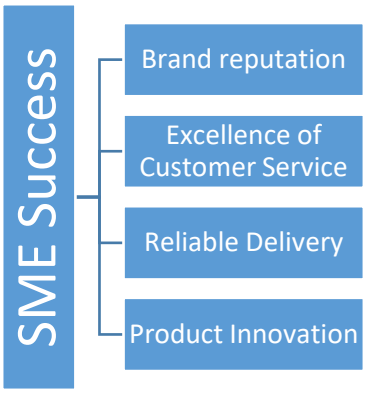

Figure 1: A framework for developing key success factors. Adapted from: Alfoqahaa (2018)

Another study by Alonso & Kok (2020), examined how owners and managers of micro and small enterprises perceive firm success and the future of their businesses. Entrepreneurial action theory is adopted in the analysis and a modified theoretical framework is proposed. Eight dimensions common to both groups of participants emerged, with the most prevalent themes revealing strong links with opportunity maximization. In particular, the importance of perceived critical success factors was manifested by continuous improvements, building relationships, and being perceived highly are in line with perceptions of wineries' future, including entering demanding markets, becoming a referent for the region, or attaining global recognition.

Another study by Panno (2019) examined how modern small-medium enterprises (SMEs) operating in the tourism industry perceive and define corporate performance, and how they measure and monitor businesses' achievements. The results suggest that small-medium Italian hotels, typically family firms managed by owners, tend to adopt a balanced system of performance measurement that keeps track of the financial and non-financial dimensions of hotel's performance; customer orientation proves to be an extremely important leading indicator of non-financial corporate performance. Amongst traditional financial indicators, net profits, profitability ratios such as return on investment and return on sales, revenues for available room, occupancy rate and some cost efficiency ratios are found to be relevant, whereas extensive use is made of non-financial metrics such as customer satisfaction, number of complaints, number of new and repeat customers, employee

competencies and staff abilities. Furthermore, some interesting results about frequency of measurement and purpose of measurement are also presented.

Veiga et al (2021) study the influence of the characteristics of small-and medium-sized enterprises (SMEs) in the process of knowledge creation, knowledge transfer and innovation in conjunction with the utilization of private and public knowledge in accordance with the "spinner' innovation model" (SIM). The results demonstrate that some of the SME characteristics return significant impacts on private and public Knowledge Management (KM): the processes of knowledge creation, transfers of knowledge and innovation. The results also identify how private KM statistically predicts the processes of knowledge creation and transfer and innovation while public KM shapes and influences the creation of knowledge.

Considering information technology as a key success factor, Figueiredo and de Matos Ferreira (2020) first proposed the spinner innovation model (SIM) as a new approach to the management of innovation and internationalization in knowledge-intensive business services (KIBSs). The application of the SIM model focuses on the relationships ongoing between three variables defined for these processes, knowledge creation, transfer of knowledge and innovation, supported by the interactions ongoing between the internal and external environments of the company. This enables the acceleration of processes designed to change mindsets and bring about organizational transformation in addition to helping better understand the interactions between professional intelligence and technology (Figueiredo & Franco 2021).

Furthermore, Secundo et al. (2019) explored how knowledge gets transferred and flows between the different actors in healthcare ecosystems in order to provide support for open innovation processes and conclude by presenting four classification scenarios based on the levels of influence and the motivations of the core actors involved in open innovations. The influence of the amplitude of the open innovation strategy on the performance of the products and services of SMEs in the United Kingdom was also subjected to research by Uduma et al. (2015).

According to Santoro et al. (2018), SMEs primarily take closed approaches to innovation and depend on internal sources to develop new products and services. Furthermore, de Oliveira et al. (2019) analysed the critical factors to the success of implementing open innovation (Efstathiades & Papageorgiou, 2019) in companies participating in regional innovation systems before reporting that people and culture are the factors generating the greatest impact.

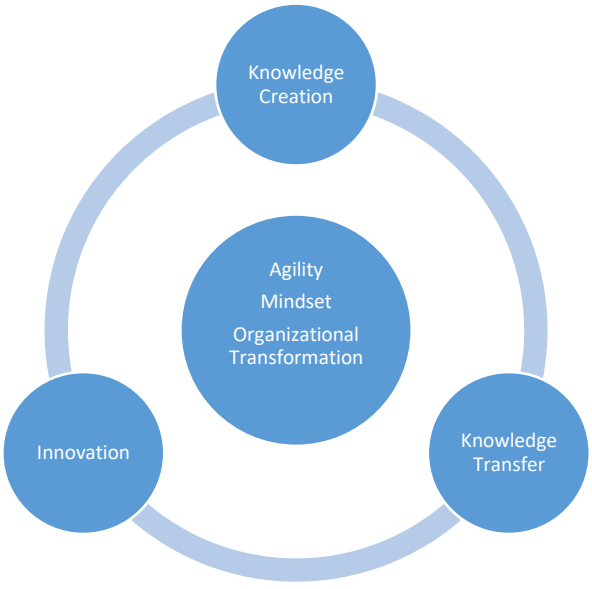

Figure 2: Spinner Innovation Model (SIM), adapted from Figueiredo and de Matos Ferreira (2020)

Jabeen et al (2019) investigate the factors that influence the innovation decisions of Emirati women-owned small and medium-sized enterprises (SMEs). Female SME owners prioritize government policies, research and development, innovation strategy and skill development as the main criteria that influence their innovation

decisions. Family support, access to external financing, social networks and the allocation of funds are the main sub-criteria affecting their decisions to be innovative. Furthermore, respondents who are in the nascent business stage consider family motivation as the greatest influence on initiating new ideas through financial and moral support. Among all respondents, the nascent business owners rank skill development the highest because they are still in the initial stages of their business journeys, and thus, obtaining these skills could help them increase innovation and success in their ventures. However, respondents in the established stage rank innovation strategy the highest.

3. Methodology

Primary and secondary sources were used for data collection. Primary research was carried out by means of interviewing ten SMEs family businesses from the hospitality and tourism industry of Cyprus. The ten companies were given an alphabetical code (SME A, B, C,… J). For reasons of confidentiality we will refer to these companies by the code hereafter. A short description of the companies is provided below.

- Company A is a bistro and wine bar SME that has a good location in the heart of Paphos old town. Company A offers a romantic atmosphere and the place is nice overlooking the square and the people passing by. Company A has been in operation for 10 years. Currently its sales turnover is in the order of 150,000 euros. The company is managed by the oldest son of the family and has four employees, which are all members of the family. The parents of the family work in the back of the house (kitchen), and the sons work in the front of the house (service area). The company is a sole proprietorship in its form of ownership.

- Company B is a restaurant that offers high quality food for all tastes, international and local cuisine. For the locals as well the tourists it is the 'hot spot of Protaras - Famagusta since it combines excellent food with a perfect location with prompt and attentive service. Company B's restaurants are operated by three brothers. The company has been in operation since 1987. Currently its sales turnover is in the order of 2,000,000 euros. The company is managed by the three brothers and has forty employees. The members of the family work in the back of the house as well as in the front of the house. The business is a private limited liability company.

- Company C is a friendly family run restaurant located in Zygi area. The family who owns and operate the business are extremely friendly and they offer fresh fish meze. Company C has been in operation for 30 years. Currently its sales turnover is in the order of 700,000 euros. The company is managed by the wife of the owner and has four employees, which are all members of the family. The employees work in the back of the house (kitchen), and the front of the house as well. The company has a sole proprietorship regarding its form of ownership.

- Company D is a small family owned hotel, situated in the village of Agios Toixonas Limassol in Cyprus. The hotel offers rooms featuring a balcony with views of the surrounding mountains. Company D has been in operation for 20 years. Currently its sales turnover is in the order of 2,000,000 euros. The company is managed by the daughter of the owner and has fourteen employees. The father act as a consultant for the hotel. The company is a partnership regarding in its form of ownership.

- Company E is a restaurant offering authentic Italian cuisine in a pleasant and casual environment, in the old city of Nicosia, on Onasagorou Street. Located within the narrow and busy streets of the city center, the restaurant gives a taste of Italy through its simple and modern ambiance. Company E has been in operation for 7 years. Currently its sales turnover is in the order of 850,000 euros. The company is managed by the owner and has 8 employees, which four are members of the family. The members of the family work in the back of the house and in the front of the house. The company has a sole proprietorship as the form of ownership.

- Company F is one of the first car hire companies in Cyprus. It was established in 1968 and since then it has served thousands of tourists and locals. This family owned car hire company, takes pride in the exceptional service that it provides to its clients and the quality of its cars. Currently its sales turnover is in the order of 600,000 euros. The company is managed by the son of the family and has two employees, which are all members of the family. The company has a sole proprietorship as is form of ownership.

- Company G is a family owned hotel situated in the central square of Troodos mountains and is surrounded by recreational areas and areas where its customers can enjoy various activities. It is also beside shops that

sell traditional Cypriot products. The company G offer accommodation services that combine a welcoming family atmosphere with high standards of service. The hotel has total 48 rooms and a spacious restaurant, which is open every day. Company G has been in operation for 40 years. Currently its sales turnover is in the order of 1,500,000 euros. The company is managed by the oldest son of the family and has five employees, which are all members of the family. The parents of the family work in the back of the house (kitchen), and the sons work in the front of the house (service area). The company is a sole proprietorship as is form of ownership.

- Company H is a SMEs family beach hotel is located in Pegia area in Paphos. The hotel offers a family hospitality, stunning emerald-blue waters, dazzling sunsets, while enjoying a relaxing environment and high quality services. Company E has been in operation for 23 years. Currently its sales turnover is in the order of 1,500, 000 euros. The company is managed by the oldest son of the family and has four employees, which are all members of the family. The parents of the family work in the business. The company is a sole proprietorship.

- Company I is a hotel situated in the heart of Paphos town. It is a three star hotel with 73 rooms, some of which are adjoining. Each room is furnished to the highest possible standards with full air-conditioning and central heating for the winter months. Company I has been in operation for 30 years. Currently its sales turnover is in the order of 800,000 euros. The company is managed by the owner of the family and has twelve employees, which six of them are members of the family. It is a private limited liability company regarding its form of ownership.

- Company J is an agrotourism business located at Maroni Village, surrounded in a lush green environment with beautiful mature gardens providing the development a true Mediterranean style. It is a traditional village style development featuring five studio apartments, fully furnished and includes all white goods and air condition units throughout. Each apartment comprises dining area with open-plan kitchen, bathroom with w/c, and veranda. . Company I has been in operation for 15 years. Currently its sales turnover is in the order of 80,000 euros. The company is managed by the oldest son of the owner and has two employees. It is a sole proprietorship.

Regarding secondary data, the information was collected from various books, articles and journals which provided useful information related to the family owned businesses. In addition, information was collected from relevant websites from the Internet.

Primary data was collected via semi-structure interviews. The authors have conducted the interviews after contacting the owners or people who were able to explain the importance of family owned business but as well as the ways that they use in order to stand out from competition. By doing this we have collected essential and important information about the family owned businesses in the hospitality and tourism industry. Questions were asked regarding:

- owning and operating a family business,
- advantages / disadvantages of a family owned business
- challenges and issues of setting up a family business
- challenges and issues for successfully operating the business
- key strategies and tactics taken to respond to competition
- opportunities for growth
- differentiation strategies on how to be distinguished from competitors
- significance of currying a competitive analysis
- threats to hospitality family owned business
- government support to tourism and hospitality family owned busniness

The responses were then consolidated and are presented in the next section.

4. Findings

The main purpose of this section is to analyze the collected data from hospitality family businesses in order to derive challenges, issues and key success factors. What follows is a discussion upon these topics based on the responses of the ten family owned SMEs that participated in the study.

Consolidating the responses from the interviewed SMEs the main advantages of owing a family business which may be considered the key success factors are the following:

- Better control since there is found to be more trust among members of a family who are working toghether.
- Management receive more reliable trustworthy feedback.
- Motivated workforce due to joined ownership.
- Increased flexibility as decisions are taken much quicker than other businesses.
- The high cohesiveness as many parents as there is inheritance where the family bond plays an important role.
- The owners are involved in the running of the business and there is no need for surveillance or bureaucratic controls.
- Owners can directly impose their principles on the business and they are more committed to it.
- There is a long-term view of management and succession of the business.
- Loyalty and dedication to the family enterprise.

Family owned businesses can also have many disadvantages as well. From the interviewed SMEs responses we have consolidate these as follows:

- Business performance is very much depended on good family relationships, which might not exist.
- High uncertainty of regular income due to the entrepreneurial nature of the family business.
- In times of crisis, there is little financial support for the business.
- High level of introversion exists as working merely with family members act as a barrier to workforce diversity and getting to know more people working in same field that allows networking.
- Younger family members suggestions are not taken into consideration with the excuse that they may not have as much experience as the parents.
- There are issues of performance in case of conflict between family members and disturbance in the chain of command.
- Issues of low level of professionalism and organization of the family business.
- Lack of workforce diversity as the owners usually are not willing to employ outsiders and as a result there is lack of new ideas and innovation.
- Issues of nepotism as there is a preference to employ within the family instead of looking for the best candidates.
- Issues of succession as the children of the owners fail to take over the business and manage it properly.

Further, the findings from the interviews revealed that the main challenges for the SME family business are related to the high competitive environment. In addition, there are aspects that affect tourists' choice of selecting Cyprus as their holiday destination. Below, we present the main challenges and issues in an epigrammatic form.

- The survival of the family SMEs depends on the accessibility to travel to Cyprus, which is related to high airline costs as it is at the far borders of Europe. Thus, the role of the government to improve accessibility is important.
- The cost of living is high in Cyprus, therefore high prices is a deterrent factor for gaining market share.
- There is high competition from neighbouring countries such as Turkey, Greece, Egypt and other Balkan countries.
- In the hospitality and tourism industry, the family owned businesses have to deal with seasonality issues, which have repercussions on staff issues.
- Difficulty in creating a Unique Selling Proposition, due to the high competition.
- The all-inclusive business model adopted by many large hotels limits the potential market with significant negative effects on the SME family hospitality businesses.

According to our sample, plausible strategies and tactics that the family SME can employ are related to service, food and quality but most of all creating a unique customer experience. Customer relationship management is also of outmost importance. According to the interviewee SMEs responses there are a number of opportunities for growth related to the following:

- Local cultural events could attract tourists and the family SME operating in the area could exploit this opportunity to gain market share.
- Cyprus, as a country, has many alternative attractions, which can be used by the family SME to create and offer new products and services such as rock climbing, water sports, cycling events etc.
- The safe and high conviviality environment of Cyprus provides many opportunities as the weather conditions are very favourable for tourism development.

Finally, a set of key success factors may be derived based on the information collected from the conducted interviews with the family SMEs operating in the hospitality and tourism industry. Such factors may help family SMEs to distinguish themselves from competition via a differentiated strategy. The main factors for success are as follows.

- The family business has the flexibility to change things for the customer's benefit.
- Offering quality service and good experiences, customers leaving satisfied and promote the business using word of mouth advertisement, which in the fact is the best way to being advertised for the family enterprises.
- Gaining marketing insight from other brands especially when they are also your customers' chosen brands, provides valuable insight into competitive advantage.
- Knowing where your brand stands against a national brand-scape can be humbling, but it provides the early warning you need to make the necessary correction.
- Competitive analysis is the essential process which must be carried out on a continuous basis.

5. Conclusion

Summing up, operating a family owned business in the hospitality industry is quite a challenging task. Even though there are advantages such as better control, motivated workforce and increased flexibility, at the same time there are problems with high uncertainty, introversion, nepotism, and lack of workforce diversity. Further, there are challenges related to: high competition, difficulties in the economy with repercussions on the company, and the risks of conflicts within the family. On the other hand, there are opportunities that family SMEs in the hospitality and tourism industry undertake in order to develop a differentiated product or service in niche markets. Unfortunately, the all-inclusive business model of large hotel enterprises, limits the market opportunities. Here, the hand of the government is necessary to put things right by claiming unfair competition and the creation of monopolies, so that through regulation set a limit on the all-inclusive businesses.

Family small and medium size enterprises (SMEs) operating in the hospitality and tourism industry, play a vital role for economic growth and prosperity. Therefore, the government, and other institutions such as the Chamber of Commerce and Industry, should formulate and implement programs and policies for supporting family SMEs. Such programs could include training and business counselling, setting up advisory and information services in order to help SMEs in their competiveness and industrial development.

References

Alfoqahaa, S. (2018) "Critical success factors of small and medium-sized enterprises in Palestine", Journal of Research in Marketing and Entrepreneurship, Vol. 20 No. 2, pp. 170-188. https://doi.org/10.1108/JRME-05-2016-0014

Alonso, A.D. and Kok, S.K. (2020) "Understanding critical success factors and perceived future among micro and small firms through entrepreneurial action theory", European Business Review, Vol. 33, No. 2, pp. 383-406.

Chang, J. (2011) "Introduction: Entrepreneurship in tourism and hospitality: The role of SMEs", Asia Pacific Journal of Tourism Research, Vol 16, No. 5, pp. 467-469.

Chung, K. L., and D'Annunzio-Green, N. (2018) "Talent management practices in small-and medium-sized enterprises in the hospitality sector: An entrepreneurial owner-manager perspective", Worldwide Hospitality and Tourism Themes.

de Oliveira, L. S., Echeveste, M. E. S., Cortimiglia, M. N., and Gularte, A. C. (2019) "Open innovation in regional innovation systems: Assessment of critical success factors for implementation in SMEs", *Journal of the Knowledge Economy*, Vol *10, No.*4, pp. 1597-1619.

Efstathiades, A., and Papageorgiou, G. (2019) "A quantitative model for open innovation and customer involvement", International Journal of Economics and Business Research, Vol 17, No. 2, pp.168-188.

Figueiredo, R., and de Matos Ferreira, J. J. (2020) "Spinner model: prediction of propensity to innovate based on knowledge-intensive business services", Journal of the Knowledge Economy, Vol 11, No. 4, pp. 1316-1335.

Figueiredo, N. D. L., and Franco, M. (2021) "Business simulation in higher education: A case study from a network cooperation perspective", Industry and Higher Education, 09504222211029191.

Getz, D. and Carlsen, J. (2005) "Family business in tourism: State of the art", Annals of tourism research, Vol 32, No. 1, pp.237-258.

Jabeen, F., Faisal, M.N., Al Matroushi, H. and Farouk, S. (2019) "Determinants of innovation decisions among Emirati female-owned small and medium enterprises", International Journal of Gender and Entrepreneurship.

Kusluvan, S., Kusluvan, Z., Ilhan, I., and Buyruk, L. (2010) "The human dimension: A review of human resources management issues in the tourism and hospitality industry", *Cornell Hospitality Quarterly*, Vol *32, No* 2, pp. 171-214.

Mele, N. (2015) "Why more M & As is a sign that scale is no longer an advantage", Harvard Business Review, available at: https://hbr.org/2015/10/why-more-mas-is-a-sign-that-scale-is-no-longer-anadvantage.

Motwani, J.G., Sower, V.E., Hwang, L.J.J. and Lockwood, A. (2006) "Understanding the challenges of implementing best practices in hospitality and tourism SMEs", Benchmarking: An International Journal.

Naser,Y.(1999) "Palestine Small Business Enterprises: The Nature and Causes of Success", The Forum of Social and Economic Policy Research in Palestine (PRIP), Ramallah, Palestine.

Oxford Economics (2013) "SMEs equipped to compete – innovation and differentiation", available at: http://go.sap.com/docs/download/2014/01/96d61054-397c-0010-82c7-eda71af511fa.pdf

Panno, A. (2019) "Performance measurement and management in small companies of the service sector; evidence from a sample of Italian hotels", Measuring Business Excellence, Vol. 24, No.2, pp. 133-160.

Papageorgiou, G., Efstathiades, A., and Milikouri, G. (2017) "Innovation, co-creation and the new product development process in small to medium-sized enterprises (SMEs). In *European conference on innovation and entrepreneurship* (pp. 488-495). Academic Conferences International Limited.

Secundo, G., Ndou, V., Del Vecchio, P., and De Pascale, G. (2019) "Knowledge management in entrepreneurial universities: A structured literature review and avenue for future research agenda", *Management Decision*.

Veiga, P.M., Figueiredo, R., Ferreira, J.J. and Ambrósio, F. (2021) "The spinner innovation model: understanding the knowledge creation, knowledge transfer and innovation process in SMEs", Business Process Management Journal, Vol. 27, No. 2, pp. 590 – 614.

Uduma, I. A., Wali, A. F., and Wright, L. T. (2015) "A quantitative study on the influence of breadth of open innovation on SMEs product-service performance: The moderating effect of type of innovation", *Cogent Business & Management*, Vol *2, No.* 1, pp. 1120421.

Westhead, P. and Cowling, M. (1998) "Family firm research: The need for a methodological rethink", Entrepreneurship theory and practice, Vol. 23 No. (1), pp.31-56.

Engineering Innovation Eco-System by Design: Insights From India

Vikram Singh Parmar[1], Neeraj Sonalkar[2], Ade Mabogunje[2], Prafull Anubhai[3] and Larry Leifer[2]
[1]Norwegian University of Science and Technology, Trondheim, Norway
[2]Center for Design Research, Stanford University, USA
[3]Ahmedabad University, Gujarat, India
vikram.s.parmar@ntnu.no
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Abstract: Can you engineer entrepreneurship in a socially complex environment that is risk averse, and build an innovation ecosystem? We believe it's possible by inducing certain type of behaviour via persuasive educational curriculum and physical environment. This paper reports preliminary findings from VentureStudio - an innovation centre of Ahmedabad University, that was established by following a Persuasive Education and Environment (PEE) Framework. The PEE Framework is based on well-known theory of planned behaviour, persuasive technology, and diffusion of innovation. Seven batches were offered six-month design fellowship program that included following a persuasive venture design curriculum and exposure to persuasive physical environment. Through PEE Framework, we could motivate participants to pursue entrepreneurship as a career. Some of our start-ups tasted early success in terms of international acquisition and receiving seed funding. The preliminary results after following PEE framework indicates that this framework may be useful in setting up innovation centres and shaping societal behaviour; and contribute to building an innovation ecosystem to promote entrepreneurship.

Keywords: engineering entrepreneurship, venture curriculum, design driven approach, innovation mindset

1. Introduction

A successful innovation ecosystem in a country could bring prosperity, generate employment opportunities, and increase cash flows. The process of building an ecosystem involve challenges at a socio-cultural, economic, and infrastructural level. For building and sustaining such an innovation ecosystem, country would need bright citizens that are risk taking and willingly wants to become entrepreneurs. The environment in which entrepreneurship occurs plays a key role in understanding how entrepreneurship originates and how it takes multiple forms and produces diverse outcomes (Autio et al, 2014; Levie et al, 2014). The institutional environment is important to entrepreneurship because it facilitates business activity in general, but also influences the allocation of entrepreneurship in an economy (Baumol, 1990).

Among the emerging economies, India occupies a unique position as the third largest and fast-growing start-up hub in the global economy (NASSCOM, 2019). In India, there is a realization that, "to sustain rapid growth and alleviate poverty, India needs to aggressively harness its innovative potential, relying on innovation-led, rapid, and inclusive growth to achieve economic and social transformation" (Dutz, 2007). The innovative potential of the Indian youth population, if supported through an effective innovation ecosystem, holds potential for developing entrepreneurship and providing growth and job opportunities that India needs (Baporikar,2015).

There are several initiatives launched to tap entrepreneurial potential in India. For instance, technology business incubators (TBIs) comprising accelerators, incubators and coworking spaces are emerging rapidly all across India, particularly in its start-up hubs (Bala Subrahmanya, M.H. & Ramachandran, P. 2018). TBIs are designed to offer start-up founders technological support and services by bridging the knowledge gap to enable the latter to realize product ideation, innovation, product development and marketing leading to successful start-up emergence (Bismala et al., 2020). However, still very few studies have been carried out on impact of persuasive venture design curriculum and physical environment in shaping mindsets of entrepreneurs towards building an innovation ecosystem in a socially complex society like India. While we acknowledge that TBIs offering technological support and services to start-up is of great value, however, we want to emphasise that building human capital that could nurture innovative environment, financial capital that could invest money on high risk ventures, and building trust at a society level will be a key to building new innovation ecosystem.

This paper contributes to literature of designing innovation ecosystem by sharing a living example of an innovation center that was founded by designers. Further share insights about how a formal curriculum was designed and implemented to nurture innovative mindset by addressing existing social beliefs and attitude, and value of physical environment design in promoting human-human interaction.

1.1 Need for persuasive venture design education

In India, there have been several initiatives by the government to support entrepreneurship at a country level. All premium engineering and management institutes have dedicated incubation center that invites applications from entrepreneurs and if found interesting, provide them seed grant support and access to network to grow these ideas. However, there is no mandate for these incubators to work on the mind-sets of these entrepreneurs or offer a curriculum that can accelerate the process of launching and scale-up ventures.

This situation offered us an opportunity to challenge current education system of India that has largely not changed since British colonization (lall,2005; Sinha 2014). Implying that certain social beliefs and attitude ingrained in the Indian culture needed to be questioned. For instance, social pressure to secure government or private jobs for security have made people risk averse, always need to be top of the class, and no room to appreciate learnings from failures (Sinha, 2014). We took this challenge and designed a persuasive venture design curriculum focusing on venture design and making entrepreneurs with an open mind to accept change. This curriculum included aspects that are largely missing in the current education system and startup support system.

This opens a research question: By Persuasive Education and Environment (PEE), can we engineer a thought of becoming an entrepreneur that can play an important role in addressing some of the most compelling needs of the society including healthcare, food, sanitation, air quality, clean tech etc. Can we prepare a fleet of entrepreneurs from any age group to work on solutions that will shape the future of our society; individuals that may be persuaded to become innovators cum entrepreneurs.

1.2 Need for persuasive environment

Existing environment in university set ups often follow spatial designs that lead to dull and non-interactive environment to foster creativity and innovation. In the last decades, creativity and innovation became a bigger part of work, and therefore the interest in the connection between space and creativity grew (Dul & Ceylan, 2014). (Thoring et al, 2017) have argued that physical environment potentially has an impact on creativity, well-being and learning performance. The questions whether a space can facilitate the learning process, enhance the wellbeing of students and teachers, and most notably foster creativity and innovation have remained under-researched. Bird (1988) pointed out that both personal characteristics and environmental factors define entrepreneurial intentionality.

In the Indian context, we saw an opportunity to design an environment that pushes certain type of behaviour including initiating innovative projects, team-based learning, differ judgement, collective action, celebrate failure, encourage public speaking, freedom to speak, work with machines to build working prototypes and playing interactive physical games. In the remainder of the paper, we will explain the method followed to build VentureStudio (VS)- innovation center of Ahmedabad University, theoretical framework applied to design persuasive venture curriculum design, and preliminary evaluation of our approach towards building regional innovation-ecosystem.

2. Method

2.1 Venture Design Fellowship

Venture Design Fellowship program of six months that exposes design fellows to venture design process, and lead to formation of a scalable venture was designed. There were two critical aspects of this program. First, designing a physical environment that can bring together a cohort of design fellows for collaborative learning, and second, offer a structured curriculum to engineer entrepreneurship among design fellows. In the first five-year, n=49 design fellows participated in our fellowship program and n=24 ventures were founded.

2.2 Securing funding

The first chairman of Ahmedabad University (AU) had managed to convince a group of High Net-Worth Individuals (HNWI) to give endowment funds to cover costs of operations and construction of physical environment for the VS. An Education Society that is behind setting up AU also played an important role throughout the process; specially in donating a centrally located real estate in the city for setting up this center.

2.3 Engaging design driven expertise

The chairman of the AU and management hired human resource that came with design and engineering background. This ensured that the approach of this center is Design Driven and follows the design thinking cycle across VS. Including course curriculum development, hiring staff, line-up resources that would play a critical role in upscaling innovative ideas. The international team came with their personal network from Europe and North America. This also included access to resources such as digital libraries, and investor network. In the Indian context, following a Design Driven approach and engaging human resource with significant international exposure was one of the critical building blocks to implement vision of creating innovation ecosystem by AU.

2.4 Enrolling Design Fellows

Design Fellows can be understood as individuals that are interested in building a start-up that addresses a compelling need and results in improving overall well-being of their customer or users. Design fellows with pre-determined business needs or without any need identifications were enrolled in this program. Only "Design Fellows" that are hungry to work on a challenging idea and have fire to work hard "to do whatever it takes attitude" and open to acquiring new skill sets were selected. Once selected, they were offered a seed grant to develop their innovative ideas.

2.5 Venture design curriculum

A venture design curriculum was offered for six months to each batch for five years. Once the physical space and curriculum were ready, we had enrolled design fellows from varied academic and socio-economic background. The following modules were offered by VS coaches: (a) *Building self-awareness:* The main aim of this module was to develop individual capacity to be self- reflective. In the Indian context, opportunity to be reflective about own strength and weakness seldom exist (Sinha, 2014). Knowledge about individual self-awareness was achieved by focusing on fellows learning styles, personality, self-reporting of events, confronting them with conflicts and stressful situations. Simple exercise to write their honest reflections every day about incidents from yesterday or whatever they were thinking about and share their concerns with other fellows ended up building high degree of trust among design fellows, thereby making it easier to manage each other expectations. (b) *Venture Creation:* Following the design innovation cycle this module developed fellows understanding about customers, their needs, personas, insight building, design evaluation protocols, and building prototypes. Making design fellows perform short exercise that challenges their notion of impossible to possible. This included working on problem, concept, and building a physical prototype to test their assumptions. This process offered them insights about thinking in mind versus implementing their ideas in a physical form. How entrepreneur's ability to quickly test their assumption by putting a low or high-fidelity prototype in the real context fast forwarded the process of venture design. Thereby reinforcing fellow's confidence to deal with any problem. How to tell a story that could convince investors to bet money on their ventures. Value of narrating an impactful story were taught via successful and failure case studies. This approach was novel to most of the design fellows that had perhaps never built anything since they left their school. (c) *Team building:* The focus of this module was to enable fellows to find their founding team member and build relationship with VS coaches, management, and external stakeholder. In the book Psycho-Social Analysis of the Indian Mindset (Sinha, 2014) pointed out that individually, Indians are brilliant and are likely to be very successful in favourable situations but may turn out to be counterproductive collectively. To overcome such a mindset, various situations were created to let fellows understand and respect each other disciplines. For instance, engineering, commerce, design and management background fellows need to respect each other for the value they bring on table. Due to existing silo approach of education in the Indian context, most of our design fellows initially hesitated to accept what they don't know, and how another design fellow could fill in that knowledge gap, thereby forming a reliable founding team with sufficient knowledge expertise to address any given problem. Short- and long-term venture building exercise were used to explicitly discuss team conflicts, synergies, and work culture differences. This approach persuaded fellows to openly talk about their inhibitions and expectations from each other. As a part of curriculum activity, we designed conflicts to confront design fellows and shape their mindsets about criticism and build attitude to receive feed-back constructively for improving the quality of their venture. Constant interactions with leaders from the industry to learn what it takes to be successful, how did they deal with crisis and what will they do differently now, offered design fellows an insight about a choice they have made and what it holds for them. Basics of communicating your ideas in a simple way with high impact trained our design fellows to formulate persuasive pitch for external investors. (d) *Finance investment design:* Existing Indian schools or college education (except commerce study) doesn't expose students to issues related to financial planning. As an

entrepreneur, once you raise funding, it is equally critical to know how to manage investors' money. Therefore, it was critical to develop basic understanding of finance and business modelling. Further, instill confidence among design fellows to take informed decisions about finance and business risks.

2.6 Designing persuasive physical infrastructure

Once an old building was allotted to VS (see Figure 1), chairman and the founding team had conducted a global survey of how physical spaces are designed to spur innovation. What level of flexibility is required for budding entrepreneurs to work with freedom and organize their team members to be highly productive in meeting their venture deadlines? Further, the design facilitated seamless physical flow across VS spaces, presentation rooms, administration offices, and close vicinity to prototype workshop. This enabled design fellows to walk from design conceptualization space to protype space in less than three-five minutes. Multiple open spaces offered flexibility to be used for lunch, playing, group discussions, or having open arguments. Physical design persuaded design fellows to behave freely, without any restrictions to test and try their ideas, unlike regimented institutional environments.

Figure 1: Old physical structure above and renovated structure below

3. Persuasive education and environment framework

Often an approach that is adapted from a Silicon Valley model in USA for building an innovation- ecosystem have had been used in a developing country context (Angelique SS et al, 2018). Audretsch (2021) pointed out that the Silicon Valley model of entrepreneurship seems to have been adept at providing a solution for penetrating the knowledge filter that inhibits investments in knowledge and ideas from being commercialized and transformed into innovative activity, which ultimately can ignite innovative activity and economic growth. However, the fundamental problems confronting many regions in the developed countries are less characterized by an inability to take advantage of costly investments in new knowledge and human capital but rather a paucity of such knowledge investments and human capital in the first place, resulting in problems of social and economic inclusion. (Welter et al, 2018) emphasize, context matters profoundly. A type of entrepreneurship that works in the context of Silicon Valley may be applicable for other regions as well, but certainly not for all regions in the United States, let alone the entire world.

(Angelique et al, 2018) reported that a Silicon Valley approach has not worked in a long term mostly because key stakeholder and components including entrepreneurs attitude, investors mindsets, access to industry network, and undisclosed social contract to support each other; that exist in the western world has not yet fully developed in a developing country context. In the Indian context, limited success of these western adapted models could be attributed to lack of understanding about (a) socially complex society structure, (b) bureaucratic economical support system, (c) institutional approach and policies that are responsible to promote innovative ideas, (d) Indian HNI's mindset and their intention of paying it forward, and (e) educational system that doesn't have a core focus to promote entrepreneurship. Indian contextual challenges related to building an innovation ecosystem underscore the need for a design framework where the gaps in existing development approaches can be systematically considered during the design process. Such a design framework should lead to the development of a sustainable innovation ecosystem in terms of creating knowledge and aligning stakeholder expectations (Parmar, 2009).

Considering the complexities involved in designing an innovation ecosystem in India, particularly in planning overall strategy, physical environment, and venture design curriculum for VS; we developed a Persuasive Education and Environment (PEE) framework by amalgamating knowledge from different scientific disciplines such as social sciences, industrial design, design management, and persuasive technology to converge and simultaneously address the needs of various stakeholders. These disciplines were selected because (a) social science can provide important guidelines for investigating the user and their behaviour, develop in-depth understanding about societal issues at a community and individual level, (b) Industrial design for developing skill sets for designing field protocol, empathising with users, prototyping, design conceptualisation with users, (c) design management offers an overall understanding about design thinking cycle and its role in innovation, market positioning, and addressing issues of economic sustainability and technology adoption, and (d) persuasive technology to use psychological cues to design physical environment, and design venture curriculum for shaping behaviour linked to existing social norms and mindset of participants within VS towards pursuing entrepreneurship as a career.

The advantage of this multidisciplinary theoretical framework is that it can be used as a source of principle for guiding design innovation to address complex development issues. (Lenihan, 2007) suggested that the theory-based evaluation is a more appropriate methodology for setting up and evaluating an incubation programme. In evaluation, this approach makes it possible for multiple or mixed research methodologies to be deployed within the broader framework. While studying implementation of entrepreneurial ideas and role of intention, (Bird, 1988) suggested that entrepreneurial intention directs critical strategic thinking and decisions, and operates as a perceptual screen for viewing relationship, resources, and exchanges. This is in corroboration with our approach of using theory of planned behaviour (Ajzen, 1991), where we would like to increase perceive capability of our design fellows and thereby influence their intentions to become entrepreneur and implement innovative ideas.

The following section describes the two components of the PEE framework and their application in shaping mindsets of entrepreneurs to create scalable and impactful ventures. The modularity of both components provides the right emphasis to theoretical underpinning at each stage of the venture design. This linking allows for generating scientific knowledge required to give direction to future innovation ecosystem development, which is often overlooked in the existing literature related to building innovation ecosystem in the developing country context due to lack of theoretical-driven approaches.

3.1 Component A: Design driven framework

The Design Driven Framework comprises three phases: exploratory research, creative design research, and evaluative research. Together, these phases allow for empirical validation of the design and development approach. See Figure 2.

3.1.1 Exploratory research

Most of our design fellows joined this fellowship program with no pre-conceived idea, it was important to guide their problem identification process. Few fellows that came with pre-conceived ideas also had an opportunity to re-evaluate their problem space and explore if it does have enough challenge to keep them motivated in this entrepreneurial journey. Exploratory research involves the following investigations:

(a) Identifying the target user group, user needs, user characteristics, and social norms. It also includes assessing the knowledge level of users (potential customers) related to problem that exist and perhaps needs a solution(s), (b) Obtaining insights about existing beliefs and attitude among users, relevant stakeholders about a selected problem that design fellows were committed to solve, (c) Formulating design brief for a new venture design, specifically the information content, form, and requirements for user interaction, (d) Identifying and outlining the responsibility of involved stakeholders in the design and development of a new venture design. This phase allows the design fellows and coaches to understand context and translate contextual factors into the design of products or services that meet the users' needs. These observation studies are mainly conducted in the field, along with actual users, stakeholders, government or non-government organizations, and stakeholders that could have direct or indirect influence in the development of a new venture.

3.1.2 Creative design research

This phase involves hands-on work to actually convert concepts into tangible solutions. This is often not a core strength design fellow have, however, their experience in this phase confronts them about their strength and weakness. Therefore, giving them feedback on which new skill they may have to acquire for overcoming their limitations. This phase involves the design, development, and iteration of different concepts via building Venture Prototype (VP). The VP enables individuals/teams to gain hands-on user experience and understand issues related to manufacturing, programming, or logistics. Additionally, it offers an opportunity to evaluate design strategies with their potential users from the initial design phase. This results in the development of a dynamic evaluating mechanism that can collect user feedback in a short design cycle, thus providing an opportunity for innovators to iterate VP design in line with user needs. To increase the rate of adoption, the user feedback is collected based on five product innovation attributes—relative advantage, compatibility, complexity, trialability, and observability—from the theory of diffusion (Rogers, 1995). In the business term, these attributes could be understood as desirability (relative advantage, compatibility), commercial viability (relative advantage, complexity, observability), feasibility (trialability).

3.1.3 Evaluative research

This phase involves measuring user adoption of VP by conducting short and long-term studies with users of VP. In this phase, the results from the studies are constantly integrated in the design of next version VP by comparing data collected in the exploratory research phase. This ensures that a venture idea is meeting the expectation of users and there is no mismatch in expectations. From an innovation ecosystem perspective, adoption of VS is evaluated in terms of how much human capital is trained, how much finance capital is readily available for supporting ventures or number of professional investors that are keen to work as a core mentor with venture founders, degree of business and knowledge network created.

3.2 Component B: Theoretical framework

This component explains the application of the theories that have been adapted to guide the design driven development cycle followed in component A. Three phases of the PEE framework have been supported by the theory of planned behaviour (Ajzen, 1991), persuasive technology (Fogg, 2003), and diffusion of innovation (Rogers, 1995).

3.2.1 Exploratory research

In the exploratory stage, the Theory of Planned Behaviour (TPB) has been adopted to understand social norms and perception of becoming an entrepreneur in the Indian context. The theory suggests that the combination of three variables—attitude toward the behaviour, subjective norm, and perceived behaviour control lead to the formation of a behavioural intention. These variables can be further understood as: (a) Attitude toward the behaviour: This variable can be understood as an individual's positive or negative evaluation of self-performance of the particular behaviour. For example, in the case of entrepreneurship, this variable provides a guideline for investigating beliefs and attitude of individuals related to becoming an entrepreneur, how do they perceive entrepreneurial ventures, and perception about taking a risk to work on their dream ideas, (b) Subjective norm: This variable is defined as an individual's perception of social normative pressures or other beliefs that he or she should or should not perform certain behaviour. For example, this variable allows investigation into social beliefs that influence thinking of individuals to pursue a safer versus riskier career approach, (c) Perceived behavioural control: This variable can be understood as an individual's perceived ease or difficulty with performing the behaviour. For example, this variable provides guidelines for investigating the capacity of design fellows to

question existing subjective norms and the ability to change their existing attitudes related to an entrepreneur and entrepreneurship.

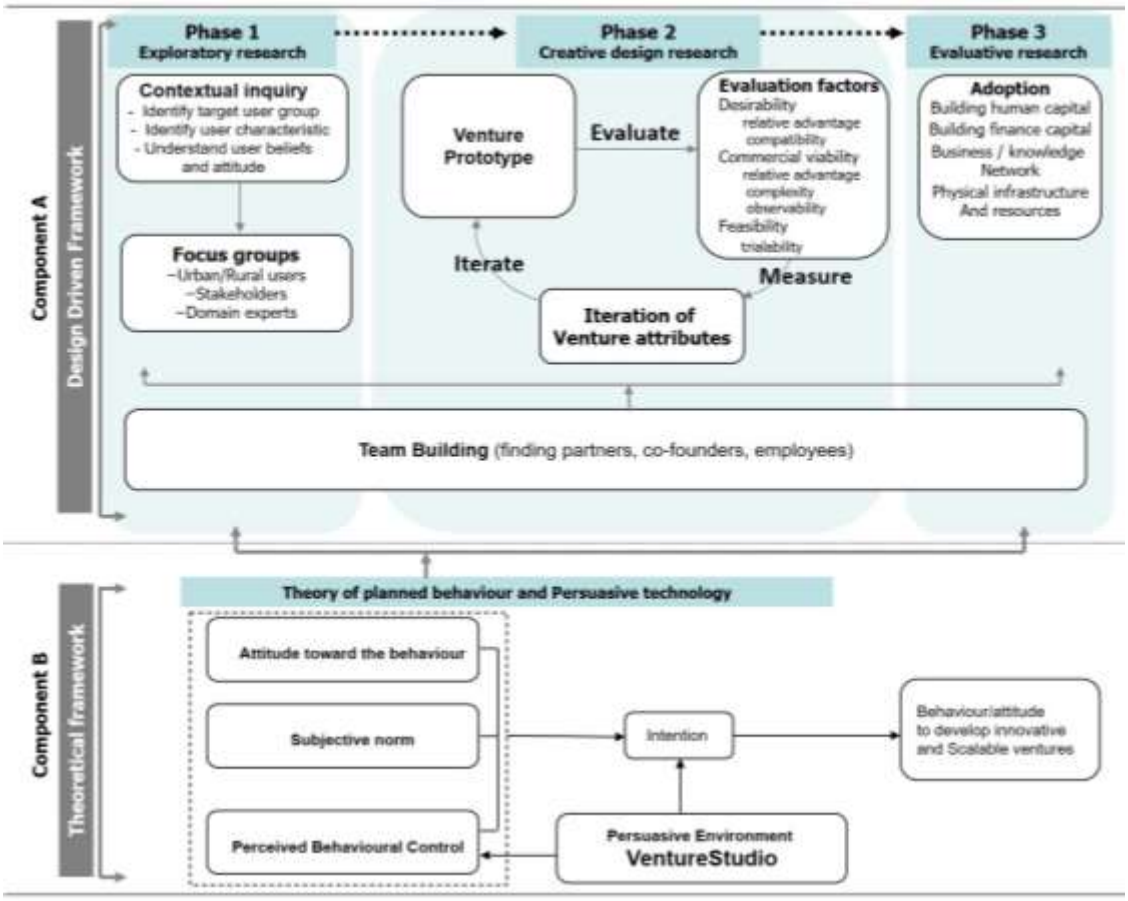

Figure. 2: Persuasive education and environment framework

3.2.2 Creative design research

The first aim is to design a prototype of a product or services and to test all value proposition assumptions with actual customers/users. In creative design research, we apply Persuasive Technology (PT). With a focus on persuading individuals to becoming an entrepreneur, functional triad framework from PT that illustrates the three roles computing technology can play: as a tool, a medium, and a social actor were adapted to design the physical environment of VS, and curriculum that could shape design fellow's mindsets. In the Indian context, the social actor approach is more effective because it offers a variety of social cues that elicit social responses from the design fellows. There are five types of social cues including physical, psychological, language, social dynamics, and social roles. In engineering entrepreneurship, all the cues were integrated for instance, (a) designing of physical spaces to push community or individual centric behaviour, (b) designing and sharing content that could influence the psychology of design fellows, (c) using content and language that is widely understood by design fellows, (d) building teams that could spur constructive social dynamics, and (e) involving social role models to expose design fellows about venture narration, and entrepreneurship.

The second aim is to iterate the design of VP on the basis of user feedback. User feedback is collected on the basis of five innovation attributes (relative advantage, compatibility, complexity, trialability and observability). The five innovation attributes were mapped in the venture design context and can be understood as: (a) Desirability (relative advantage, compatibility): idea of becoming an entrepreneur versus safe job should be judged by risk and scale of reward. In terms of venture, if offering has clear relative advantage over competitors, better economic value, and matching the demand of users would make idea desirable. The greater the perceived advantage, the higher the rate of adoption, (b) Commercial viability (relative advantage, complexity, observability): a commercial viability is based on factors such as price positioning in the market in relation to competitors, is customer base increasing after launch of venture, degree to which an innovation is perceived as

complex to understand and use. How it will be marketed and made visible would increase observability of the venture, (c) Feasibility (trialability): feasibility of the venture is the degree to which an innovation may be tried and experimented with users in the context.

3.2.3 Evaluative research

In this phase, Desirability, Commercial viability, and Feasibility that are mapped to innovation attributes from diffusion theory; aid in evaluating the quality of venture design. The findings from this phase should measure the acceptance rate of new venture and act as an indicator for measuring user adoption. From the innovation ecosystem perspective, evaluation is conducted on hard and soft indicators. For instance, how many ventures were founded, how many design fellows were trained to become and think like entrepreneurs (human capital), how many investors believe in this vision and are keen to contribute as mentor (Finance capital). Evaluation of ecosystem level initiative is challenging due to involvement of multiple stakeholders. (Odemir & Sehitoglu, 2013; Abi-Fadel & Peeters, 2019) pointed out that though there are several empirical studies on the performance of business incubators, however, there is no single standard method that is universally acceptable has emerged to measure the incubation performance and make comparisons.

4. Results from PEE framework

The Design driven approach applied in designing the physical space and venture curriculum led to structured development of the VS. Based on the literature findings, we agree that innovation ecosystem initiative cannot be evaluated as a laboratory experiment, rather it should be evaluated with both hard and soft performance indicators. The following sections reports some of the initial learnings from implementing PEE framework in the Indian context.

4.1 Creating entrepreneurs and founding ventures

In the first five year, we could attract n=49 design fellows to participate in our fellowship program. In total n=24 ventures were founded.

4.1.1 Building human capital

VS offering: Venture Design curriculum offered by design and engineering experts for six-month duration *Measurable result: (a)* Curriculum attracted design fellows from varied education and economic background, (b) Every six months, average 3-4 start-ups were founded, (c) Grooming of venture fellows to become reflective and innovative in their approach, (d) Design fellows build team and started venture creation process.

4.1.2 Building financial capital

VS offering: Seed funding for venture exploration- All the venture fellows were offered a seed funding support based on intermediate evaluation of venture, *Formation of Ahmedabad Venture Alliance and Angel network* to support next stage funding of ventures, Establishing *VS as a nodal institution for government funding monitoring and distribution*

Measurable result: (a) Available seed funds were used by the design fellows to demonstrate their venture value propositions via working prototypes. Prototypes supported venture fellows in the pitching process, (b) This initiative attracted group of senior industrialists with interest in innovation ecosystem and created pool of mentors with diverse background, (c) Venture design curriculum leading to early success of ventures, and industry association gave confidence to government organisation to trust VS as a reliable partner for building innovation eco-system.

4.1.3 Access to knowledge and business network

VS offering: Access to knowledge resource- Venture Fellows were offered access to libraries and resources from international collaboration. *Access to subject expertise* - Venture Fellows could interact with subject experts to expand their knowledge related to their own venture. *Access to regional industry network* - University management and mentors' national and international network were accessible for in-depth venture discussion

Measurable result: (a) Design fellows conducted competitive analysis by primary research, (b) Access to state of the art literature related to their venture idea led to deeper understanding of ideas, (c) Interact with subject

experts to validate their venture approach, (d) Design fellow's interaction with industry network and their owners led to formation of Ahmedabad Angel fund that agreed to invest on VS ventures and other start-ups from the regional eco-system.

4.1.4 Physical infrastructure and resources

VS offering: Workshop facilities for prototyping - Access to tools and machine for building low and high-fidelity prototypes. *Physical environment for experimentation* - Physical environment that encourages venture fellow to be experimental, and offers freedom to express themselves

Measurable result: (a) Workable prototype brought credibility to venture fellows pitch and confidence among investors, (b) Bringing like-minded people under the same roof led to venture team formation, (c) Physical environment offered freedom to argue and deal with conflicts, (d) Physical environment that delayed judgement, instead promoted radical thinking.

4.2 Persuasive entrepreneurial institution

The VS became a nucleus within Ahmedabad University to promote innovation culture among students and faculty members. With success from initial fellowship batches, we could convince government organizations involved with innovation promotional activities about the value of structured approach to engineering entrepreneurship, rather than giving away seed funds to already developed ideas that were not tested enough on their business viability. Our approach won the trust of government officials to make VS innovation center as their satellite center to distribute and monitor their different funding schemes. The board members of the VS could persuade their network to come together to form an investment fund. With initial success of few ventures, we could advocate effectiveness of the venture design curriculum to relevant stakeholders to engineer entrepreneurship and created credibility among professional investors.

5. Conclusion

The implementation of PEE framework led to few successful start-ups from a first batch onwards. However, exact contribution to build an innovation ecosystem would require a bit longer observation to see how companies from VS will grow and influence the surrounding context. The multidisciplinary theoretical approach became a source of principle for guiding design innovation to address complex development issues. The theoretical understanding provided guidance to apply design and user driven processes to achieve focused results. The modularity of both components provided the right emphasis to theoretical underpinning at each stage of the development. This linking generated scientific knowledge required to give direction to build effective Innovation and Entrepreneurial institutions, that is often over-looked in the existing approaches of innovation ecosystem development. In future, we will continue to observe the long-term impact of VS and evaluate if PEE framework really shortened the cycle of developing innovation ecosystem in a socially complex context like India.

References

Abi-Fadel,M. and Peeters, W.A.R. (2019) "The role of incubators in the European new space economy", New Space, Vol. 7 No. 4, pp. 201-207

Angelique, SS., Geoffrey, K., Charlene, Z (2018) The opportunity not taken: The occupational identity of entrepreneurs in contexts of poverty. Journal of Busi-ness Venturing 33, 416-427

Ajzen, I (1991) The Theory of Planned Behaviour: Organisational Behviour and Human Decision Processes 50(2): 179-211

Autio, E., Kenney, M., Mustard, P., Siegel, D., & Wright, M. (2014) Entrepreneurial innovation: The importance of context. Research Policy, 43(7), 1097–1108.

Baumol, W. J. (1990) Entrepreneurship: Productive, unproductive, and destructive. Journal of Political Economy, 98(5, Part 1), 893–921.

Baporikar, N. (2015) Framework for Social Change through Startups in India, International Journal of Civic Engagement and Social Change, 2(1), 30-42, January-March 2015

Bala Subrahmanya, M.H. and Ramachandran, P. (2018) Technology Business Incubators in India: An Exploratory Study on their contribution to National R&D Efforts, Research Project Report, National Science and Technology Management Information System (NSTMIS) Division, Department of Science and Technology, New Delhi

Bismala, L., Andriany, D. and Siregar, G. (2020) "Development strategy analysis of technology business incubator in small medium enterprises accompaniment", Journal of Critical Reviews, Vol. 7 No. 1, pp. 221-225.

Bird, B. (1988) Implementing entrepreneurial ideas: The case for intention. Academy of Management Review, 13(3), 442–453.

David B. Audretsch (2021) "Have we oversold the Silicon Valley model of entrepreneurship?," Small Business Economics, Springer, vol. 56(2), pages 849-856, February.

Dul, J., & Ceylan, C. (2014) The Impact of a Creativity-supporting Work Environment on a Firm's Product Innovation Performance. Journal of Product Innovation Management, 31(6), 1254–1267.

Dutz, M. A. (2007) Unleashing India's Innovation: Towards Sustainable and Inclusive Growth. Washington, DC: The World Bank. doi:10.1596/978-0-8213-7197-8

Fogg, B. J (2003) Persuasive Technology: Using Computers to Change What We Think and Do. San Francisco, Morgan Kaufmann Publishers.

Jai B.P. Sinha (2014) Psycho-Social Analysis of the Indian Mindset. New Delhi: Springer, ISBN 97881-322-1803-6

Kumar, R. (2004) Brahmanical idealism, anarchical individualism, and dynamics of Indian negotiating behaviour. International Journal of Cross-Cultural Management, 4, 39–58.

Lenihan, H., Hart, M. & Roper, S. (2007) Industrial Policy Evaluation: Theoretical Foundations and Empirical Innovations: New Wine in New Bottles, International Review of Applied Economics, Vol. 21, No.3, 313-319

Levie, J., Autio, E., Acs, Z., & Hart, M. (2014) Global entrepreneurship and institutions: An introduction. Small Business Economics, 42(3), 437–444.

Marie Lall (2005) The Challenges for India's Education System, Asia Programme, Chatham House, Report

NASSCOM (2019) Indian Tech Startup Ecosystem: Leading Tech in the 20s, Noida

Odemir, O.C. and Sehitglu, Y. (2013), "Assessing the impacts of technology business incubators: a framework for technology development centres in Turkey", Procedia – Social and Behavioural Sciences, Vol. 75 No. 3, pp. 282-291.

Parmar, VS (2009) Design framework for developing ICT products and services for rural development - A persuasive health information system for rural India. Publisher: TUD

Rogers, E. M (1995) Diffusion of Innovations. The Free Press, New York.

Ramsden M., and Bennett, RJ (2005) The benefits of external support to SMEs, Journal of Small Business and Enterprise Development, Vol. 12 Is 2 pp. 227 – 243

Sinha, J. B. P., & Verma, J. (1994) Collectivism and socio-economic and psychological wellbeing. In U. Kim, H. C. Triandis, C. Kagitcibasi, S. C. Choi, & G. Yoon (Eds.), Individualism and collectivism: Theory, method, and applications (pp. 267–275). Thousand Oakes/London/New Delhi: Sage.

Stephens, S., & Onofrei, G. (2012) Measuring business incubation outcomes An Irish case study. The International Journal of Entrepreneurship and Innovation, 13(4), 277-285.

Thoring, K., Goncalves, M., Mueller, R., Badke-Schaub, P., Desmet, P (2017) Inspiration Space: Towards a theory of creativity-supporting learning environments, In: E. Bohemia, C. de Bont, & L. S. Holm (Eds.), Conference Proceedings of the Design Management Academy Vol. 1, pp. 161–178). London: De-sign Management Academy.

Welter, F., Baker, T. and Wirsching, K. (2018) Three waves and counting: the rising tide of contextualization in entrepreneurship research, Small Business Economics/article/10.1007/s11187-018-0094-5.

How to Increase the Efficiency of Social Enterprises During the COVID-19 Pandemic?

Ruslan Pavlov
Central Economics and Mathematics Institute of the Russian Academy of Sciences, Moscow, Russia
pavlovru@mail.ru
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Abstract: The paper considers the examples of economic activities of social enterprises during the COVID-19 pandemic. It is shown that often social enterprises are more effective than common enterprises in their responses to the processes caused by the COVID-19 pandemic. A model of interaction between different actors enhancing the efficiency of social enterprises by means of providing the continuous source of cashflow is provided. At the macro-level of this model it's necessary to mention such interesting program as Pay for Success which was initiated by B. Obama's Administration in 2009. Indeed, this program was a way of government support of the social entrepreneurship programs, but only those programs which proved to be successful during the process of their realization. At the meso-level of mechanisms supporting social enterprises we should mention such institutions as the social stock exchange and microfinance institutions. In order to enhance the efficiency of the social stock exchange as a new financial tool for supporting social enterprises one should make some arrangements. First, we should conclude that this instrument should not act as an isolated unit. It should be implemented into the system of different actors supporting social enterprises, along with such potential investors as private sector companies and microfinance institutions. Second, these actors should interact in such manner that enables a cooperation between them. For instance, microfinance institutions should be encouraged to support the social stock exchange. They could do it through providing loans for attracting brokers who could find respectable institutional and strategic investors for the social stock exchange. These loans could be repaid from the profits that brokers could get from selling shares. The system would be enhanced by encouraging private sector companies to act in this process. The private sector companies could acquire shares at the social stock exchange, and they could be encouraged to do so by the policy of tax rate decreasing for those companies, who would invest into the social enterprises.

Keywords: social enterprise, COVID-19 pandemic, innovation, private sector

1. Introduction

Nowadays the problems caused by the COVID-19 pandemic become very urgent, because almost all the sectors of national economies are influenced by this phenomenon. Social enterprises are often treated as efficient tools in the struggle against pandemic. It is sufficient to present just few examples concerning the role of social enterprises in the fight against COVID-19 to exemplify their ability to overcome the difficulties caused by this phenomenon.

So, for instance, now different reports suggest the distribution of counterfeit medications is on the rise, filling gaps in the market caused by production delays in India and China. Innovators that provide quality-assurance services can help providers and consumers validate the authenticity of essential goods. For example, the RxDelivered platform in Nigeria connects pharmacists and consumers to a network of licensed wholesalers and manufacturers, from which they batch-certify product quality prior to delivery. This social enterprise has reported a tenfold increase in week-on-week customers, which it attributes to a growing demand for authenticated masks and medication (Staples et al., 2020).

Another example is connected with the social enterprise Root Capital, which works in the most remote communities of Africa, Latin America, and Indonesia. Working with socially-minded enterprises across its global network, over the last several months this enterprise has been able to deliver services and much-needed supplies (face masks, soap, medicine, and more) to hundreds of thousands of rural families (Foote, 2020).

The third example is connected with Amazon Conservation Team, which is filling a public service vacuum in highly remote indigenous communities of the Amazon. Among other things, they are translating public health information into native languages and sharing it through radio and WhatsApp, channels that they know indigenous communities utilize. Social entrepreneurs are ready, able, and willing to reach underserved groups—in many cases, they already have reach into these communities. By leveraging those connections, they can help flatten the disproportionate impacts of the pandemic.

The fourth example is connected with YouthBuild USA that tackles a systemic challenge: the estimated 4.5 million young adults aged 16-24 in America that were neither in work nor in school even before COVID-19 hit. Between February and June of 2020, the rate of "disconnected" youth (out of work and out of school) more than doubled making YouthBuild's work even more vital. According to John Valverde, YouthBuild USA's president and CEO, young people who graduated in 2008 during the Great Recession "were just starting to recover when COVID-19 hit." Projections already indicated that these youth had lost a third of their lifetime earning potential. Now, says Valverde, "not only will they be further set back, but young people graduating in 2020 will experience the same, if not worse, impacts. That's why YouthBuild has shifted its model to focus not just on building jobs and skills, but on the mental health and wellness of its students—and on creating strong community connections that can help young people weather the storm of COVID-19" (Foote, 2020).

The last example deals with Citizen Schools, another social enterprise focused on young adults, which is tackling the pandemic-related challenge of students' education and wellbeing in the age of distance learning. According to Emily McCann, CEO of Citizen Schools, "Citizen Schools is mobilizing volunteers to offer additional support to middle school students across the country in ways that are engaging, joyful, and skill building" (Foote, 2020). The organization's COVID-19-related innovations also include virtual "apprenticeships" in which students work with volunteers to solve authentic community problems in small groups; one-on-one and small group tutoring in English, math, and science; and Career Connection Conversations that allow students to indulge their curiosity and build their social network.

2. Who helped social enterprises in their struggle against COVID-19?

The COVID Response Alliance for Social Entrepreneurs was founded in April 2020 by 60 leading organizations to help mobilize support for social entrepreneurs and to raise awareness of the vital role they play during the crisis and beyond (COVID Response Alliance for Social Entrepreneurs, 2020). Here 6 cases concerning the role of members of the COVID Response Alliance for Social Entrepreneurs in the struggle of social enterprises against the COVID-19 pandemic will be considered.

The first case is connected with Family Independence Initiative (FII). Founded in 2001, FII provides families with direct cash transfers, a digital platform and peer groups to accelerate the exchange of financial and social capital in low-income communities across the USA. FII has collaborated with over 250 community-based organizations to help families escape the cycle of poverty. Through the GiveTogetherNow campaign and the UpTogether platform, FII raised over $100 million and provided direct cash transfers to over 100,000 low-income families who were struggling to make ends meet and to care for their loved one. The Alliance member involved into its activity was Schwab Foundation for Social Entrepreneurship. This organization is collating all the information that may be of use to social innovators from external sources, including access to financial support, access to legal resources and access to technology.

Another example is connected with Instituto Muda. Established in 2007, Instituto Muda provides recycling collection services in residential areas, companies and schools around São Paulo. It allocates more than 300 tons of recyclable materials per month to cooperatives that employ people living below the poverty line. During the COVID-19 pandemic Instituto Muda stepped in to provide the cooperatives not only with financial help to pay their workers to support their families, but also with a supply of masks, equipment and disinfectant gel. The Alliance member that was involved in this process was Yunus Social Business. This organization turns donations into investments in sustainable Social Businesses that provide employment, education, healthcare, safe water and clean energy to over 9 million people worldwide. As well as finance it provides growth support to help its Social Businesses create the most social impact possible.

The third example is connected with Praekelt, a mobile technology company that harnesses the power of communication between patients, health workers and the health system to ensure that patients are informed and empowered; health workers are supported and valued; and health system officials have the information they need to make informed and effective decisions to improve service delivery and quality. During the COVID-19 pandemic with countries and organizations experiencing a massive need for direct communication of reliable information, Praekelt partnered with the World Health Organization and WhatsApp to develop the WHO's global public health WhatsApp information tool for citizens. In addition, 11 national health systems, primarily in Africa and South-East Asia, launched local versions of this service. These solutions provide citizens and health workers with reliable, up-to-date information and relevant services related to COVID-19 and are reaching over 20 million

people in 20 languages worldwide. The Alliance member that was involved in this process was Johnson & Johnson. This company is delivering critical support for communities and health workers on the frontlines. In March 2020 the Johnson & Johnson Family of Companies and the Johnson & Johnson Foundation committed $50 million dollars to support frontline health workers—from meals to protective equipment, extra training to mental health. This commitment expands upon a $250 million multi-year commitment the company made earlier that year to support those at the frontlines guided by the Johnson & Johnson Center for Health Worker Innovation.

The fourth example is connected with Jan Sahas, a 20-year-old community organization working with excluded social groups on safe migration and workers' protection in 14,000 villages and urban areas in 57 districts in India. In response to COVID-19, Jan Sahas provided food to over 420,000 migrants, 11,000 personal protective equipment kits, and emergency transportation to 17,000 migrants and their families. It is now launching a grassroots-led collaboration with approximately 80 partners to ensure the safe, responsible recovery of migrant families and their livelihoods post-COVID. The Alliance member involved in this process is Ashoka that is helping small and medium-sized enterprises resist the economic effects of the crisis: using social media to promote businesses and advertise their services at a low cost and reach a new pool of potential clients.

The fifth example is connected with Eneza Education, which provides SMS-based learning to students who do not have access to a classroom or need additional support. In the wake of COVID-19-related school closures, Eneza Education leveraged strategic partnerships to open its platform without charge to learners in Kenya and Côte d'Ivoire, reaching 2.2 million learners who do not have steady access to the internet with its USSD/SMS-based learning resources. It has now launched its platform in Rwanda to serve users in that country. The Alliance member that was involved in that process was Sorenson Impact Foundation. It was founded by James Lee Sorenson, who was intrigued many years ago with the idea of finding market solutions to meet the needs of underserved communities and since then he has established the Sorenson Impact Foundation, which invests in scalable, innovative social entrepreneurs.

The last example is connected with Barefoot College Zanzibar, which is a joint venture set up in 2015 by Barefoot College and the Government of Zanzibar. Barefoot College Zanzibar has been training women solar engineers, women beekeepers and women seamstresses for five years. At the start of COVID-19, the Government of Zanzibar turned to Barefoot College to provide personal protective equipment to more than 70 communities on the island. Its community outreach team educated communities with the result that the incidence of community transmission was cut by more than 80%. The Alliance member that was involved in that process was Catalyst 2030. It is a special platform for redesigning the way of supporting social enterprises. It invites the funding community – including philanthropists, foundations, impact investors, corporate donors, government agencies, and multilateral organizations – to fundamentally rethink and redesign the way systems change approaches are being supported.

3. Why social entrepreneurs are needed now more than ever

Social entrepreneurs have been working to solve market failures and demonstrate sustainable models to build inclusive economies for years. These entrepreneurs bring vital products and services to those on the fringes of society, while acting as first responders during a crisis and sustain jobs and social security at a time, when the effects of losing one's income can be particularly devastating. Moreover, social enterprises typically create jobs for local people, resulting in direct and indirect impacts on the local supply chain and broader economy – all of which is viewed very positively in the current economic environment (Galbraith and Molinari, 2014).

The Schwab Foundation 2020 Report entitled "Two decades of Impact" demonstrates how its network of 400 leading social innovators and entrepreneurs alone have improved the lives of more than 622 million people in over 190 countries by protecting livelihoods, driving movements for social inclusion and environmental sustainability, and providing improved access to health, sanitation, education and energy (Schwab Foundation…, 2020).

When COVID-19 brought disarray to communities across the world, and social entrepreneurs everywhere instantly assumed first responder roles. From providing reliable information, services and care to the most vulnerable to developing community tracing initiatives or mental health support through mobile phones, the work of the social entrepreneurs became even more critical during the pandemic.

Over the last few months notable stories of social entrepreneurs who have gone above and beyond their regular mandates have emerged. Many chose to maintain jobs through the pandemic despite their halting businesses, while those in a position to do so provided last-mile support – for example by delivering essentials like masks and sanitizers to those unable to afford the bare minimum to keep themselves safe. Their existing relationships with low-income customers or beneficiaries and the trust they had built on the ground positioned them well as early responders to the pandemic.

The need for social entrepreneurs is clearer now than ever before. They are a crucial social safety net for our systemic inequalities and market failures. The social entrepreneurs who are "system change leaders" have an especially invaluable role to play in triggering a reset of today's markets and societies. They have managed to enable whole groups of society to become agents of their own change and have effectively managed to navigate the complex arrangements of institutions of power (COVID Response Alliance for Social Entrepreneurs, 2020).

Social entrepreneurs are uniquely positioned to represent a new yardstick for leaders in the 21st century. Their knowledge, experience and existing on-the-ground infrastructure can play a vital role in revitalizing the sustainable development agenda and building more inclusive, shockproof and resilient markets and societies.

Yet, many social entrepreneurs face significant and immediate operational and viability challenges and need backing. Significant capital and non-financial support are vital to put social entrepreneurs in a position to effectively protect the most vulnerable in the crisis and help shape the transition to a new social and economic reality.

4. What should be done to enhance the sustainability of social enterprises during the COVID-19 Pandemic

In this section we provide one of possible models of interaction between different institutions supporting the development of social enterprises during the COVID-19 pandemic. It's necessary to mention such interesting program as Pay for Success which was initiated by B. Obama's Administration in 2009. Indeed, this program was a way of government support of the social entrepreneurship programs, but only those programs which proved to be successful during the process of their realization. Americans have developed programs to tackle seemingly intractable problems, from homelessness to illiteracy, from chronic disease to climate change and more. Some of these services are already proven by rigorous evaluation to be effective; others show tremendous promise to move the needle. But they often are not equipped to make the kind of impact that the U.S. nation needs. Pay for Success (PFS) can be a solution. It tests and advances promising and proven interventions, while providing taxpayer (or other) dollars for successful outcomes for families, individuals, communities, or natural resources. From the other hand, it's necessary to mention such kind of government support as the public procurements which played a major role in strengthening the financial position of the British social enterprises. And the third participant of the support mechanisms of social enterprises at the macro-level are Community Development Financial Institutions (CDFIs). A CDFI is a financial institution that provides credit and financial services to underserved markets and populations, primarily in the USA, but also in the UK. A CDFI may be a community development bank, a community development credit union, a community development loan fund, a community development venture capital fund, a microenterprise development loan fund, or a community development corporation. In 2006 there were approximately 1,250 CDFIs consisting of more than 500 community development loan funds, more than 350 community development banks, more than 290 community development credit unions, more than 80 community development venture capital funds (Wikipedia, 2020).

At the meso-level of mechanisms supporting social enterprises we should mention such institutions as the social stock exchange and microfinance institutions. So, what should be done to enhance the efficiency of the social stock exchange as a new financial tool for supporting social enterprises? First, we should conclude that this instrument should not act as an isolated unit. It should be implemented into the system of different actors supporting social enterprises, along with such potential investors as private sector companies and microfinance institutions (see Figure 1). These actors should interact in such manner that enables a cooperation between them. For instance, microfinance institutions should be encouraged to invest their funds into the social enterprises. They could do it through providing loans for attracting brokers who could find respectable institutional and strategic investors for the social stock exchange. These loans could be repaid from the profits that brokers could get from selling shares. The system would be enhancing by encouraging private sector companies to act in this process. The private sector companies could acquire shares at the social stock exchange,

and they could be encouraged to do so by the policy of tax rate decreasing for those companies, who would invest into the social enterprises. Also they could be encouraged to do so by the perspective of using social enterprises as sub-contractors, outsourcing them those business processes from their contract activities that could be performed well without any damage for the social projects. So, they could control them and at the same time they could support them, because they are interested in them as sub-contractors. At the same time they could acquire microloans from microfinance institutions and repay it at a special interest rate that could be higher than that of microloans for social enterprises, and by doing that way they could support microfinance institutions. That could be one of the forms of social responsibility of business.

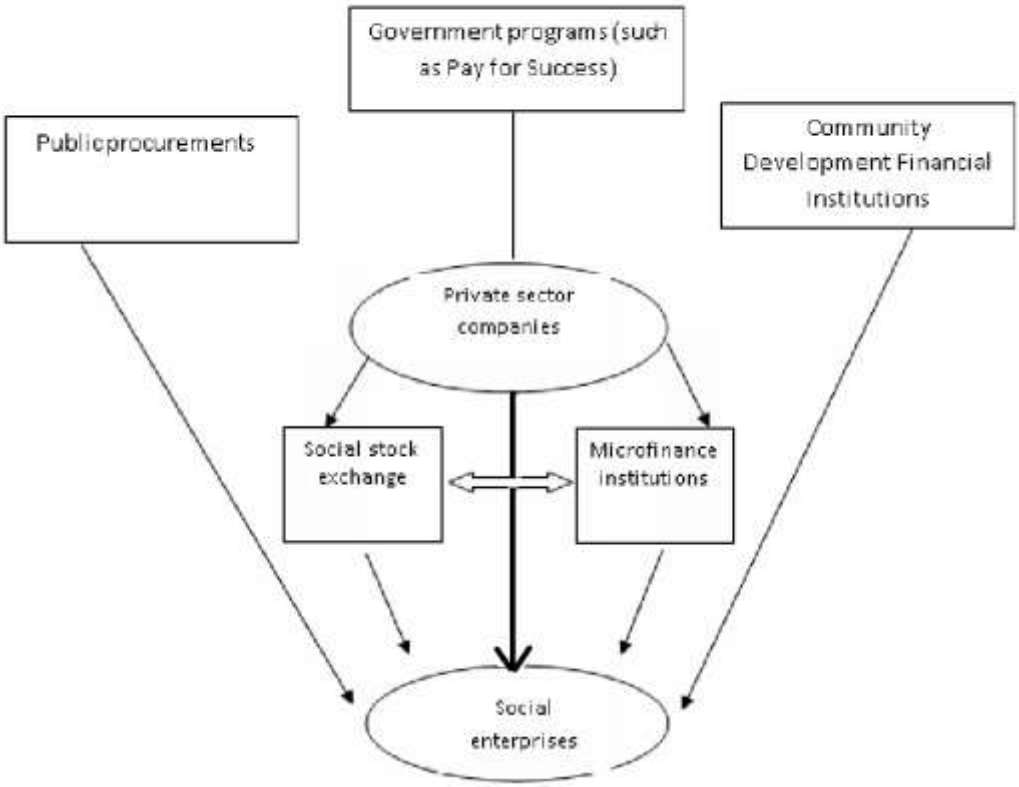

Figure 1: Interaction between different elements of support system for social enterprises

At the same time if the market lacks any necessary investors to maintain its normal performance, microfinance institutions could act as investors themselves, acquiring shares of social enterprises listed at this exchange, and so facilitating the work of this exchange by supporting it. Having much experience in the financial sector services, as well as being successful in raising capital, they could act as a special mutual fund, the funds of which could be spent to acquire shares of social enterprises, and the dividends could be used as micro-loans for other social enterprises being their customers.

The UK social stock exchange acts as a private limited company now, but it should be protected against different ways of takeovers, especially hostile ones. First, the government could protect this financial institute by holding a controlling interest in this exchange as a special social purpose institution. Otherwise it could be captured by the large private companies, and the situation would be similar to the consequences of social outsourcing, when a lot of social entities in the UK were managed by the private business. That led to a disaster in the performance of these entities, because of reducing social costs by new management, which didn't act in line with public interest, but instead was pursuing its own. These cases were highlighted in a special report on social outsourcing in the UK (see Williams, Richardson, 2012). Another measure of securing social stock exchange against any threats of privatizing could be expressed in introducing the asset lock principle, which is often used to protect social enterprises against possible abuses of the private sector.

5. In conclusion

So, in conclusion we should say that to have the ability to win during the fight with COVID-19 one should form a system of institutions backing social enterprises at different levels of their regulation. It's necessary to create a close integration between microfinance institutions and the social stock exchange by means of the mechanism provided in this paper. Also it's necessary to find out new ways of involving the private sector companies into the process of development of social entrepreneurship by means of private investments. As the experience of the COVID-19 Response Alliance for Social Entrepreneurs suggests, these institutions can play this role effectively. Though, as many experts think, many social entrepreneurs face significant and immediate operational and viability challenges and need backing. Significant capital and non-financial support are vital to put social entrepreneurs in a position to effectively protect the most vulnerable in the crisis and help shape the transition to a new social and economic reality.

References

Galbraith B. and Molinari F. (2014) The role of the business school in supporting social enterprises: practices and perspectives // Social Innovation and Entrepreneurship: Case Studies, Practices and Perspectives. Ed. by B. Galbraith and F. Molinari. ACPI, Reading, pp. 1-13.

Schwab Foundation for Social Entrepreneurship (2020), Two decades of Impact, 2020 Impact Report [online], World Economic Forum, http://www3.weforum.org/docs/WEF_Schwab_Foundation_2020_Impact_Report.pdf

COVID Response Alliance for Social Entrepreneurs (2020) COVID-19 Action Agenda Leaders on the Front Line: Why Social Entrepreneurs Are Needed Now More than Ever [online], World Economic Forum http://www3.weforum.org/docs/COVID19_SocEnt_Alliance_Report_2020.pdf

Staples M.H., St-Denis K., Allen A., Yadav P. (2020) Opinion: How social enterprises are playing a role in COVID-19 response [online], Devex, https://www.devex.com/news/opinion-how-social-enterprises-are-playing-a-role-in-ovid-19-response-97146

Foote W. (2020) How Social Entrepreneurs Will help us fight COVID-19 and Build Back Better [online], Forbes, https://www.forbes.com/sites/willyfoote/2020/11/17/how-social-entrepreneurs-will-help-us-fight-covid-19-and-build-back-better/?sh=76084fbe5c93

Wikipedia (2020) Community Development Financial Institutions, [online], http://www.en.wikipedia.org/wiki/Community_development_financial_institution

Organizational Innovation: The Theoretical Ideas of James G. March

Tor Helge Pedersen
Inland University College of Applied Sciences, Lillehammer, Norway
Tor.Helge.Pedersen@inn.no
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Abstract: The significant scholarly productions of James G. March have contributed to and even shaped several research fields, including political and organizational science. For example, his contributions to the topic of organizational learning are widely known in organization research. Furthermore, recent studies on the impact of the specific publications of James March have identified organizational innovation as an emerging topic of inspiration from his publications over the years (e.g., Wilden, Hohlberger, Devinney and Lumineau 2019). This is not surprising. James March, Herbert A. Simon and Richard Cyert were among the first to connect the theoretical concept of innovation to processes inside organizations (March and Simon 1958; Cyert and March 1963). However, even though March has long influenced research on innovation, there are few, if any, scholars who have traced his ideas about innovation over his long and influential career. Motivated by this observation, this paper focuses on James March's theoretical contribution to innovation in organizations. The objective is to identify, extract and discuss his ideas by asking the following question: how did March use the concept of innovation over time, and what relevance does it have today? The theoretical discussion is based on eight key publications from 1958 to 2015, which were selected because they introduce new theoretical ideas to innovation or innovation-related topics. The three examples (central findings) of the relevance today have the following implications or contributions. First, the idea that organizations must balance the pursuit of novelty and the pursuit of efficiency implies that internal innovation efforts are as important as adopting external innovations. Second, the idea of performance gaps is relevant in understanding organizational responses to the COVID-19 crisis and lockdowns. Third, the idea of sunk costs of innovation implies that innovations are investments that can (more or less) lead to inertia in connection to later changes. All of these implications contribute to the general discourse on innovation in organizations by adding the ideas of James March.

Keywords: innovation, novelty, exploration, exploitation, sunk cost, performance gap theory

1. Introduction

There are at least two main conceptions of organizational innovation. First, it can be viewed as a novel output and category in the theory of innovation-driven economic development (Schumpeter 1934). The other conception is that organizational innovation is a specific type of organizational change that involves adopting something new in the organization (Hage 1999) or the process of developing and implementing a new idea (Schroeder, Van De Ven, Scudder and Polley 1989, p. 108), whether this is a new technology, ideas, structures, models, processes, products or services. This conception has roots in the 1960s, when researchers adopted the classic model of diffusion to study organizational innovation (Van de Ven and Rogers 1988).

In their book *Organizations*, March and Simon (1958) used a new conception of (organizational) innovation. The focus was not on autonomous individual adopters (e.g., farmers and representatives of organizations) but within organizations: internal processes, structures, sources of innovation, behaviours (e.g., problem-solving, search) and the why and how of innovation. These innovations could be borrowed from outside or invented within organizations. From this first book with Herbert A. Simon and until 2015, March devoted at least a small part of his large scholarly production to innovation-related topics. He discussed innovation in connection with organizational change (March 1981), the technology of foolishness (March 1971; 1972) and organizational learning (March 1991). Later, he became interested in novelty and discussed it in connection with topics such as the technology of foolishness (March 1971; 1972), organizational learning (March 1991; 2003), the case study of the Rand Corporation (Augier, March and Marshall, 2015), and especially in two later publications (Becker, Knudsen, and March 2006; March 2010). This paper traces his thinking on innovation and extracts his ideas that are relevant today.

The objective of this paper is to identify, extract and discuss March's ideas on innovation. The theoretical discussion is based on eight key publications regarding innovation. Methodologically, these publications and identified theoretical ideas are related to three periods in March's academic career (see section 2). March's scholarly production is large and covers various fields. He is, with regard to organization research, the father of concepts and ideas such as organizational slack, standard operating procedures, organizational learning, sequential attention to goals, problemistic search, the firm as a political coalition, and exploration and exploitation (Brunsson 2019). March discusses or mentions innovation in several publications. Among these, we

have selected publications that introduce new innovation-related concepts (e.g., March 1971, 1991). This means that several publications are excluded. Examples include republished materials in anthologies, later publications discussing the same theme and publications not explicitly about innovation-related themes. The remainder of the paper is organized as follows. First, March's evolving theoretical architecture over three periods is presented. Next, the paper illustrates its relevance today through three examples: developing innovations inside organizations, performance gaps and sunk costs.

2. James March's thinking on innovations in three periods

As mentioned, James March (1928–2018) published prolifically during all three periods included here (Carnegie Tech, Irvine and Stanford). This section describes his ideas in relation to innovation, taken from key publications from the three periods.

2.1 The Carnegie Tech period (1953–1964)

Herbert Simon hired James March from Yale to Carnegie Tech in 1953. The latter was an emerging innovative interdisciplinary milieu with funding from the Ford Foundation that was intended to reform business education, and the milieu had connections to the Rand Corporation. Out of this environment came two books in which March participated. The first was *Organizations* (March and Simon 1958) on organization theory. It built on ideas from various disciplines, such as sociology, social psychology, economics, game theory and statistical decision theory. The chapter on innovation did not follow Schumpeter's approach to or conception of innovation. Unlike Schumpeter, March and Simon looked inside the organization at its structure and behaviours. While Schumpeter (1934) separated economically significant innovation from inventions not relevant to economics, March and Simon (1958) included both invention and innovation in their conception of innovation. Their inspiration drawn from diffusion research was also limited. For them, the adopting and innovating unit is the organization, not the individual. Their inspiration was drawn more heavily from inside the Carnegie Tech milieu. For example, Simon (1952) had previously identified innovation as a research area relevant to organization theory. Other examples are the notion of sunk cost (Simon 1947, pp. 66, 95, 110) and the idea of the cognitive limits of rationality, that is, limited information, attention and processing ability. March and Simon begin the chapter on planning and innovation by writing that their task is one of "analyzing more completely how cognitive limits on rationality affect the processes of organizational change and program development [innovation]" (March and Simon 1958, p. 193). The innovating process is closely related to problem-solving processes, so the search activities during the innovation process will be limited in scope. Rather than searching for all possible alternatives, an organization finds a satisfactory solution, and the search is terminated.

March and Simon (1958) define initiation and innovation as introducing "new performance programs that have not previously been part of the organization's repertory" (p. 195), which represent the extent of change because innovation "cannot be introduced by a simple application of programmed switching rules" (p. 195). Newness and change are, therefore, keywords in their definition. They adopt an individualist perspective on innovation: individuals cause innovation. A search for innovation is initiated via dissatisfaction with, for example, the organization's perceived achievement relative to its changing environment. They call this a theory of choice between persistence and change. The absence of a search for new alternatives means that there is no dissatisfaction with existing programs (p. 194). Perception and performance dissatisfaction are keywords. The lower an organization's satisfaction with its performance, the more likely it is that new programs will be initiated. Comparisons with other organizations and an awareness of better programs may affect decision makers' perception of their own existing programs; therefore, they write that better programs will be pursued "when changes in the environment make the existing organizational procedures unsatisfactory" (March and Simon 1958, p. 204), although "some innovation will result from accidental encounters with opportunities" (p. 204). The innovation process is normally not programmed and is seen as closely related to problem solving. In connection with the process of innovation, March and Simon (1958, pp. 198–9) point out that even complex problem solving or "complex processes can be aggregated from simple elements" (p. 199).

March and Simon (1958) also discuss the sources of new program ideas, suggesting that innovations in an organization may be borrowed or invented. In this way, they include invention in their conception of innovation, but they hypothesise that borrowing is the normal source of innovation because it saves "an organization many of the costs associated with innovation" (p. 209). Furthermore, they discuss the parenthood of innovation, such as necessity versus opportunity, and the optimal stress hypothesis, as well as the nature of innovative activity (p. 208). For example, they write about the processes where new programmes of decision and actions are

"discovered, developed, and put into action" (p. 208), and they discuss the sunk costs of innovation that stem from introducing new programs, ideas and organizations (p. 194). Finally, they discuss organization level and innovation, for example, in relation to participation in the innovation process, the type of innovation and sensitivity to innovation (pp. 215–221).

March's next early book is about the business firm, seen as an adaptive political coalition, and how it makes business decisions (Cyert and March 1963). It has a narrower focus regarding innovation. Cyert and March write about search processes. Perception is a key word in this text because the authors argue that the perception of an organization's success by its participants depends on past experiences of performance rather than on an absolute level of performance. When performance falls below the aspirational level, organizations or leaders search for solutions (Cyert and March 1963). Furthermore, the perception of success may vary among the subunits in the organization.

Innovation is about search behavior, and innovation activity is a form of organizational search. Whether organizational search is problem-driven or opportunity-driven (slack search), the search is conducted in the immediate neighbourhood of the perceived problem, and past experiences in searching for innovations shape the organizational search rules (cognitive limits on rationality). For example, Cyert and March write that "when an organization discovers a solution to a problem by searching in a particular way, it will be more likely to search in that way in future problems of the same type" (Cyert and March 1963, p. 174).

As briefly mentioned above, Cyert and March (1963) also discuss the origins of innovation, which they call "problem-oriented" and slack innovation. Initially, they write, "everything else being equal, relatively unsuccessful firms would be more likely to innovate than successful firms" (p. 188). This hypothesis concerns problem-oriented innovation, such as closing perceived gaps in an organization's performance. Cyert and March suggest a complementary hypothesis regarding slack innovation. They argue that successful organizations can channel slack resources toward innovation activity. They use the findings of another Carnegie Tech study of technological change as an example (Mansfield 1961; see Cyert and March 1963, pp. 188–189). Slack (excess resources), the disparity between the resources available to the organization and the resources required to maintain the organization (p. 42), can spur innovation. They conclude that

> *"Problem-oriented innovation will tend to be justifiable in the short run and directly linked to the problem. Slack innovation will tend to be difficult to justify in the short run and remotely related to any major organizational problem" (Cyert and March 1963, p. 189).*

Thus, in 1963, they concluded that organizations may innovate "both when successful and when unsuccessful" (p. 189). The next section focuses on the Irvine period, which began a year later.

2.2 The Irvine period (1964–1969)

In 1964, March went to Irvine to become a professor of psychology and sociology and the dean of the School of Social Sciences at UCI. Here, he carried out organizational experiments based on elements such as interdisciplinary collaboration, a lack of departments (called disorganization internally) and a quantitative approach to studying social phenomena. March wanted the school to "be conspicuously experimental and innovative" (Kavanagh 2020, p. 46) and felt that it "should be viewed as an experimental laboratory rather than as primarily a production facility" (p. 46). After the Irvine period (1964–1969), ideas such as ambiguity (with Michael Cohen), garbage can decision processes (with Michael Cohen and Johan P. Olsen) and the technology of foolishness emerged in the publications in which March participated.

Especially relevant in connection to the innovation topic in this paper is the idea of the technology of foolishness (March 1971). The article was published about the same time that March was a visiting researcher at various Scandinavian business schools and universities. In it, March argues, "Individuals and organizations need ways of doing things for which they have no good reason. Not always. But sometimes, they need to act before they think" (March 1971, p. 10). He calls this the technology of foolishness and contrasts it with the technology of reason. This concept was devised to supplement the technology of reason, not to replace it. He writes, "Suppose we treat action as a way of creating interesting goals at the same time as we treat goals as a way of justifying action" (March 1971, p. 10). He encourages organizations and their members to experiment to develop their preferences, because preferences may be affected by the experiment (action). Additionally, such experimentation (action) may lead to new and perhaps better preferences and goals. This is a so-called

endogenous change in preferences. As he states earlier in the article, "Human choice behavior is at least as much a process for discovering goals as for acting on them" (p. 8). Finally, March suggests five small beginnings for a technology of foolishness. This article can be related to the pursuit of novelty, which was confirmed by March in an interview (Dong, March and Workiewicz 2017).

2.3 The Stanford period 1970–2018

March went to Stanford University in 1970, and during that period, he was part of the so-called Renaissance in organization theories (Dobbin and Schoonhoven 2010). A decade into the Stanford period, March (1981) discusses innovation in relation to change and research on innovation in organizations. The focus is especially on the later stages of innovation, such as implementation. He argues that during this stage, both innovations and organizations tend to be transformed (p. 569), and this argument builds on an earlier argument about endogenous changes in preferences and goals, for example, "the possibility that preferences and goals may change in response to behavior [the innovation process]" (March 1981, p. 570; see also March 1971, p. 8). Furthermore, he questions assumptions in innovation research at that time, for example, "relying on the assumption that innovations spreading unchanged" (March 1981, p. 569). He discusses solution-driven problems and solution-driven innovation, meaning that the innovation may be a popular idea or fad. In this way, he introduces a new hypothesis about why organizations innovate: innovation may be solution-driven. Finally, he briefly discusses foolishness, new ideas and mechanisms that shield organizations "from the operation of normal rationality" (pp. 572–3). Examples of such mechanisms are organizational slack, ambiguity and loose coupling.

Exploration: Several years later, March (1991) explores the adaptive dilemma underlying organizational adaptation: how to balance efficiency and stability with novelty and innovation. All organizational adaptation, innovation and organizational learning involve a balance between "exploration" and "exploitation". He introduces these two concepts and proposes that exploitation and exploration are two fundamentally different learning activities between which firms divide their attention and resources. Whereas exploitation is associated with activities such as "refinement, efficiency, selection and implementation," exploration refers to notions such as "search, variation, risk taking, experimentation, play, flexibility, discovery and innovation" (March 1991, p. 71). In other words, March offers a host of synonyms for the two concepts and, as mentioned, connects novelty to exploration, writing that exploration is about the pursuit of novelty (March 2003; Dong et al. 2017), while exploitation is about the pursuit of efficiency (March 2003). March (1991; 1999) discusses the relationship and trade-off between the processes and activities underlying exploitation and exploration (Wilden, Hohberger, Devinney and Lavie 2018). For example, it is difficult to balance these two processes. Both excessive exploitation (the success trap) and excessive exploration (the failure trap) are dynamic threats to this balance (March 1999). This discussion has roots in March and Simon's earlier discussion of daily routine versus planning (innovation) (March and Simon 1958, p. 206) and the distinction between program elaboration and program execution (p. 208).

Novelty: Novelty is deviation from established procedures or knowledge. March uses this innovation-related term in three later publications included in this paper. The first example of this is his discussion of Sidney Winter and an earlier unpublished article by Schumpeter (1932) on the sources of novelty (Becker, Knudsen and March 2006). They conclude that Schumpeter did not develop an explanation for novelty. Later, March (2010) discusses the emergence and pursuit of global novelty, which is "new to a population of organizations, not just new to the organization to which they spread" (March 2010, pp. 74–75). He distinguishes novelty from creativity, writing that "creativity is novelty that is subsequently judged successful" (March 2010, p. 75), and he stresses the fact that "[n]ovelty is a necessary, but not sufficient, condition for creativity" (p. 75). March argues that theories of adaptation "deal less well with the exploratory processes by which new ideas, forms, products or practices are created, made available, and protected from premature elimination" (March 2010, p. 74) and goes on to discuss the processes and notions that may constitute the rudiments of a theory of novelty. He identifies two theoretical tracks for understanding novelty: adaptive combinations (new elements that are produced from combinations of established elements) and adaptive inefficiency (e.g., ignorance and error). He concludes that these tracks are promising but have not provided a satisfactory understanding of novelty.

While March, in the early 1970s, argues for tolerance of foolishness or experimentation, he (2010) writes that a theory of novelty must provide an understanding of how exploration survives processes of exploitation. Novel ideas have two characteristics that threaten them: most novel ideas are bad ones, and "when novel ideas are generated, there is no reliable way to anticipate which of them will be successful" (March 2010, p. 75).

Exploration is the pursuit of novelty (March 2003). If organizations want to develop innovations, they must find ways to protect and buffer exploration and novelty and become more able to filter novel ideas and select which ones will be useful.

Highly innovative organizations (creative groups): The final example is a case study of the Rand Corporation, which, for about two decades after World War II, was a highly innovative and influential organization (Augier, March and Marshall 2015). The study illustrates his interest in the rise (flowering) and decline of a culture of innovation or collective intellectual creativity (p. 1142). Without denying the importance of individually idiosyncratic factors, his focus was on organizational features (Augier et al. 2015). He was concerned with which organizational aspects are produced, such as cluster/institution, the mechanisms and seeds of success (e.g., buffering exploration) and decline. The two latter publications, from 2010 and 2015, especially illustrate that March was interested in the mechanisms underlying novelty and innovation (2010; 2015).

3. The relevance of March's ideas of innovation: three examples

March's thinking on innovation evolved over time, and he used various innovation-related concepts, such as the technology of foolishness, exploration, novelty and creativity. Over the years, March put forward three hypotheses about why organizations innovate (i.e., problem-driven, slack-driven and solution-driven innovation). This section focuses on three examples of ideas that can be connected to March and have relevance today.

3.1 Developing innovations inside organizations

First, adopting or borrowing innovations from outside exploits existing knowledge, and this may reduce many costs associated with innovation (March and Simon 1958). As mentioned, March (1981) discusses such innovation, for example, the fact that both innovations and organizations tend to change during the implementation process. However, March most commonly discusses the problem of development innovations inside organizations, for example, in connection to novelty and exploration. The fundamental theorem related to innovation is that a long-term perspective allows for the exploration of new possibilities, while a short-term perspective requires the exploitation of existing knowledge and certainties. Developing innovation therefore implies sacrificing short-term effects for potential long-term effects.

The concept of exploration (March 1991) covers what he previously called program elaboration (March and Simon 1958, pp. 207–8), the technology of foolishness (March 1971; 1981) and generating novelty (March 2010). March focused on organizational factors (e.g., mechanisms), for example, the roles of ambiguity, uncertainty, complexities, organizational slack and novelty in organizational adaptation (e.g., innovation). Even though exploiting existing innovations reduces costs, organizations must also develop their own knowledge and innovations. The pursuit of novelty (exploration) must be buffered from the processes of exploitation. For novelty to be useful in innovation (organizational adaptation), it must be judged successful and survive (March 2010). March's idea of balancing exploration and exploitation is well known and much discussed in relation to adaptation more generally (Wilden et al. 2018). It is also an idea that must be explored more deeply in relation to novelty and innovation (March 2010, p. 74).

3.2 Performance gaps and innovation

The second example is a theory that has renewed relevance. The theory of performance gaps has roots in March and Simon (1958, pp. 203–206; Cyert and March 1963). Briefly, performance dissatisfaction, or performance gaps, is seen as a stimulus for innovation and change (March and Simon 1958). As mentioned above, "changes in the environment" (p. 204) may lead organizational decision makers to perceive that the organization's course of action is unsatisfactory. Several others have later also discussed sources of performance gaps: technological changes in the environment (Downs 1966; Zaltman, Duncan and Holbek 1973); environmental shifts, such as radical changes in technology, regulation or competition, and seeking an attractive opportunity (Wischnevsky and Damanpour 2006; Damanpour 2020). In the Minnesota studies on innovation, they refer to March and Simon's hypothesis when they, in seven case studies, found that shocks, internal or external to the organization, triggered innovation (Schroeder et al. 1989, p. 123). They also stress that "a shock can come in many different forms" (p. 123). "Ideas were often generated but are not acted on in an organization until some form of shock occurred" (p. 123). Today there are similar cases in the management of the lockdowns in connection with the COVID-19 crisis. The lockdowns triggered the use of new technologies that had been available several years

before. The old idea that perceived performance gaps (problem-driven innovation) increase the search for new solutions may be relevant to understanding why organizations attempt to change or innovate.

3.3 The sunk costs of innovation

The third example is an old idea by March and Simon (1958) that has received less attention in later research. Innovation has sunk costs; "even if there are no tangible sunk costs, like factory buildings or specialized equipment, there will almost always be associated with a change in program a number of sunk costs of innovation" (March and Simon 1958, p. 194). They argue that these types of costs work in favour of program continuity or inertia and are difficult to estimate. However, the idea of sunk costs could also help researchers understand the consequences of innovation. It is not only investment in physical assets that may create sunk costs but also investment in programs, ideas, services, the organization and competences. These types of investments may also lead to inertia and path dependence.

4. Conclusion

March's interest, over nearly 60 years (1958–2015), in the organizational aspects of innovation places his ideas in relation to the topic of organizational innovation. He did not suggest recipes for success or believe that organizational processes follow the rational model of choice. He discussed limited rationality, adaptive dilemma, ambiguity and uncertainty. Unlike previous studies on March, including those that have discussed the topic of innovation (Wilden et al. 2019), this paper has focused especially on his evolving innovation-related ideas over time. The discussion is based on a selection of key publications, and one limitation is that the discussion in section 3.1 could have included more publications. The three ideas (see sections 3.1–3.3) identified and discussed here can lead to the following recommendations for practice or further research. First, innovation must also be developed through exploring new possibilities rather than merely exploiting existing knowledge and old certainties. Such development of innovations inside the organization is important in the long run but is also connected with uncertainty, and it may lead to excessive exploration. Therefore, March suggests balancing the pursuit of novelty (exploration) and efficiency (exploitation). Studies of cases of deliberate exploration efforts are a possible direction of research. Secondly, the old idea of closing perceived performance gaps seems to have a renewed actuality in times of crisis and environmental shifts. Further research could, for example, examine the importance of perceived performance gaps in organizational innovation and change. This can be done through comparing perceived performance gaps with other reason, and in relation to different contexts. Finally, the idea of the sunk cost of innovation helps us understand that investments in competence, services and structures may have sunk costs, which favours inertia. Decision makers should therefore be aware that investing in certain innovations may create inertia in relation to later changes. A possible direction of research is to explore which types of innovations lead to possible sunk costs and inertia and which do not. This insight may, for example, be relevant in connection with innovation in public sector organizations that involves introducing new programs and services that may require an investment in competences and technology.

References

Augier, M., and March, J.G. (2011) *The Roots, Rituals and Rhetorics of Change*, Stanford University Press, Stanford, CA.

Augier, M., March, J.G., and Marshall, A.W. (2015) "Perspective–the flaring of intellectual outliers: an organizational interpretation of the generation of novelty in the RAND corporation", *Organization Science*, Vol 26, No 4, pp. 1140–1161.

Becker, M.C., Knudsen, T., and J.G. March, J. G. (2006) "Schumpeter, Winter, and the sources of novelty", *Industrial and Corporate Change,* Vol 15, No 2, pp. 353–371.

Brunsson, N. (2019) "In memoriam: James G. March", *Organization Studies* Vol 40 No 2, pp. 291–295.

Cyert, R.M., and March, J.G. (1963) *A Behavioral Theory of the Firm*, Prentice Hall, Englewood Cliffs, NJ.

Damanpour, F. (2020) *Organizational Innovation: Theory, Research and Direction*, Edward Elgar, Cheltenham, UK.

Dobbin, F., and Schoonhoven, C.B. (2010) *Stanford's Organization Theory Renaissance, 1970–2000*, Emerald Group Publishing Limited, Bingley.

Dong, J., March, J.G., and Workiewicz, M. (2017) "On organizing: an interview with James G. March", *Journal of Organization Design,* Vol 6, No 14, pp. 1–19.

Downs, A. (1966) *Inside Bureaucracy*, Little, Brown and Company, Boston, MA.

Hage, J. (1999) "Organizational innovation and organizational change", *Annual Review of Sociology,* Vol 25, pp. 597–622.

Kavanagh, D. (2020) "James March in Irvine: A history of the ahistorical in organization theory". *Management Learning*, Vol 51, No 1, pp. 35–54.

Mansfield, E. (1961) "Technical change and the rate of imitation", *Econometrica,* Vol 29, pp. 741–766.

March, J.G. (1971) "The Technology of Foolishness", *Civiløkonomen* Vol 18, No 4, pp. 7–12.

March, J.G. (1972) "Model bias in social action", *Review of Educational Research,* Vol 42, No 4, pp. 413–429.

March, J.G. (1981) "Footnotes on organizational change", *Administrative Science Quarterly,* Vol 17, pp. 563–577.
March, J.G. (1991) "Exploration and exploitation in organizational learning", *Organizational Science*, Vol 2, No 1, pp. 71–87.
March, J.G. (1999) "Introduction", March, J.G. (ed.), *The Pursuit of Organizational Intelligence* (pp. 1–9), Blackwell, Malden, MA and Oxford, UK.
March, J.G. (2003) "Understanding organizational adaptation", *Society and Economy*, Vol 25 No 1, pp. 1–10.
March, J.G. (2010) *The Ambiguities of Experience*, Cornell University Press, Ithaca and London.
March, J.G., and Simon, H.A. (1958/1993) *Organizations*, 2nd edition, Wiley, New York.
March, J.G., and Olsen, J.P. (1975) "The uncertainty of the past: organizational learning under ambiguity", *European Journal of Political Research*, Vol 3, pp. 147–171.
March, J.G., and Olsen, J.P. (1976) "Organizational learning and the ambiguity of the past", March, J.G. and Olsen, J.P. (Eds) *Ambiguity and Choice in Organizations* (pp. 54–68), Universitetsforlaget, Bergen, Oslo and Tromsø.
Schroeder, R.G., Van de Ven, A., Scudder, G.D., and Polley, D. (1989) "The development of innovation ideas", in Van de Ven, A.H., Angle, H.L., and Poole, M.S. (Eds.) *Research on the Management of Innovation: The Minnesota Studies* (pp. 107–134), New York: Harper & Row.
Schumpeter, J.A. (1932/2005) "Development", *Journal of Economic Literature*, Vol XLIII, pp. 108–120.
Schumpeter, J.A. (1934/1983) *Theory of Economic Development*, Transactions Publishers, New Brunswick and London.
Simon, H.A. (1947) *Administrative Behaviour*, fifth printing 1950, The Macmillan Company, New York.
Simon, H.A. (1952) "Comments on theory of organization", *American Political Science Review,* Vol 46, No 4, pp. 1130–1139.
Van de Ven, A. H., and Rogers, E. M. (1988) "Innovations and organizations: critical perspectives", *Communication Research,* Vol 15, pp. 632–651.
Wilden, R., Hohberger, J., Devinney, T.M., and Lavie, D. (2018) "Revisiting James March (1991): whither exploration and exploitation?", *Strategic Organization,* Vol 16 No 3, pp. 352–369.
Wilden, R., Hohlberger, J., Devinney, T.M., and Lumineau, F. (2019) "60 years of March and Simon's *Organizations*: an empirical examination of its impact and influence on subsequent research", *Journal of Management Studies,* Vol 56 No 8, pp. 1527–1604.
Wischnewsky and Damanpour, F. (2006) "Organizational transformation and performance: an examination of three perspectives", *Journal of Managerial Issue*, Vol XVIII, No 1, pp. 104–128.
Zaltman, G., Duncan, R., and Holbek, J. (1973) *Innovations and Organizations*, John Wiley and Sons, New York.

Snakes and Ladders: Going Through the Disciplined Entrepreneurship Theory by Bill Aulet

Aura Cecilia Pedraza Avella, Nathaly Albarracín Gutiérrez and Roque Antonio Carreño Ramírez
Universidad Industrial de Santander, Bucaramanga, Colombia
acecipe@uis.edu.co
nathaly.albarracin@correo.uis.edu.co
roque.carreno@correo.uis.edu.co
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Abstract: Due to the revolution of pedagogical teaching methods, entrepreneurship turns out to be an important field to approach. In this research, the classic snakes and ladders board game has been adapted to teach "Disciplined Entrepreneurship: 24 steps to a successful startup", a methodology developed by Bill Aulet while teaching in MIT entrepreneurship program that is one of the most successful in the USA (Roberts & Eesley, 2009). This game-based method has been compared to others used previously to teach entrepreneurship models, such as Business Model Generation by Alexander Osterwalder and the Lean Startup by Eric Ries (Strand, 2018). To investigate how the learning process is perceived following different strategies, in this research we compare the traditional and passive teaching of the Osterwalder and Ries models with active teaching of Aulet's methodology, in a group of Colombian industrial engineering students during the second semester of 2020. After some master classes on the first two models, a session was spent on a virtual version of snakes and ladders board game about Aulet's methodology. The data were collected by three stages, first recall technical terms, second introduce and observe the behavior during the board game as an activity in groups, leading to the final part by getting feedback from the students. Our results show Snakes and Ladders was an effective methodology to teach an entrepreneurship model and surpassed passive teaching in enjoyment and engagement; however, it should be taken into account that students stated that the game was easy to play because it handled concepts widely explored in the lectures on the previous methodologies. As a conclusion, this research reaffirms that the common method of the master class is being discarded and capturing the student's attention needs the development of new tools that can help to explain a lot of theory more easily, allowing active methodologies to develop dynamic, fast and simple interactions between students, especially in classes mediated by virtual teaching platforms.

Keywords: active methodology, entrepreneurship, learning process, gamification

1. Introduction

In entrepreneurship-oriented education, it is common to find passive methodologies for teaching business models design, so the teacher conducts a master class and students copy and replicate on templates. However, pedagogy plays an important role in any branch of the academy and it is convenient to take advantage of new tools that help students to improve their teaching-learning process both in and outside the classroom. Educational innovation commits teachers to carry out activities that involve student's thinking and analysis, strengthening hard and soft skills during execution and give feedback about the learning obtained from the activity.

For a long time, pedagogical advance in entrepreneurship and business management teaching has been studied. Hytti and Gorman (2004) investigated how business education was developed in Europe, highlighting that, in addition to traditional methodologies such as a master class, strategies as simulation, workshops, mentoring, guided tours in companies, gamification and internships were implemented as innovations in the classroom. In addition, De Almeida et al (2017) states teachers have the challenge of student motivation, adding nowadays a forced transition to virtuality due to the pandemic conditions.

In this context, our research question was ¿does gamification stimulates the learning process in topics related to entrepreneurship, in comparison to passive teaching methodologies? We wanted to identify how the learning process was perceived by students when they transitioned from the passive methodology of a master class to an active methodology combined with a pedagogical resource based on gamification principles. For this, a group of industrial engineering students who were taking a class about entrepreneurship was taken as a test population. First, through teacher-led classes, they were taught technical concepts related to market research, operational needs, and financial analysis; it included the review of entrepreneurship models such as Business Model Generation and the Lean Startup. Second, it was introduced the methodology "Disciplined

Entrepreneurship: 24 steps to a successful startup" through an active methodology known as flipped classroom; it began with the independent study of the concepts by the students and continued with their endorsement in the classroom through a game of *Snakes and Ladders*. Lastly, it was applied a data collection instrument to measure the impact the pilot had on the learning process, obtaining feedback on aspects such as the ease of use, aesthetics, commitment (engagement), enjoyment and utility.

After this introduction, the rest of the paper presents the literature review, the research method followed and the discussion of results.

2. Literature review

2.1 Pedagogical advances

Currently, one of the main aspects of the teaching-learning processes is to be able to favor active learning and offer a greater role to the students, all accompanied by the use of Information and Communication Technologies (Rodríguez & Palomares, 2020). According to this and taking advantage of the virtualization of the academy given the pandemic conditions, it has increased the motivation for finding active methodologies that adapt theoretical concepts to activities that promote factors as remembrance and association, allowing the space in the virtual classroom to be used for the resolution of doubts, design and validate dynamics.

Active methodologies are defined as the didactic and dynamic process that is carried out with the application of participatory techniques, with the use of abundant didactic material, educational games, and group work (Hernández, 2014). In this way Barrado et al. (2001) present 3 reasons for applying an active methodology:

- - Students maintain better the level of attention
- - Facilitates the acquisition of knowledge
- - Facilitates obtaining feedback on the level of understanding

One of the active methodologies, that has been chosen for this research, is known as the flipped classroom. In this, the teacher provides a series of materials and short-term audiovisual resources before the synchronous spaces of the class, in order for the students to study independently and come to the classroom to solve doubts and to participate in practical exercises on them.

Bloom's taxonomy is a theoretical model of cognitive nature that tries to describe, schematize and hierarchize the mental operations that underlie all learning processes (Chacón & Andrade, 2018). Through a pyramid, it represents 6 levels of cognitive actions starting from memorize, understand, apply, analyze, evaluate and finally create. The flipped classroom method preponderates the upper levels of the pyramid, allocating more time to create, evaluate and analyze as shown in the following figure.

Figure 1: Relationship of Bloom's taxonomy with the inverted class Source: Adapted from Andrade & Chacón (2018)

2.2 Gamification elements

Kapp (2012) defines gamification as the use of mechanics based on games, aesthetics, and playful thoughts to retain people, motivate actions, promote learning and solve problems. This learning method eases for the students to stay inform about their progress while offering immediate feedback and guidance to correct results; additionally, gamification enhance knowledge retention (Edutrends, 2016).

Teixes (2014) breaks down each of the components of this definition, highlighting that game operating elements are adopted like this: aesthetics as a first hook to attract the player or user, playful thinking as the predisposition to face the challenges of a game, motivate actions in the sense of exercising a call to action for modifying attitudes, actions and behaviors, promote learning since the study approach of gamification is oriented to education and finally solving problems that aims to solve aspects related to the two elements previously mentioned.

In this sense, it is important to highlight the elements of a gamified strategy, which according to Werbach & Hunter (2012) are divided into 3 categories, being dynamic, mechanical, and components. The elements are organized in a decreasing way, that is to say, that each mechanic is tied to one or more dynamics, and each component is tied to one or more top-level elements as shown in the following graph.

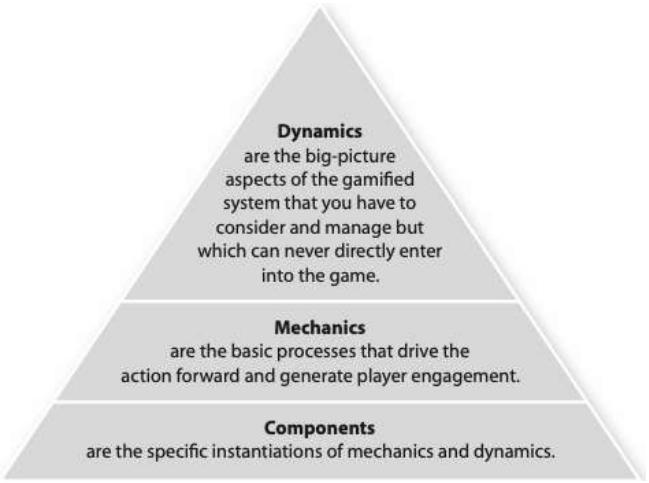

Figure 2: The Game Element Hierarchy. Excerpted from Werbach, Kevin & Hunter, Dan, 2012. For the Win, Philadelphia: Wharton Digital Press. Chapter: The Gamification Toolkit Game Elements Page 82 figure 4.3

To design a gamified strategy, the elements corresponding to each level of the pyramid are presented in the table below:

Table 1: Elements that comprise the dynamics of the games. Adapted from Werbach, Kevin & Hunter, Dan, 2012. For the Win, Philadelphia: Wharton Digital Press. Chapter: The Gamification Toolkit Game Elements Page 78-80

DYNAMICS	MECHANICS	COMPONENTS
Constraints: limitations or forced trade-offs Emotions: curiosity, competitiveness, frustration, happiness Narrative: a consistent, ongoing storyline Progression: the player's growth and development Relationships: social interactions generating feelings of camaraderie, status, altruism	Challenges: puzzles or other tasks that require effort to solve. Chance: elements of randomness Competition: one player or group wins, and the other loses Cooperation: players must work together to achieve a shared goal Feedback: information about how the player is doing Resource Acquisition: obtaining useful or collectible items Rewards: benefits for some action or achievement	Achievements: Defined objectives. Avatars: Visual representations of a player's character Badges: Visual representations of achievements Boss Fights: Especially hard challenges at the culmination of a level Collections: Sets of items or badges to accumulate Combat: A defined battle, typically short-lived Content Unlocking: Aspects available only when players reach objectives

DYNAMICS	MECHANICS	COMPONENTS
	Transactions: trading between players, directly or through intermediaries Turns: sequential participation by alternating players Win States: objectives that make one player or group the winner—draw and loss states are related concepts	Gifting: Opportunities to share resources with others Leaderboards: Visual displays of player progression and achievement Levels: Defined steps in player progression Points: Numerical representations of game progression Quests: Predefined challenges with objectives and rewards Social Graphs: Representation of players' social network within the game Teams: Defined groups of players working together for a common goal Virtual Goods: Game assets with perceived or real-money value

However, the authors consider that the aforementioned components should not be considered as a checklist to mark but should be selected and implemented according to the strategy to meet the objective that the game has.

2.3 Entrepreneurship education

As Rartten and Jones (2020) mentioned "Entrepreneurship education is one of the most popular topics in management education for its ability to relate theory to practice." Peltier and Scovotti (2010), consider that entrepreneurship is a discipline that can be learned, and they call on universities, as sources of higher education, to have platforms that strengthen entrepreneurial skills in the population in the training stage.

In this context, Bill Aulet's theoretical contribution called "Disciplined Entrepreneurship" was developed in recent years and adopted by MIT, being classified as one of the most successful university entrepreneurship courses in the United States (Field, 2014). This author emphasizes that entrepreneurs are not only born but also can be made through hands-on methodologies. Disciplined Entrepreneurship has been compared to other previously presented entrepreneurship models, such as Business Model Generation by Alexander Osterwalder and the Lean Startup by Eric Ries (Strand, 2018).

In entrepreneurial education student are central actors mostly because pedagogical mediations trigger student's interest, motivation, encouraging creativity, initiative and innovation plus critical reflection and new ways to solve problems, in order to promote using facts for decision making rather than re-producing facts (Sagar, 2015).

According to this, regarding the methodologies used in entrepreneurship training, a report by the European Commission (2016) says the most used are usually active learning, project-based learning, experiential learning and activities outside the classroom, such as case studies or complementary videos (Pedraza and Bravo, 2011). Ultimately, what is sought with entrepreneurship education is for the student to assume an active role in their training and not to become only a passive recipient of knowledge and information (Freire, 2015).

3. Methodology

3.1 Participants

Students who were part of the pilot test of this educational strategy were taking a semester class on entrepreneurship in the Industrial Engineering undergraduate program of the Industrial University of Santander (Bucaramanga, Colombia), during the second academic period of 2020. Previous research done by the authors identified that 80% of the respondents do not like fully master classes and prefer methodologies as flipped classroom, case study discussions, role-plays, simulation and solving problems taken from real life.

3.2 Research design

This research was divided into 3 stages. The first includes the review of technical concepts related to entrepreneurship as commercial, operational and financial analysis, including master classes about Business

Model Generation by Alexander Osterwalder and the Lean Startup by Eric Ries. It followed a passive approach, where students only listened to the theoretical lessons and then carried out homework by themselves.

As a second stage, using the flipped classroom methodology, Disciplined Entrepreneurship model was introduced. Before the synchronous meeting, a reading on the topic was assigned to be reviewed by the students independently; then, in the virtual classroom (according to the conditions of the pandemic for the year 2020) was played an adaptation of board game called "Snakes and Ladders" that allowed the class to review the entrepreneurship model in a different way, solving the doubts that had remained from independent work and socializing real cases of the application of each step proposed by Bill Aulet. To facilitate the playing, the group of students were divided in 2 virtual rooms, each of them with a monitor; additionally, there were created small groups of 3-4 students which competed between each other. To advance through the game board, players had to roll a virtual dice.

As a final stage, it was applied an instrument to receive feedback from the students about the introduced pedagogical innovation.

3.3 Adaptations to the board game

Snakes and ladders is a classic game which dynamic comprehends two or more people playing in turns: so when it is the turn of player one, the dice must throw and, according to the result, advance a certain number of squares, hoping not to fall into one that has the tail of a snake, because then he would have to go back to where the head is located; on the other hand, if the player touch a ladder, it can climb and go across the board rapidly, increasing the chances of winning. When player one has finished its moves, the next player starts by throwing the dice and attending the rules of moving on the board.

In this educational experience, for the aesthetics of the tool, a template provided by the online software called Genially was used (see figure 3), making a simile between the graph adopted by Bill Aulet to explain his theory in a didactic way (See figure 4). Questions about real applications of Disciplined Entrepreneurship methodology were designed for each step of the board marked with yellow and green eyes; for other steps were proposed questions related to entrepreneurship or general culture.

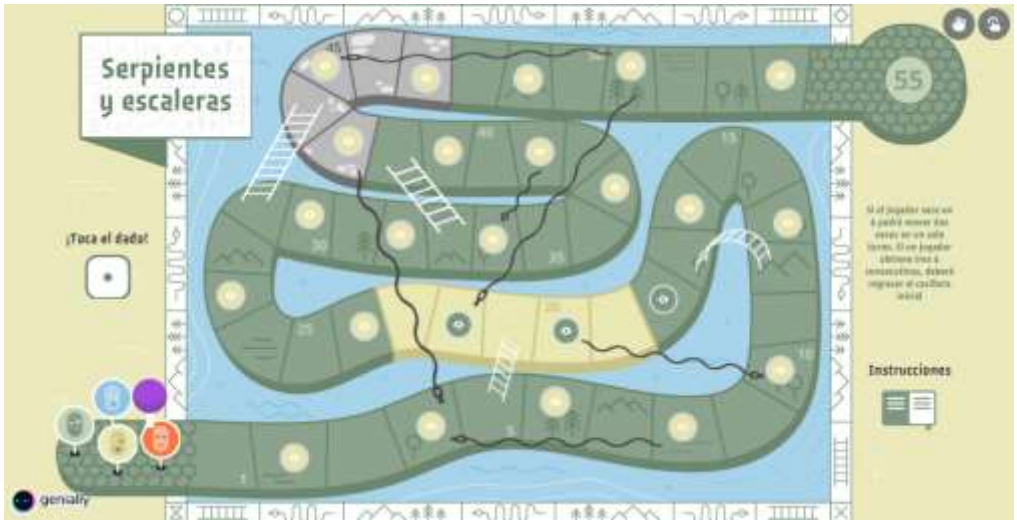

Figure 3: Board Game for Snakes and Ladders. Source: Authors

The snakes (steps of the board where the player returns) shown in the figure 3 correspond to questions related to steps 4, 9, 17, 19, and 23 of Disciplined Entrepreneurship methodology; if they were answered wrongly, the player had to return to previous steps (2, 5, 15, 2, 11 and 20 respectively), just as an entrepreneur must repeat a previous activity again if at some stage of the creation of its business the adequate results are not obtained. In the case of the question related to step 23, it was observed that it contains two possibilities of snakes to descend, so it was decided that participants should roll the dice again; if the number obtained was even, they would descend through the snake shorter reaching the box corresponding to the question in step 20, and if the die fell on an odd number, the player would descend until landing on the box corresponding to step 11. On the

other hand, ladders were used by the players to advance to higher steps of the board after correctly answering the respective question.

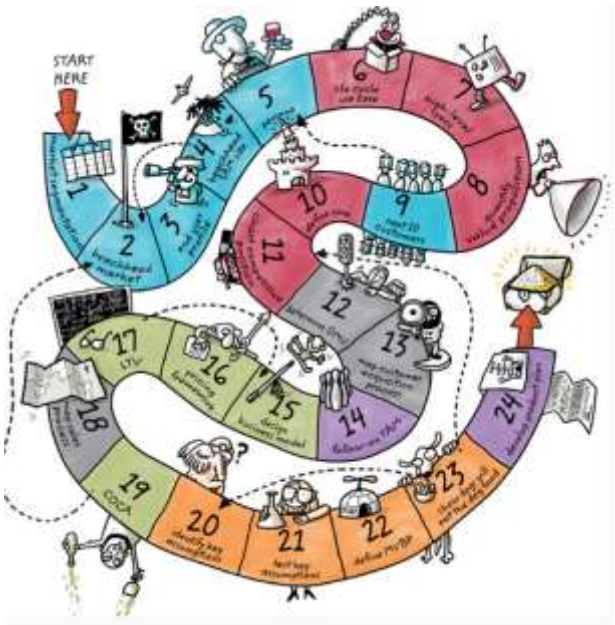

Figure 4: Six themes of the 24 steps. Extracted from Aulet, B, & Aulet, B 2013, Disciplined Entrepreneurship: 24 Steps to a Successful Startup, page 12.

To describe and comprehend the rules and structure of the activity, guided by the theory of Werbach & Hunter (2012), the elements identified that compromise *Snakes and Ladders* game are explained in the next figure:

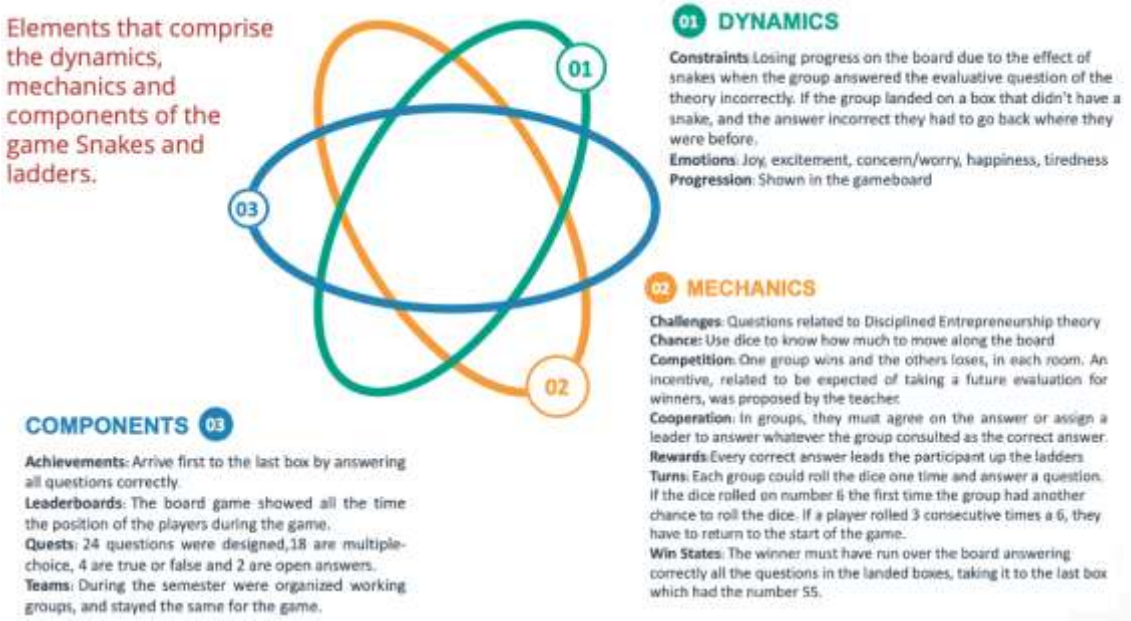

Figure 5: Elements that comprise the dynamics, mechanics and components of the game Snakes and ladders. Source: Authors

4. Results

To validate the new learning tool, a questionnaire was designed according to different theoretical references, to collect the perception of the students who participate in the pilot. The instrument uses a 5-point Likert scale (Totally disagree - Strongly agree) intending to evaluate factors such as ease of use, aesthetics, engagement, enjoyment, and usefulness (See table 2). The items were randomly written with a positive or negative connotation to avoid possible misunderstandings in the answers. However, before the statistical analysis, the scale of the negative items was inverted to unify and facilitate the analysis.

Table 2: Data collection instrument designed for the students. Source: Authors

Factor	Affirmation
Ease of use Adapted from Filippou, Cheong, Cheong (2018)	I found the activity snakes and ladders unnecessarily complex
	I considered the activity snakes and ladders easy to execute
Aesthetics Adapted from Prensky (2010)	The design of the dynamic of the activity snakes and ladders is clearly structured
	The design of the dynamic of the activity snakes and ladders is NOT innovative
	The dynamic of the activity snakes and ladders lacks its concept
Engagement Adapted from Filippou, Cheong, Cheong (2018)	I found the activity snakes and ladders pleasant
	I felt excited while playing snakes and ladders
Enjoyment Adapted from Fu et al (2009)	I felt worried while playing snakes and ladders
	I felt happy while playing snakes and ladders
	I felt exhausted while snakes and ladders
Utility Adapted from Davis (1989)	The language used in the questions formulated in the activity snakes and ladders are hard to comprehend
	The questions formulated in the activity snakes and ladders related to the Bill Aulet's methodology are clear
	The level of complexity of the questions in the Snakes and ladders activity is too high
	The didactic methodology of snakes and ladders allowed to learn the theory of Bill Aulet in a better way, compared to a master class

The results of the test indicated that all items were adequate for each factor, since their variance was within a range of ± 1.15 with respect to the general mean (See Table 3).

Table 5: Statistics from the collection instrument designed for the students. Source: Authors

Factor	$\bar{x}$	$\bar{x}$	σ	σ
Ease of use	4,28	4,33	0,96	1,00
	4,38		1,04	
Aesthetics	4,34	4,08	0,86	0,86
	3,83		0,89	
	4,07		0,84	
Engagement	4,41	4,47	0,68	0,78
	4,52		0,87	
Enjoyment	3,52	4,01	1,15	0,83
	4,24		0,69	
	4,28		0,65	
Usefulness	4,07	4,06	1,13	0,87
	4,14		0,74	
	4,03		0,78	
	4,00		0,85	

The average values obtained in the applied test show the high positive assessment given by the participants on the gamified strategy. Additionally, reviewing responses to an open feedback question that was formulated, students considered that one of most useful things of the activity was that every answer had its feedback, identifying that the questions were well formulated, short and easy to comprehend. The feeling of competitiveness didn't put at risk the activity which end up making the groups motivate even more to work as a team. On the other hand, the sensation of having a different dynamic in the virtual classroom in contrast to master classes, made easier for them appropriate the theory about this particular model of entrepreneurship, leaving to the memory a new learning experience.

5. Limitations

This pilot and the feedback from the students allowed us to detect some limitations on this very first try. It is impossible to control what happens on the other side of their cameras, so some students could reach for their answers online or in notebooks. Also, given the impossibility from the participants to roll the dice on their own physically, could take out the emotions and rituals for luck of the randomness aspect.

Players also suggest bringing up in the board game more questions about the theory or aspects seen during the semester class and less about general culture.

Additionally, we think there is a big space to enhance the gamification strategy that was implemented and give a new trial in the future with another audience.

6. Conclusion

This approach to disciplined entrepreneurship's theory using the dynamic of the classic game Snakes and Ladders had a wide range of acceptance given the results shown in this paper. The gamification theory helped to demonstrate that it is possible to implement enjoyable and effective learning instruments, offering the chance to evaluate knowledge and using more time in the classroom to give feedback and answer questions that prove students checked materials before classes and letting them to consult more information on their own.

Although this first attempt turn out to be perceived as satisfactory, there is plenty of methods than can offer better approaches to any topic in general, so as a recommendation, active methodologies combine with creativity and ICT's can make a transformation in the educational system, challenging both teachers and students to get involved in the classroom in activities that can let both of them to explore soft skills leading it to a better environment to analyze and take decisions letting space for improvement as students build their professional career.

References

Andrade, E., & Chacón, E. (2018). Implicaciones teóricas y procedimentales de la clase invertida. *PULSO. Revista de Educación*, (41), 251-267.

Aulet, B. (2013). *Disciplined entrepreneurship: 24 steps to a successful startup*. John Wiley & Sons.

Barrado, C., Bofill, P., Díaz de Cerio, L., Herrero, J., Morancho, E., Navarro, L., & Valero-García, M. (2001). *Siete experiencias de aprendizaje activo*. Barcelona: Universitat Politécnica de Catalunya, Departament d'Arquitectura de Computadors.

Davis, F. D. (1989). Perceived usefulness, perceived ease of use, and user acceptance of information technology. *MIS quarterly*, 319-340. https://doi.org/10.2307/249008

De Almeida Seixas, E. P., de Araújo, M. V. P., de Araújo Brito, M. L., & Fonseca, G. F. (2017). Dificuldades e desafios na aplicação de metodologias ativas no ensino de turismo: Um estudo em Instituição de Ensino Superior. *Turismo-Visão e Ação*, 19(3), 566-588.

Domínguez Rodríguez, F. J. D., & Ruiz, A. P. (2020). El" aula invertida" como metodología activa para fomentar la centralidad en el estudiante como protagonista de su aprendizaje. *Contextos educativos: Revista de educación*, (26), 261-275.

EduTrends. (2016). "Gamificación". Tecnológico de Monterrey, Observatorio de Innovación Educativa.

Field, R. (2014). Disciplined Entrepreneurship: 24 Steps to a Successful Startup by Bill Aulet. *Journal of Business & finance librarianship*, 19(1), pp.83–86.

Filippou, J., Cheong, C., & Cheong, F. (2018). A model to investigate preference for use of gamification in a learning activity. *Australasian Journal of Information Systems,* vol. 22, pp. 1–23. https://doi.org/10.3127/ajis.v22i0.1397

Fu, F. L., Su, R. C., & Yu, S. C. (2009). EGameFlow: A scale to measure learners' enjoyment of e-learning games. *Computers and Education*, vol. 52 núm. 1, pp. 101–112. https://doi.org/10.1016/j.compedu.2008.07.004

Hytti, U. O'Gorman, Colm. (2004). *What is 'Enterprise education'? An analysis of the objectives and methods of enterprise education programmes in four European countries*. Recuperado de: www.emeraldinsight.com/0040-0912.htm

Hernandez, M. A. (2014). *Metodología activa como herramienta para el aprendizaje de las operaciones básicas en matemática maya* (tesis de grado ed.) [libro electrónico]. Campus de quetzaltenango. http://recursosbiblio.url.edu.gt/tesiseortiz/2014/05/86/Hernandez-Miguel.pdf

Kapp, K. M. (2012). Games, gamification, and the quest for learner engagement. *T+ D*, 66(6), 64-68.

Prensky, M. R. (2010). *Teaching Digital Natives: Partnering for Real Learning*. SAGE Publications Inc.

Roberts, E. B., & Impact, E. C. E. E. (2011). The Role of MIT-An Updated Report. *Foundations and Trends in Entrepreneurship*, (1-2), 1-149.

Sagar, H. (2015). Entrepreneurial schools part 2 - entrepreneurial learning environments and a changed role for teachers. OECD. Recuperado de: https://www.oecd.org/cfe/leed/Entrepreneurial-School-pt2.pdf

Strand, K. (2018). From the Academic Editor: Participating in Our Professional World. *Music Educators Journal,* 104(3), 8-9. https://doi:10.1177/0027432117751601

Teixes, F. (2014). *Gamificación*. Barcelona: Editorial UOC.

Werbach, K., & Hunter, D. (2012). *For the win: How game thinking can revolutionize your business*. Wharton digital press

Identifying the Need of Developing a Matching Methodology for Successful Intergenerational Entrepreneurship

Adriana Perez-Encinas, Isidro de Pablo, Yolanda Bueno and Begoña Santos
Universidad Autónoma de Madrid, Spain
Adriana.perez.encinas@uam.es
Isidro.de.pablo@uam.es
Yolanda.bueno@uam.es
Begonna.santos@uam.es
DOI: 10.34190/EIE.21.121

Abstract: This study presents the need of developing an innovative way of approaching intergenerational entrepreneurship by developing a matching pedagogical methodology that includes a training program to generate effective business synergies between young and senior entrepreneurs as a response to generational challenges. We argue that intergenerational entrepreneurial initiatives are aimed at addressing the needs and opportunities of certain social groups and have the potential of becoming successful business projects. Focus groups were conducted to provide a qualitative framework to understand the needs of intergenerational teams by group interaction. The main reason to use this qualitative methodology was to identify complementarities and gaps between young and senior entrepreneurs along the entrepreneurial process. In general, results show that for achieving a successful intergenerational cooperation, specific training is needed for both generations and thus, the design of a matching methodology that will enhance and promote potential collaboration between both groups would be highly pertinent. We have found no research done on methodologies for collaborative intergenerational entrepreneurship projects between young and seniors. Therefore, our study identifies the need to develop a methodology for intergenerational entrepreneurship projects. This work can be considered as a starting point for future research on intergenerational entrepreneurship or entrepreneurship initiatives for a specific social context or population groups.

Keywords: intergenerational entrepreneurship, entrepreneurship and innovation, matching generations, young and senior entrepreneurship, matching methodology

1. Introduction

Intergenerational entrepreneurship as a social innovation promotes job creation through social inclusion and fosters the transfer of knowledge and experience between generations. In this context, we identify that there is a need for an innovative matching methodology which generates effective business synergies between senior and young entrepreneurs as an answer to generational challenges. We argue that the intergenerational entrepreneurial initiatives are aimed at addressing the needs and opportunities of certain social groups and have the potential of becoming successful business projects.

Senior people, while increasing their share in total population in most societies, accumulate a very valuable load of experience and maturity that any changing society should consider putting into value. On the other side, there are young people seeking for a professional opportunity as entrepreneurs, but lack the experience, contacts, resources and certain soft skills to take up such a deal. Even though there might be complementarities, both groups do not usually have the chance to get in contact or are not even aware of the existence of the other (GEM, 2019). The opportunity to put both groups in contact, explore the possibility of collaboration, do the right matching and team building, and provide support during the first stages of the entrepreneurial adventure is an open field for the design of a viable program in intergenerational entrepreneurship based on institutional collaboration.

Thus, the purpose of this paper is to identify the path over which a matching and pedagogical methodology should be developed for achieving successful intergenerational entrepreneurship projects, considering the diverse needs and skills young and seniors have.

The data presented in this paper come from a European project on promoting the intergenerational entrepreneurship among potential young and senior entrepreneurs, in which three universities working with young population and three NGOs that are working with the elderly populations in Spain, Sweden and France are participating. Focus groups is the methodological approach used to understand the needs of young and senior entrepreneurs, being the basis on which the matching methodology is developed.

This study presents an innovative way of approaching entrepreneurship by analysing the profiles of young and senior entrepreneurs and understanding their roles in intergenerational tandems, and then, by identifying the need of a training programme generating effective business synergies between both generations answering to generational challenges. We have found no research done on methodologies for collaborative intergenerational entrepreneurship projects between young and seniors. Thus, our research represents a proposal to develop a theoretical framework addressing the limited and scarce evidence in this field.

2. Literature review

Intergenerational entrepreneurship is understood as joint business projects between different generations fostering complementarities of skills and weaknesses. This kind of entrepreneurial activity approached as a social innovation can promote job creation, social inclusion and transfer of knowledge and experience between generations. Specifically, young and senior collectives are vulnerable of being excluded in the labor market. Youth are in risk of long-term unemployment due to lack of social and institutional support, low qualification and passivity in the labor market (Kieselbach, 2003). Moreover, senior can undergo age discrimination, difficulties in adapting to work changes and obstacles for getting a job as age increases (Yeatts, et al. 2000; Malinen & Johnston, 2013).

There is evidence in terms of the potential value added of young and senior entrepreneurs teaming up (Isele and Rogoff, 2014, pp. 141-147). So, young and senior people working hand-in-hand to operate a business or a non-governmental organization (NGO) is a practice found in the society and the marketplace, due to the circumstances or in a specific context of a community programme for a specific population (seniors or young).

However, changes in society, new family structures, technology and the educational system have generated a shift in social values. This brings a loss of social cohesion and a differing way intergenerational knowledge is transmitted, which was done spontaneously in the past. A new sensitivity towards the recovery of this transmission of values and wisdom has shifted the focus to the development of intergenerational programmes.

Historically, there is evidence of the need to generate intergenerational projects that are based on reciprocal relationships between young and senior people, and not related to family business projects, which represent a challenge due to its novelty. Intergenerational teaching and learning practices can contribute to balance inequalities and overcome social segregation, promoting a greater capacity for understanding and respect between generations, thus allowing the development of more cohesive societies (Pinto, Marreel and Hatton-Yeo, 2009).

After an exhaustive search for relevant literature and academic research on intergenerational entrepreneurship, a gap was found in this branch of research. Literature on senior entrepreneurship is found, but intergenerational entrepreneurship as a research topic is still emerging and there is not a significant academic contribution. Literature on senior entrepreneurship approaches intergenerational entrepreneurship as a secondary issue and is focused on characterizing this kind of entrepreneurship without a purposeful nor practical intention. Mainly, experiences and initiatives of civil society without academic purposes were found, of which we only have informative records. This revision is presented below:

Different initiatives regarding intergenerational for-profit entrepreneurship with the focus on seniors have been presented at a European level as the document “Senior Entrepreneurship Good Practices Manual” (European Commission, 2016), “Senior entrepreneurs: best practices Exchange” (European commission, 2014) & “50+ Entrepreneurship Platform” (European commission, 2014), for example.

Besides, some initiatives have emerged exploring the synergies of intergenerational entrepreneurship. Some of these initiatives are the Experience Incubator of the Global Institute for Experienced Entrepreneurship (2017) and the Power Shift Forum Proposal (2016) of senior women breaking into intergenerational entrepreneurship building sustainable inclusion in the female community. Moreover, in Japan the Oita Prefectural Start-up Center is recognized as one of the most innovative intergenerational centers. Also, at the University of Magdeburg in Germany, there is a project called the 'SeJu' (Senior & Juniorpreneurship) project between the chair of Information Technologies in Mechanical Engineering of the Faculty of Mechanical Engineering and the chair of Entrepreneurship of the Faculty of Economics (Neutchel, et al., 2013).

Even though, we did not find research on methodologies of collaborative intergenerational entrepreneurship projects or programmes between seniors and young, we believe that the approach of this research in identifying the need of developing a methodology for intergenerational entrepreneurship projects represents a solution in creating a theoretical frame which address the scarce evidence.

3. Methodology

The purpose of this study is to identify the ground over which a matching and pedagogical methodology should be developed for achieving successful intergenerational entrepreneurship projects, all of this considering the differing needs and skills young and seniors have. For this purpose, a qualitative methodology was chosen. Focus groups is the method chosen as they serve as main sources of data and they are very appropriate for the generation of new ideas emerging within a social context (Breen, 2006, pp. 463-475).

Focus groups have three main uses in social sciences research: (1) they are a self-contained method in studies for which they serve as principal sources of data, (2) they can be used as supplementary data source, and (3) they are also used in multi-method studies, in which two or more means of gathering data are used (Morgan, 1997). According to Kitzinger (1995), focus groups explicitly use group interaction as part of the method. The focus groups were conducted to provide a qualitative framework to gather information, thoughts, and opinions from junior and senior participants, to understand the needs of intergenerational groups by group interaction. The analysis of the information gathered allow us to identify complementarities and gaps between young and senior entrepreneurs along the entrepreneurial process, in order to identify the need of designing a matching methodology that will enhance and promote potential collaboration between both groups.

The data presented in this paper come from a European project on promoting the intergenerational entrepreneurship among potential young and senior entrepreneurs, in which three universities working with young population and three NGOs that are working with the elderly populations in Spain, Sweden and France are participating.

The application of the methodology consisted of selecting the target group (potential young and senior entrepreneurs). Then, designing a protocol for the group discussions, followed by the development of the focus groups with a moderator. In this study, each focus group took a maximum of about two hours, including greetings, instructions, discussion, and conclusions. In total six focus groups were held: two in Spain, one in France and three in Sweden with the participation of 18 young and senior entrepreneurs, nine men and nine women. Finally, the information was analysed.

The discussion centred over seven topics including personal situation, professional network, perception of the intergenerational aspect of a partnership, perception of complementarities between generations, perception of the respective roles of each group when managing a common project, hard and soft skills of each population, and finally perception of specific needs identified in terms of skills for each group.

The information gathered during the focus groups was analysed through a topic analysis, detecting the main themes and identifying common thoughts and differences between the objective groups.

4. Results and discussion

Results shed light on the necessity of a matching methodology that will enhance and promote potential collaboration between both groups uncovering complementarities and gaps of intergenerational entrepreneurship groups along the process. Thanks to the focus groups, we could delve into the perspectives of the senior and young entrepreneurs about their needs and assets when talking about entrepreneurship. Also, this methodology was used with the objective of identifying gaps and coincidences between both groups giving direction to the matching methodology and shedding light on the content it should have, so it can potentially generate strong synergies for business projects.

In general, results show that for achieving a successful intergenerational cooperation, training is needed for both senior and young population. There is a common understanding of the potential complementarity between young people and seniors to conduct a sustainable successful entrepreneurial project, but there is a need for an upgrade in different aspects so that the cooperation works well. Overall, seniors and young differ in terms of their abilities, skills and personal context. Seniors have a positive perception of intergenerational

entrepreneurship, while young entrepreneurs rarely contemplate this option, fearing a parental attitude from seniors. Both groups complement each other in terms of networking and know-how from the seniors and the technical knowledge and dynamism from young population. In the future, complementarities and needs from each collective should be further developed for a good match.

Additionally, from the information gathered during the focus groups, seven top concerns were identified for achieving intergenerational teams. Social and professional contacts were considered an important factor for entrepreneurship by both groups. Also, funding, ideas, support, trust and passion were considered as key components. Lastly, skills were considered as an important concern when creating intergenerational teams.

The information gathered during the focus groups served as a basis over which, with the viewpoint of experts and mentors, for the design of a common integrative training methodology for intergenerational entrepreneurship to address both groups and facilitate teambuilding. Such methodology should be applied along a wide time lapse to increase effectiveness based on availability, technical expertise and confidence. Focus groups allow us to identify two fundamental aspects for designing a training program for intergenerational entrepreneurship. From the viewpoint of contents, the program should have distinct, although integrated, contents: a broad training package in entrepreneurship embedded in a specialized soft skills package adapted to intergenerational settings, encompassing behavioral aspects, networking and pitching.

This scenario justifies the need to have a singular institutional environment in which academic institutions – providing knowledge of hard skills and young potential entrepreneurs-, NGOs working with seniors, and local or regional administrations, provide the appropriate resources and legitimation for the project to be successful.

As a result, from the information gathered during the groups the needs for developing a pedagogical methodology were identified. Users are both young and senior potential entrepreneurs. The pedagogical methodology has the purpose to answer to their needs and enhance the complementarities between both generations, and its application assumes a previous match of the business team. A set of hard and soft skills should be developed throughout the program by the whole group and the entrepreneuring teams. The business development process must be practice-oriented, serving as background process for the teams to build-up cohesion, acquire the necessary skills and come up with a viable business project.

Throughout this methodology both hard and soft skills must be worked to provide participants with the intellectual and social levers they need to develop their projects in the appropriate context in which they may be necessary. The skills comprise the technical knowledge that entrepreneurs must know and the personal and interpersonal skills they should develop throughout the process of creating a company.

The implementation of this pedagogical methodology requires the design of a panoply of tools for achieving successful business projects by having the would-be entrepreneurs acquire the skills they need. A team of trainers and a road map is required to implement the methodology. Also, a set of teaching materials are needed to address the basic contents of the hard and soft skills presented above.

5. Conclusion

The results yield very interesting conclusions about the kind of complementarities and differences in terms of skills and abilities that seniors and young entrepreneurs perceive, which allows the research team to draw a general outline of the direction in which the methodology for successful matching should go. This ongoing project sheds light on the ground where the matching must happen, taking into account the need of an organized pedagogical tool for developing the hard and soft skills in both collectives.

The institutions involved in this innovative entrepreneuring program should be related to the socioeconomic environment, say ecosystem, of both groups. On the side of young people, the desirable partner could be a university or business school with an established entrepreneurship program. Senior people could be addressed by civil organizations promoting an active life for these citizens, both for leisure, involvement in community issues, life-long-learning activities, etc. Besides, there is the need for “outsider” institutions, as is the case of a municipality or regional administration, a company engaged in early retirement programs or layoffs, or even national or international programs fostering intergenerational entrepreneurship.

References

Breen, R. (2006). A Practical Guide to Focus-Group Research. *Journal Of Geography In Higher Education*, *30*(3), 463-475. https://doi.org/10.1080/03098260600927575

European Commission. (2016) "Senior Entrepreneurship Good Practices Manual" [online] https://op.europa.eu/en/publication-detail/-/publication/8fdadabd-9ac8-11e6-868c-01aa75ed71a1/

European Commission. (2014) "Senior entrepreneurs: best practices Exchange" [online] https://ec.europa.eu/easme/en/tender/33/senior-entrepreneurs-best-practices-exchange

European commission. (2014) "50+ Entrepreneurship Platform" [online] https://ec.europa.eu/eip/ageing/sites/eipaha/files/results_attachments/50epe-brochure.pdf

GIEE (2017). "Experience Incubator". [online] https://experieneurship.com/programs/experience-incubator/

Isele, E., & Rogoff, E. (2014). Senior Entrepreneurship: The New Normal. *Public Policy & Aging Report*, *24*(4), 141-147. https://doi.org/10.1093/ppar/pru043

Kieselbach, T. (2003). Long-Term Unemployment Among Young People: The Risk of Social Exclusion. *American Journal Of Community Psychology*, *32*(1-2), 69-76. https://doi.org/10.1023/a:1025694823396

Kitzinger, J. (1995). Qualitative Research: Introducing focus groups. *BMJ*, *311*(7000), 299-302. https://doi.org/10.1136/bmj.311.7000.299

Malinen, S., & Johnston, L. (2013). Workplace Ageism: Discovering Hidden Bias. *Experimental Aging Research*, *39*(4), 445-465. https://doi.org/10.1080/0361073x.2013.808111

Morgan, D. (1997). *Focus groups as qualitative research*. Sage Publications.

Neutschel, B., Gaus, O., Raith, M., & Vajna, S. (2013). Senior & juniorpreneurship: An intergenerational approach in engineering and entrepreneurship for value creation. *European Conference on Innovation and Entrepreneurship,* 2. Academic Conferences International Limited.

Oita Start-up Center, [online] https://startup.oita.jp/

Pinto, T. A., Marreel, I., and Hatton-Yeo, A. (2009) *Guía de ideas para la Planificación y Aplicación de Proyectos Intergeneracionales (Guide of Ideas for Planning and Implementing Intergenerational Projects).*

Power Shift Forum, [online] https://www.powershiftforum.com/

Red Global Entrepreneurship Monitor (GEM) (2019). *Informe Gem España 2018-19,* [online] https://www.gem-spain.com/wp-content/uploads/2019/05/GEM 2018-2019.pdf

Yeatts, D.E., Folts, W.E. & James, K. (2000). Older workers' adaptation to a changing workplace: Employment issues for the 21st century. *Educational Gerontology*, *26*(6), 565-582. https://doi.org/10.1080/03601270050133900

Combining Machine Learning Algorithm With ARIMA for Stock Market Forecasting: The Case of SET100 Index

Boontarika Paphawasit, Phasit Charoenkwan and Setthawit Thaweeaphiradeebun
College of Arts, Media and Technology, Chiang Mai University, Thailand
boontarika.p@cmu.ac.th
phasit.c@cmu.ac.th
thaweeaphiradeebun@gmail.com
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Abstract: At present, the number of investors in the Stock Exchange of Thailand has continuously increased while the loss of investors also increased due to lack of experience, and they are unable to predict the stock price accurately. This paper proposes a two-stage forecasting model that incorporates a machine learning algorithm such as a decision tree model and parametric techniques such as autoregressive integrated moving average (ARIMA) and aims to improve stock price forecasting. In this case, the decision tree model determines the investment attractiveness of the SET100 Index listed in the Stock Exchange of Thailand, and the group of stocks with high investment potential is identified with 90.48 percent accuracy. According to the decision tree model, the BTS Group Holdings Public Company Limited was chosen from the high investment potential group to predict the short-term closing price trend with the ARIMA model. The ARIMA model can predict precisely with a slight error (p-value < 0.01). Therefore, it can be concluded that the ensemble machine learning methods together with ARIMA can be used as a hybrid method to increase prediction capability for supporting investment decisions.

Keywords: stock market, forecasting, hybrid model, decision tree model, ARIMA

1. Introduction

The number of investors in Thailand has continued to grow, which has resulted in the increasing number of individual investor trading accounts; however, new investors may not achieve the expected return on investment. The possible reason is that novice investors lack investment knowledge and experience, making them unable to analyze relevant information effectively. As a result, it is not possible to select attractive stocks. For new investors who are trader type, understand the graph and the stock market trend is highly risky for investment and is inadequate to make the decision. Understanding the steady flow of any index and the seasonal variance can help both experience and inexperience investors make investing decision in the stock market and time series forecasting is the technique to solve the problem.

Time series forecasting plays a vital role in many fields, particularly in finance and economics for so many years. As technology changes and data science emerges with the arrival of the big data era, forecasting has a more detailed approach and the time series forecasting found to be struggled with the complicate structure including complex dependence and strong diurnal patterns (Russell and Engle, 2009). Non-linear models can deal with the limitation of linear models by capturing non-linear pattern of data and also enhance the prediction performance (Armano et al., 2005; Kim and Han, 2000). Deep learning is a type of machine learning that is more complex of algorithms to process more data in a multidimensional manner. Deep learning is a learning simulation model similar to the human nervous system, Artificial Neural Networks (ANNs) algorithms with a large network, many nodes, many layers to process the best solutions with minimum errors. Combing multiple techniques, such as hybrid techniques, has shown better performances than single techniques in which to integrate the technical and basic analyses to forecast the stock price more accurately (Baba and Kozaki, 1992; Chang et al., 2004).

Therefore, this research would like to suggest guidelines to support investment decisions in the Stock Exchange of Thailand. The research aims to indicate the investment attractiveness score of the SET100 index listed in the Stock Exchange of Thailand using a machine learning algorithm; to create a stock price forecasting model with the future trend of stocks using statistical techniques to support investment decisions. The results can support investors in making investment decisions for both experienced and inexperienced investor.

This paper consists of five sections. A brief review of basic models for time series forecasting and machine learning techniques are described in section 2. Section 3 declares an extension of Decision tree and ARIMA to construct the forecasting models. The results of the hybrid method are elucidated in section 4. Finally, the discussions and research limitations are provided in section 5.

2. Literature review

The decision tree technique is one of the classification techniques of data mining. It is a supervised learning technique where this classification can help analyze data for decision-making and works in the form of an If-Then rule. In machine learning, decision trees are mathematical models that predict data by learning from the original data, while decision trees will be created to support decision-making for event planning in business administration. In other words, this technique is suitable for predictive modeling. The data used for executing decision trees are divided into two data sets: a data set for learning (Training Data) and a data set for testing (Testing Data). The test data and training data for the decision tree should not be the exact dataset as it cannot measure the model's actual accuracy (Tsai and Wang, 2009). A time series is a set of quantitative data stored over a period of time, which can be in the form of annual, quarterly, or monthly data depending on suitability for use, such as daily stock market indices, Gross National Product (GNP), company's annual revenue. Time series forecasting is a statistical method that uses historical data to generate a model describing the relationship between observations collected in chronological order and use that model to predict future observations, which is also widely used in data science. There are several methods of time series analysis, which are divided into two main groups: the linear approach (e.g., the BR-Jenkins or Autoregressive Integrated Moving Average Model) and the non-linear approach, which is a method that attempts to characterize non-linear relationships of time series (e.g., the Artificial Neural Network Model) (Kotu and Deshpande, 2019). The Box-Jenkins time series analysis is a highly effective technique for short-term forecasting. The model is called the ARIMA model, which stands for Autoregressive Integrated Moving Average. The ARIMA model assumes that the current value of the observation is a linear function of the previous observation and random error.

On these grounds, the appropriate decision-making model for determining the investment attractiveness score in this study is the decision tree model as it is an easy-to-understand model and can predict with high accuracy compared to other models. The ARIMA model is suitable for forecasting the stock price because the model is highly accurate in short-term forecasting. Literature also spots on the hybrid model combining decision trees and ARIMA model for better forecasting in various fields, e.g., improving inventory performance (Bala, 2010), reservoir pressure surveillance (Mohammad Fuad et al., 2019). However, literature on the hybrid ARIMA–decision tree algorithm in stock prices forecasting has not been adequately addressed. This study, therefore, addresses combining machine learning algorithm with ARIMA based on research objectives in creating a 2-week stock index forecasting, which is so far lacking in the literature.

3. Research methodology

3.1 Data

The data used in this research are divided into two categories: the data for investment attractive scoring and data for stock price forecasting. The source of data for both categories was collected from The Stock Exchange of Thailand website (www.set.or.th) and Bualuang Securities website (www.bualuang.co.th).

3.1.1 Data for determining the investment attractiveness score

The data used to determine the investment attractiveness score of the SET100 Index are secondary time series data. The monthly data of the companies, in total 100 companies, were collected from January to December 2019. The data set is divided into two sets, the training dataset and the testing dataset. In this case, there were 42 data records for the training dataset as a fully qualified dataset, while there were 53 data records for the testing dataset, as 5 of them were incomplete and could not be used in this process. The variables for each data record consist of Dividend Yield, Return On Equity, Return On Assets, Price to Earnings Ratio, and Price to Book Value Ratio.

3.1.2 Data for stock price forecasting using ARIMA model

The data for stock price forecasting is a compilation of 244 observations of daily serialized secondary data for the SET 100 from January to December 2019. Once the required data has been obtained, the data will be updated using the RapidMiner program as a data cleaning process. First of all, incomplete data must be filtered based on missing data, outliers, and inconsistencies because these data may result in inaccurate results. After that, the data is converted so that all variables have the same weight of importance to make it more suitable for analysis (Data Transformation). The last step is to prepare other necessary information, such as data imputation. Thus, data is available for data analysis using ARIMA model.

3.2 Determining investment attractiveness score

The data obtained from the data cleaning process is divided into two data sets, i.e., the training data set and the testing data set. The investment rating is determined by score criteria based on investment specialist advice, as presents in Table 1.

Table 1: Criteria for selecting the attractive stocks based on company's financial ratio

No.	Financial ratio	Value
1	Dividend Yield	Greater than or equal to 3
2	Return On Equity	Greater than or equal to 10
3	Return On Assets	Greater than or equal to 8
4	Price to Earnings	Less than or equal to 20
5	Price to Book Value	Less than or equal to 3

Table 1 shows the appropriate value for each variable, and there are criteria for investment attractiveness score dividing into four levels with the scoring method according to Table 2.

Table 2: Scoring for the teaching dataset

Level	Definition	Scoring criteria
1	Unattractive stock	Not eligible for more than 4 criteria
2	Low level of attractiveness	Not eligible for more than 3 criteria
3	Moderate level of attractiveness	Meet at least 3 eligibility criteria
4	High level of attractiveness	Meet at least 4 eligibility criteria

Table 2 shows the scoring criteria from selecting stocks provided in Table 1 to define the level of the investment attractiveness for each stock. The data for training will be assigned in 4 investment attractiveness grade points: a score of 4 equals stocks worth investing in, a score of 3 equals moderate-attractive stocks, a score of 2 equals to less attractive stocks, and a score of 1 equals to unattractive stocks. Once the complete data without missing value are obtained, these datasets can be analyzed with the decision tree model to estimate the investment attractiveness score and then test the prototype with the test dataset to identify the cost viability score and the accuracy of the prototype obtained. This process is done using the RapidMiner program.

3.3 Stock selection

After creating attractiveness scoring criteria and perceiving the individual stock scores, the attractive stocks are then ready to be selected. The selection criteria are based on investment attractiveness scores from the decision tree model created and advice from investment specialists for decision making.

3.4 Stock price forecasting using the ARIMA model

This step is to forecast the prices of stocks selected to determine short-term trends using daily data from January to December 2019, 244 observations, to forecast the stock's closing price for the next two weeks using the ARIMA technique. The Autoregressive Integrated Moving Average (ARIMA), one of the most extensively used models to forecast linear time series data, assumes that the current value of the observation is a linear function of the past observation and random error (Box et al., 2015). The forecasting equation is constructed as follows.

$$\Delta_d y_t = \delta + \phi\Delta_d y_{t-1} + \cdots + \phi\Delta_d y_{t-p} + \varepsilon_t - \theta_1\varepsilon_{t-1} - \cdots - \theta_q\varepsilon_{t-q} \qquad (1)$$

Where: y_t is the time series observation at time t,

δ is a constant in the model,

ε_1 is the random error at time t, which assumes that ε_1 is an independent random variable,

φ(i = 1, ... p) and φ (j = 1, … , q) are parameters in the model, whereas p and q are integers representing the order of the model.

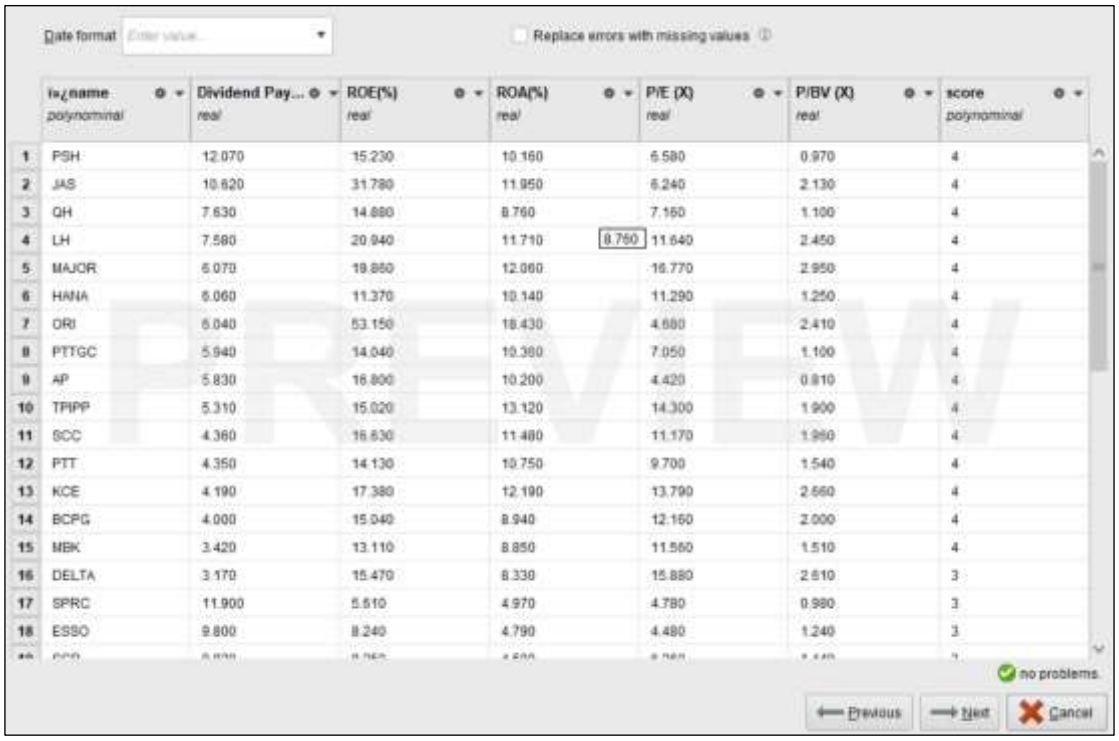
The historical part of the observations contained in the model is Autoregressive (AR), and the historical stochastic discrepancy in the model is the Moving Average (MA). The process in which time series has to differentiated first to be stationary data is called an Integrated Version of a Stationary Series (I). The ARIMA model is denoted by ARIMA (p, d, q), where p is the number of autoregressive terms, d is the number of nonseasonal differences needed for stationarity, and q is the number of lagged forecast errors in the prediction

equation. Then the model forecasted is measured to see the extent to which the model's accuracy by comparing the actual stock price data with the stock price forecasted.

4. Results

4.1 Determining investment attractiveness score of the SET100 Index

The model indicating stocks' attractiveness scores was created in RapidMiner using a decision tree as an algorithm to classify and forecast data. After importing training data into a repository with a total of 42 data sets, the next step was to determine the data types in each attribute and change the data types to suit the analysis using the decision tree model.



	name (polynominal)	Dividend Pay... (real)	ROE(%) (real)	ROA(%) (real)	P/E (X) (real)	P/BV (X) (real)	score (polynominal)
1	PSH	12.070	15.230	10.160	6.580	0.970	4
2	JAS	10.820	31.780	11.950	6.240	2.130	4
3	QH	7.630	14.880	8.760	7.160	1.100	4
4	LH	7.580	20.940	11.710	8.760	11.640	2.450	4
5	MAJOR	6.070	19.860	12.060	16.770	2.950	4
6	HANA	6.060	11.370	10.140	11.290	1.250	4
7	ORI	6.040	53.150	18.430	4.680	2.410	4
8	PTTGC	5.940	14.040	10.380	7.050	1.100	4
9	AP	5.830	16.800	10.200	4.420	0.810	4
10	TPIPP	5.310	15.020	13.120	14.300	1.900	4
11	SCC	4.360	16.630	11.480	11.170	1.960	4
12	PTT	4.350	14.130	10.750	9.700	1.540	4
13	KCE	4.190	17.380	12.190	13.790	2.660	4
14	BCPG	4.000	15.040	8.940	12.160	2.000	4
15	MBK	3.420	13.110	8.850	11.560	1.510	4
16	DELTA	3.170	15.470	8.330	15.880	2.610	3
17	SPRC	11.900	5.610	4.970	4.780	0.980	3
18	ESSO	9.800	8.240	4.790	4.480	1.240	3

Figure 1: The desired data format in RapidMiner

Figure 1 shows the input data, which is all numeric data type, while the attribute named Score, which is considered to be label data, is changed to Polynominal type because the model consisting of the numeric type of data with more than two characters is suitable for predicting with the decision tree technique. Once the required data was imported, a forecast model was created using all operators and the layout pattern indicated operators' order to build and deploy predictive models, as shown in Figure 2 and Figure 3.

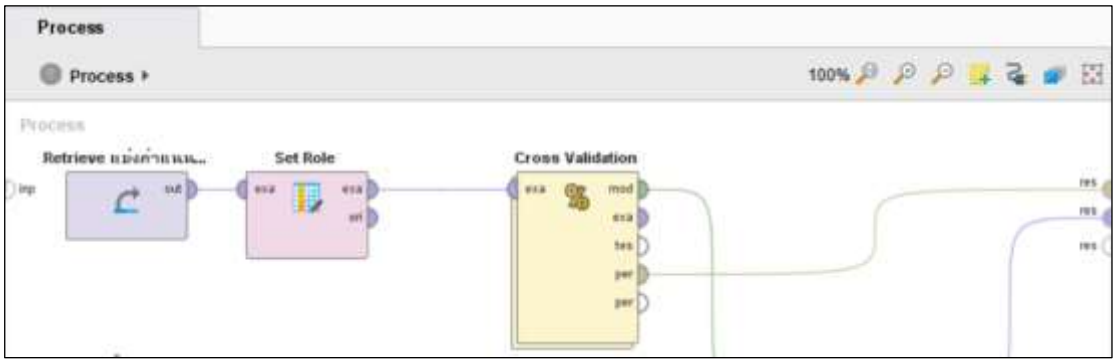


Figure 2: The order of all operators for creating the forecast model

Figure 2 shows the layout of operators for teaching, where the process started from importing data for teaching and then defining the role pattern of the variable, investment attractiveness score, being in a label form through the operator named "Set Role". After that, the operator named "Cross Validation", a sub-process as shown in

Figure 3, was selected to create the forecast model. The Cross Validation was used to test the model's performance by dividing the data into several parts (called k-fold cross-validation) for teaching and testing. The process divides the data into k parts, each part having the same amount of data. After that, the k-1 data of the Train Model is taken in RapidMiner. Then the loop testing is conducted for the rest of the data until all parts (k) were reached.

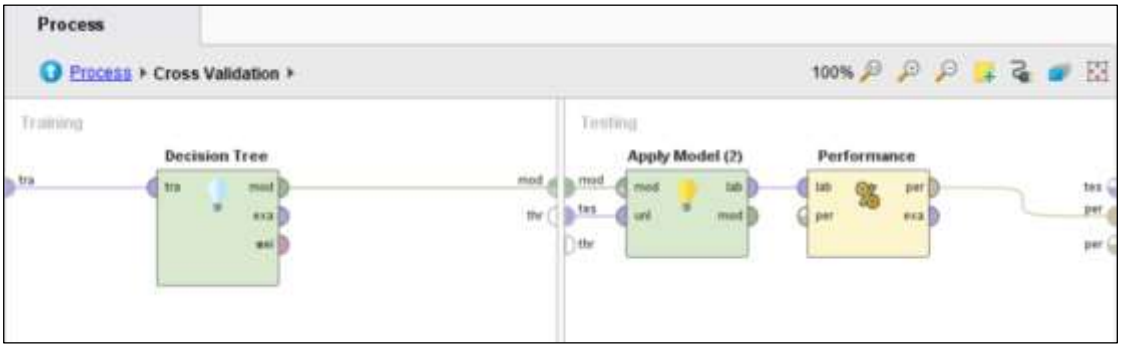


Figure 3: The sub-process pattern of the operator named “Cross Validation”

From Figure 3, Decision Tree is an operator for classification and regression to predict the target value of the data. It behaves in a node model (Hierarchical Relationship), which is suitable for feature-specific data. The next step was applying the forecasting model to new datasets. Once the teaching model is created, it is applied to the new data set and used to analyze the price trend further. The sequence of data analysis is shown in Figure 4 and 5.

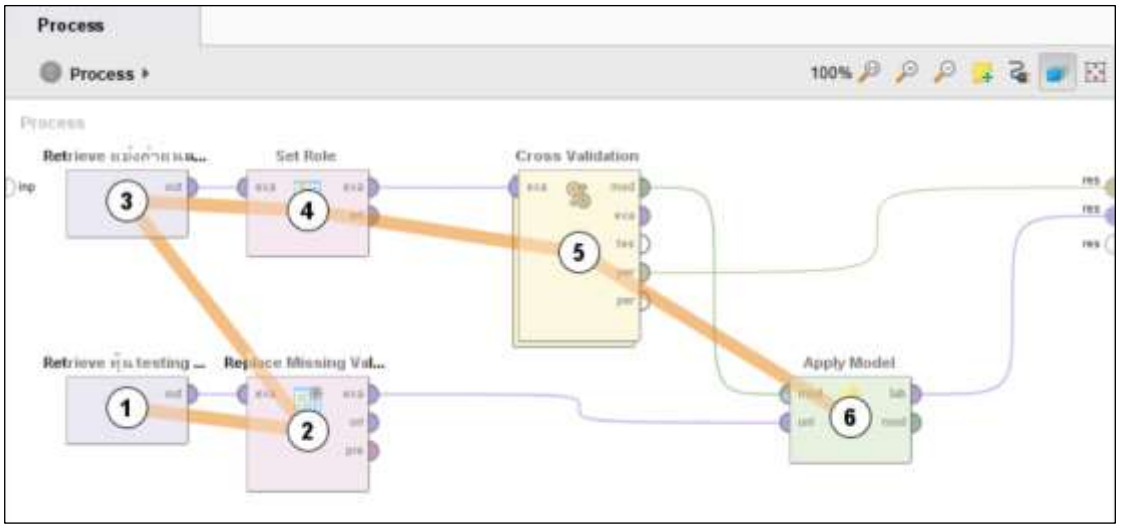


Figure 4: The forecasting sequence using RapidMiner

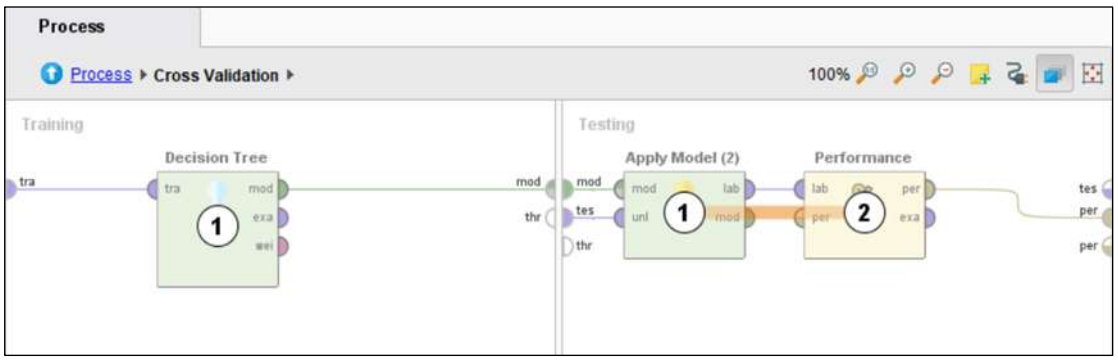
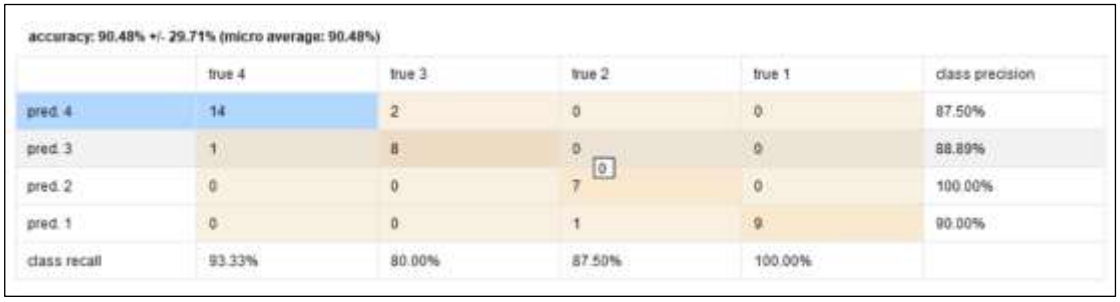


Figure 5: The sub-process sequence of the operator "Cross Validation"

The operating method for the application is slightly different from that of creating a teaching prototype. A new set of data is imported, and the missing data is replaced with an operator named "Replace Missing Value" to

increase the data integrity. The operator named "Apply Model" was then used to connect the teaching model and a new set of data.



accuracy: 90.48% +/- 29.71% (micro average: 90.48%)

	true 4	true 3	true 2	true 1	class precision
pred. 4	14	2	0	0	87.50%
pred. 3	1	8	0	0	88.89%
pred. 2	0	0	7	0	100.00%
pred. 1	0	0	1	9	90.00%
class recall	93.33%	80.00%	87.50%	100.00%	

Figure 6: The evaluation of forecasting using the decision tree model

From Figure 6, the forecast results using the decision tree model indicated that the model predicts at 90.48% accuracy based on the predictions on the training test, and recall and precision are also good. A total of 53 test data were divided into four levels: high, medium, low, or unattractive in investment attractiveness, in which the breakdown by levels is as 7 shares, 9 shares, 14 shares, and 23 shares, respectively. The stock that will be used in the stock price prediction process is listed in the group with the highest investment attractiveness, consisting of JMT, PTTEP, KKP, TCAP, SCB, BTS, and WHA.

4.2 Stock selection

As a result of investment attractiveness classification from the decision tree model, the most attractive stocks were identified, with details of business differences as shown in Table 3.

Table 3: Details of the stocks listed in the group with the highest investment attractiveness

Symbol	Security Name	Sector	Price	Shareholding
JMT	JMT NETWORK SERVICES PUBLIC COMPANY LIMITED	Finance & Securities	20.00	9.56
PTTEP	PTT EXPLORATION AND PRODUCTION PUBLIC COMPANY LIMITED	Energy & Utilities	124.50	14.09
KKP	KIATNAKIN PHATRA BANK PUBLIC COMPANY LIMITED	Banking	66.00	33.61
TCAP	THANACHART CAPITAL PUBLIC COMPANY LIMITED	Banking	53.50	47.89
SCB	THE SIAM COMMERCIAL BANK PUBLIC COMPANY LIMITED	Banking	122	47.28
BTS	BTS GROUP HOLDINGS PUBLIC COMPANY LIMITED	Transportation & Logistics	13.20	32.11
WHA	WHA CORPORATION PUBLIC COMPANY LIMITED	Property Development	3.88	21.96

The chosen stock was selected from criteria recommended by investment specialists in which to choose from stocks with low selling prices or stocks that can be efficiently invested, less than 20 baht per share, or stocks from a reliable shareholder, more than 30 percent. From these selection criteria, BTS has seen steady growth in profits, and the company meets the criteria in both steps with a share price of 13.20 baht per share, and a fund group or company holds 32.11%. It is also a company that has received government concession in the transport and logistics service industry, giving the company a strong and highly stable company. As a result of the concession from the government, there are no competitors to take part in this transportation and logistics service. As a result, BTS is selected, which is in line with the advice of the experts.

4.3 Stock price forecasting using the ARIMA model

In price forecasting using the ARIMA model, we have to identify short-term trends based on the daily secondary data series for 244 days from January to December 2019 to forecast trends over two weeks. The methodology and results of operations are as follows.

4.3.1 Time series plot of closing price

The first step is to generate a time series plot to define the format of the data. Figure 7 shows that the historical data of BTS shares used for forecasting is trending; however, the data in this format cannot be analyzed using the ARIMA model.

Figure 7: Time series plot of closing price

4.3.2 Box – Cox plot of closing price

This step takes the closing price data into the Box-Cox Transformation function to calculate λ. Figure 8 shows that λ is equal to -0.5, which is inappropriate, and data transformation should be conducted to obtain the data in the normal distribution form.

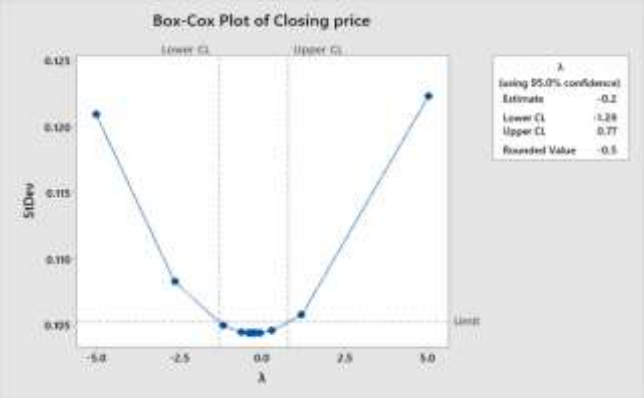


Figure 8: Box - Cox plot of closing price

4.3.3 Box - Cox plot of transformations

The information gathered from the previous step is employed to perform data transformation to get the λ value closest to 0.52 for the most accurate data analysis. After the transformation process, the estimates of the resulting coefficients are attributed to the regression equation based on the transformed data, not the collected data.

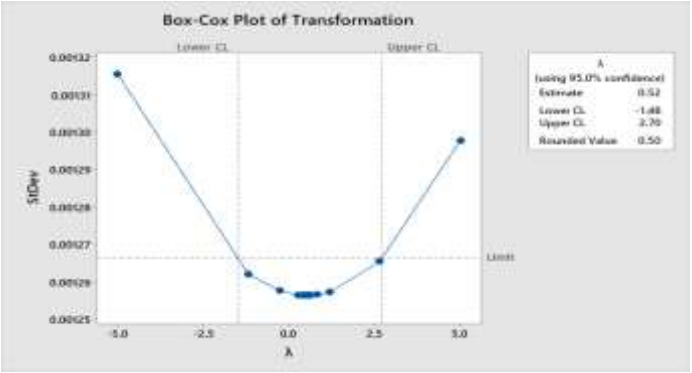


Figure 9: Box - Cox plot of transformation

4.3.4 Autocorrelation function: Transformations

When appropriate information is obtained from the data transformation process, an autocorrelation function was graphed to determine the MA(q) value. A data model suitable for ARIMA forecasting must have data dynamics based on correlation and static characteristics and the data in this format is called Stationary. Figure 10 shows that this data set is not a stationary data. Therefore, differences must be conducted so that the data is in the form of stationary.

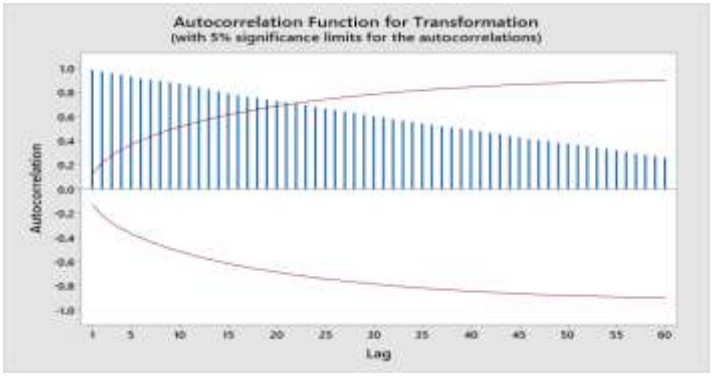


Figure 10: Autocorrelation function for Transformation

4.3.5 Autocorrelation function: Differences

After the differences, data transformation is completed, the graph is tapered, and the values approaching zero are in the red line region. Thus, it shows that such data is correlated and stable, indicating that this data is already in stationary format and provides an appropriate MA(q) value for forecasting.

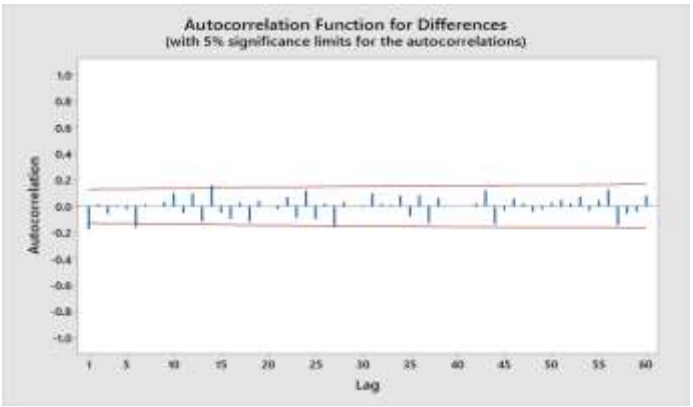


Figure 11: Autocorrelation function: Differences

4.3.6 Partial autocorrelation function: Differences

Once the MA(q) value is obtained, the next step is to find the appropriate AR(p) value by analyzing the candlestick (Spike) at the first five lag by finding the candlestick that is out of range.

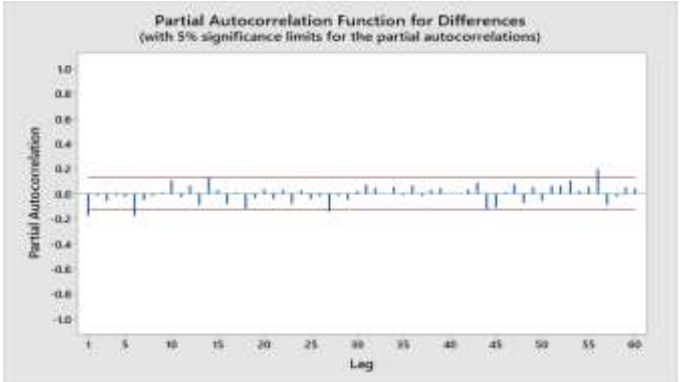


Figure 12: Partial autocorrelation function for differences

From Figure 12, a noticeably overextended candle is a lag of 1, indicating that the variable p is equal to 1. Once all the data is ready for analysis using the ARIMA model, they can be used in forecasting to identify trends.

4.3.7 ARIMA model: Closing price

After obtaining the values (p,d,q) used in ARIMA, the data was then entered into the ARIMA formula using values equal to (1,1,1) using all 244 historical data from 2 January 2019 to 30 December 2019. The model shows forecast values and limits from point 245 to point 254 for a total of 10 points. Figure 13 and 14 presents the forecast results.

Forecasts from period 244

Period	Forecast	95% Limits Lower	Upper	Actual
245	13.2320	12.9056	13.5584	
246	13.2586	12.8258	13.6915	
247	13.2816	12.7787	13.7846	
248	13.3022	12.7462	13.8581	
249	13.3211	12.7217	13.9205	
250	13.3389	12.7019	13.9758	
251	13.3559	12.6853	14.0264	
252	13.3724	12.6710	14.0738	
253	13.3886	12.6584	14.1188	
254	13.4046	12.6472	14.1620	

Figure 13: Forecast values 10 points continue from point 244

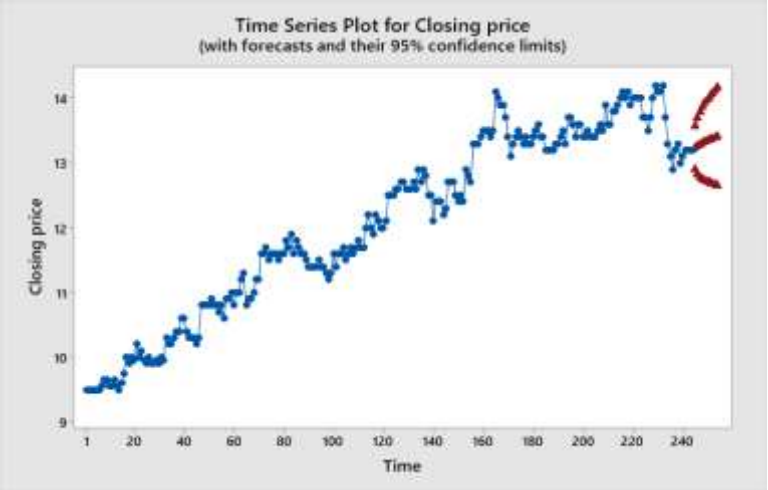


Figure 14: Time series plot for closing price

Figure 13 and 14 show the forecast values, minimum forecast limit, and maximum forecast limit of all 10 points or two weeks. It is a suitable forecast period recommended by investment specialists when there is a 1-year historical data set.

4.4 Forecasting evaluation

Forecast measurement in this study is measured by analogy with actual data from 2 to 15 January 2020. Table 4 and Figure 15 show a comparison between the actual BTS share price and the forecast results. Empirical results show that the information obtained from the ARIMA model forecasting is very close to the actual prices, which shows the accuracy of the forecast results.

Table 4: The comparison between the actual BTS prices and the forecast prices

Date	Actual prices	Forecast prices
2 January 2020	13.4	13.232
3 January 2020	13.3	13.259
6 January 2020	13.1	13.281
7 January 2020	13.5	13.302

Date	Actual prices	Forecast prices
8 January 2020	13.4	13.321
9 January 2020	13.6	13.339
10 January 2020	13.4	13.356
13 January 2020	13.5	13.372
14 January 2020	13.4	13.389
15 January 2020	13.4	13.405

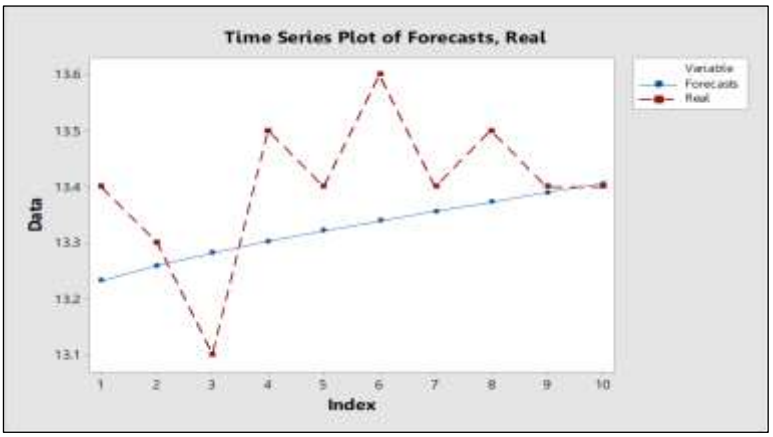


Figure 15: A time series plot comparing the actual prices with the forecast prices

The results revealed that the decision tree model can be used to classify stocks' investment attractiveness level, which was confirmed by the accuracy as high as 90.48% following the other financial criteria of the attractive stocks to invest in accordance with experts' recommendations. Among the high attractiveness shares, BTS was considered an appropriate stock because it is a leading company and well-known in the transportation and logistics service industry with a low share price and a large group of funds or holding companies that reflect the performance stability of this stock. ARIMA is then used to forecast the 2-week closing price trend of BTS with Minitab.

Table 5: Final estimated of parameters

Type	Coef	SE Coef	T-Value	P-Value
AR 1	0.674	0.168	4.02	0.000
MA 1	0.803	0.135	5.93	0.000
Constant	0.005	0.002	2.38	0.018

The final estimated of parameters of stock price forecasting using the ARIMA model was presented in Table 5 and the model specification can be summarized as follows.

$$y_t = 0.005 + 0.674y_{t-1} + \varepsilon_t - 0.803\varepsilon_{t-1} \qquad (2)$$

The experimental results indicate that the classification of investment attractiveness using the decision tree model provides a better accuracy with the optimal decision for stocks selection, resulting in improving forecast accuracy as the forecast prices were very close to the actual prices (p-value < 0.01). Thus, it can be concluded that the ensemble machine learning methods together with the ARIMA technique can be used as a hybrid method to increase prediction capability for supporting investment decisions, which are in line with the literature that the decision tree - ARIMA algorithm improves more advance analysis such as forecasting and simulation.

5. Discussions

The rise of the intricate and dynamic properties of the stock market is one of the most eminent challenges in the financial world. Rigorous trading strategies from professionals are repeatedly incapable of attaining profitable returns in all market conditions so that stock trading algorithms have become a vital part of the financial markets, and most of the trades are fully automated (Wu et al., 2020). However, relying only on machine learning (pattern matching/DRL) for trading agents is not predictable well on higher time scales so that

the balance between using AI in finance and the traditional method is practical (Pricope, 2021). This study proposed the hybrid model to mitigate the possible disadvantages of each method so that the combination of the decision tree model and ARIMA was proposed to predict the stock prices listed in the Stock Exchange of Thailand. The results show that the hybrid ARIMA–decision tree algorithm in stock prices forecasting was notably suitable for short-term prediction based on the experimental analysis. It, therefore, indicated that the Hybrid ARIMA–Decision Tree model may have a solid ability to capture the trends in stock markets. Thus, it can support the decision of new investors in the Stock Exchange of Thailand according to the objectives of this research and may result in a lower loss rate for either experienced and inexperienced investors. However, it cannot be concluded that the methodology used in this research is optimal due to the limited scope of data. This research forecasted the stock prices only two weeks in advance, which was a short-term analysis, and the data set to be used is only a sample data from the Stock Exchange of Thailand website.

Therefore, suggestions for future research include:

- There should be a more teaching data set to create an investment forecasting model with RapidMiner in order to be able to analyze the stock's investment rating sequence more accurately.
- It should not be an incomplete data set. Long-term data of at least five years should be applied to determine the seasonal pattern. Further research should collect more historical data to analyze over a more extended period. This research analyzed only the data model in the normal situation. Other factors involved in actual investment, such as economic, political, and administrative conditions, should be considered.

Acknowledgements

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References

Armano, G., Marchesi, M. and Murru, A., 2005. A hybrid genetic-neural architecture for stock indexes forecasting. *Information Sciences, 170*(1), pp.3-33.

Baba, N. and Kozaki, M., 1992, June. An intelligent forecasting system of stock price using neural networks. In *[Proceedings 1992] IJCNN International Joint Conference on Neural Networks* (Vol. 1, pp. 371-377). IEEE.

Bala, P.K., 2010. Decision tree based demand forecasts for improving inventory performance. In 2010 *IEEE International Conference on Industrial Engineering and Engineering Management* (pp. 1926-1930). IEEE.

Box, G.E., Jenkins, G.M., Reinsel, G.C. and Ljung, G.M., 2015. *Time series analysis: forecasting and control*. John Wiley & Sons.

Chang, P.C., Wang, Y.W. and Yang, W.N., 2004. An investigation of the hybrid forecasting models for stock price variation in Taiwan. *Journal of the Chinese Institute of Industrial Engineers*, 21(4), pp.358-368.

Engle, R.F. and Russell, J.R., 2009. *Analysis of high-frequency Data*, Handbook of Financial Econometrics, Eds. Y. Ait-Sahalia and LP Hansen.

Kim, K.J. and Han, I., 2000. Genetic algorithms approach to feature discretization in artificial neural networks for the prediction of stock price index. *Expert systems with Applications, 19*(2), pp.125-132.

Kotu, V. and Deshpande, B., 2019. Time series forecasting. *Data Science; Elsevier: Amsterdam, The Netherlands*, pp.395-445.

Mohammad Fuad, I.I., Rosli, L.H. and Husni, H., 2019. Application of Hybrid ARIMA–Decision Tree Algorithm in Reservoir Pressure Surveillance. *In Abu Dhabi International Petroleum Exhibition & Conference*. OnePetro.

Pricope, T.V., 2021. Deep Reinforcement Learning in Quantitative Algorithmic Trading: A Review. *arXiv preprint arXiv:2106.00123*.

Tsai, C.F. and Wang, S.P., 2009. Stock price forecasting by hybrid machine learning techniques. In *Proceedings of the international multiconference of engineers and computer scientists* (Vol. 1, No. 755, p. 60).

Wu, X., Chen, H., Wang, J., Troiano, L., Loia, V. and Fujita, H., 2020. Adaptive stock trading strategies with deep reinforcement learning methods. *Information Sciences*, *538*, pp.142-158.

Modeling the Influence of the Formal Institutional Environment on the Social Entrepreneurship Development in the Regions of Russia

Evgeny Popov[1], Anna Veretennikova[1,2,3] and Kseniya Kozinskaya[2,3]
[1]Ural Institute of Management of the Russian Presidential Academy of National Economy and Public Administration, Yekaterinburg, Russia
[2]Institute of Economics, the Ural Branch of Russian Academy of Sciences, Yekaterinburg, Russia
[3]Ural Federal University named after the First President of Russia B. N. Yeltsin, Russia
epopov@mail.ru
vay_uiec@mail.ru
ksush1@yandex.ru
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Abstract: Social entrepreneurship contributes to society's sustainable development, focused on meeting people's needs, the practical solution of social problems, including in times of crises, and the creation of innovative socio-economic solutions. However, to develop this phenomenon, the relevant institutions' functioning is necessary from society and the state. Government initiatives directly impact social entrepreneurship development both from above - through bills and supporting institutions, and from below, promoting mass initiatives in society. This study aims to determine the formal institutional environment's influence on Russia's regions' social entrepreneurship development. It has been determined that socially-oriented activity is distributed unevenly in different Russian regions, which became the reason for analyzing the supportive institutional environment's influence on developing social entrepreneurship. In the course of identifying the patterns of development of social entrepreneurship in Russia's regions, hypotheses about the influence of GRP, the average level of wages in the region, the level of investment attractiveness, the presence of a regional program for the development of the joint venture, and the amount of financing in the social sphere were tested. A model was built in the conducted regression analysis showing that social entrepreneurship development in the region depends on economic development and support programs' availability. The general trends in the development of social entrepreneurship in Russian and international practice are revealed, particularly the influence of economic development and supporting institutions on social entrepreneurship development. Simultaneously, in the Russian regions for the development of social entrepreneurship, the availability of support measures is more important than the region's investment attractiveness, which indicates the need for regulation by the state.

Keywords: social entrepreneurship, institutional environment, supporting institutions, formal institutions

1. Introduction

At the end of the 20th century and the beginning of the 21st century, the economic systems of the local, regional, national, and also world level, faced with new challenges in solving social problems of society, are forced to look for new ways to solve them, including using alternative market forms of economic interactions (Marquis & Raynard, 2015). Simultaneously, due to the development of technologies and new production models, economic structures are rapidly changing. New forms of organizations are emerging that meet the challenges of the 21st century (Estrin, Mickiewicz, Stephan, 2016).

Social entrepreneurship is one of these new forms of economic interactions, capable of stimulating the solution, first of all, of social problems, eliminating the public sector's failures, and contributing to society's sustainable development. The emergence and development of new socio-economic models are often accompanied by the transformation of existing rules and norms and require appropriate institutional conditions (Sahasranamam S., Nandakumar 2020).

The development of social entrepreneurship in Russian practice is of particular interest. Insufficiently favorable conditions for the development of small business in general, echoes of the socialist model of behavior and the expectation of the state to solve social problems, the high riskiness of this type of activity, as well as the delay in the adoption of legislation in the field of social entrepreneurship, significantly limited the development of social entrepreneurship in the regions of Russia. However, since 2019, there have been significant advances in the development of this type of activity. Changes occur in both the regulatory and supportive institutional environment, which stimulated this study's conduct. The emergence of statistical data on this issue can also form a breakthrough in this phenomenon's scientific study.

Thus, this study aims to determine the influence of the formal institutional environment on the development of social entrepreneurship in Russia's regions. The study's subject is social entrepreneurship development and the formal institution environment's role in this process. In this study, the formal institutional environment of social entrepreneurship for Russian regions will be investigated econometrically. This study's aim is an empirical evaluation of how regulative and normative institutions affect social entrepreneurship growth. In connection with the study, the existing approaches to the analysis of social entrepreneurship were disclosed, hypotheses were formulated about the influence of various factors characterizing Russian regions' formal institutional environment on social entrepreneurship. The results obtained were compared in previous international studies on this topic.

2. Social entrepreneurship and formal institutional environment

2.1 Social entrepreneurship: The essence of the concept

Researchers of social entrepreneurship give different interpretations of this phenomenon, which explains the absence of its generally accepted definition. The growing interest in scientific research on this topic has led to an increase in research and the further institutionalization of social entrepreneurship in academia. J. Greg Dees, one of the theorists in social entrepreneurship, defines this type of activity as a process based on the change that creates social value through innovation and creativity (Dees 1998).

In our previous studies (Popov et al, 2019), the world's scientific schools were described in detail, describing and explaining this phenomenon's development. In the world practice of studying the Social Entrepreneur, there are two different approaches, fundamentally different from each other: American and European. The differences between these approaches are associated with the peculiarities of historical development and, as a consequence, the existing institutional environment in European countries and the United States. Within these approaches, four leading schools are distinguished: the socially innovative school (Mair & Marti, 2006), the socially entrepreneurial school (Crimmings & Kiel, 1983; Emerson & Twersky, 1996), the European school (Spear et al., 2001) and the English school (Gartner, 1985.). These schools study various aspects of social and entrepreneurial activity, in particular: the object of research, the legal form of objects of social entrepreneurship, their innovativeness, receipt, and distribution of profits, as well as the form of management.

In Russian studies, the first scientific studies of theoretical significance belong to A.A. Moskovskaya (2011), Yu.N. Araj (2013), and N.I. Zvereva (2014), which reveals the essence of social entrepreneurship. The phenomenon of social entrepreneurship is most fully revealed in the study of social entrepreneurship in Russia, A.A. Moscovskaya, which uses the Anglo-American tradition approach (Moskovskaya, 2011, p.. 288). The definition used by A.A. Moscovskaya is based on the formulation of Kim Alter (2007). It reads as follows: "Social entrepreneurship is a new way of socio-economic activity, which combines the social purpose of an organization with entrepreneurial innovation and the achievement of sustainable self-sufficiency" (Moskovskaya, 2011, p. 15). The following characteristics are given as essential features of social entrepreneurship: the predominance of the social mission over the commercial one (i.e., the purposeful solution of social problems); self-sufficiency and financial independence of enterprises (although grants and other sources of funding are allowed as additional sources of funding); an innovative, entrepreneurial approach to problem-solving; the ethical integrity of the leader and the culture of the organization.

The emergence and institutionalization of social entrepreneurship In Russia began only in the early 2000s, which is the reason for the lag in this area from Europe. The introduction of the phenomenon under consideration into the domestic legal reality took place in 2007 when the Fund for Regional Social Programs "Our Future" was created. For the first time, the term "social entrepreneurship" appeared in the Order of the Ministry of Economic Development No. 223 on the support of small and medium-sized businesses. In 2014, this was the Order of the Ministry of Economic Development of Russia dated 01.07.2014 No. 411 "On the organization of the competitive selection of the constituent entities of the Russian Federation, whose budgets in 2014 are provided with subsidies from the federal budget for state support of small and medium-sized businesses by the constituent entities of the Russian Federation".

The speech of the President of the Russian Federation at the Forum "State and Civil Society: Cooperation for Development" in January 2015 is essential for the development of social entrepreneurship in the Russian Federation. However, the federal law that consolidated the concept of the phenomenon under consideration

was adopted only in July 2019 (Federal Law of July 26, 2019 No. 245-FZ "On Amendments to the Federal Law" On the Development of Small and Medium-Sized Businesses in the Russian Federation "in terms of consolidating the concepts of" social entrepreneurship, "" social enterprise "). Following the Federal Law, social entrepreneurship is understood as "entrepreneurial activity aimed at achieving socially useful goals, contributing to the solution of social problems of citizens and society and carried out by the conditions provided by the special point of the Federal Law. On the whole, the concept of social entrepreneurship in Russia belongs to the European tradition and does not imply innovation.

Currently, the market for social entrepreneurship in Russia is growing. It seems possible to distinguish three categories of social entrepreneurs in Russia: 1) specialized organizations and their representatives, 2) non-profit organizations that carry out entrepreneurial activities that meet their statutory and social goals, 3) small business and its representatives. There are successful projects in the Russian Federation in the following areas: farming and agriculture, the revival of crafts and folk crafts, local tourism.

It is important to note that this article is one of the first quantitative studies of the regional development of social entrepreneurship in Russia. Early works devoted to this phenomenon in Russia are descriptive since accounting for the number of social entrepreneurs was complicated by the lack of legislative norms. At the same time, one can single out the work of Smirnov (2021), dedicated to regional systems of social entrepreneurship in Russia. Popova & Solovieva (2020) on the potential for the development of social entrepreneurship in Russia compared to the EU and Umnov, Plyukhina, Matveeva (2018), which analyzed the system of state support for social entrepreneurship in Russia. In our early works, we investigated the formal and informal institutional environment of social entrepreneurship in the global space and found that social entrepreneurship is influenced by economic growth and the investment climate in a particular country. In this article, we investigate the regional level of social entrepreneurship development.

2.2 Institutional environment for the formation and development of social entrepreneurship

In research literature, there is plenty of evidence of the impact of institutions on economic growth. Social entrepreneurship as a new form of entrepreneurial activity requires certain development conditions formed due to certain institutions' functioning. It is important to note that according to the concept of D. North (1998), the leading role of institutions in society is to reduce uncertainty by establishing stable structures of human interaction. According to D. North, institutions are human-invented restrictions that structure people's political, economic, and social interactions. They consist of informal restrictions (values, norms, prohibitions, customs, traditions, and codes of conduct) and formal rules (constitution, laws, economic rules, property rights, and contracts). At the same time, the influence of institutions on both economic development and social entrepreneurship is heterogeneous. In this regard, it is advisable to consider the regulatory and supportive institutional environment separately.

Regulative institutional environment. Scientists S. Estrin and B. Urban believe that social and entrepreneurial activity is more successful in the institutional environment in which a solid legal system operates. Scientists propose to stimulate the regulative environment for the development of socially-oriented activities. Creating a regulatory framework should include legal and legal forms capable of providing social entrepreneurs with access to tax incentives, grants, subsidies, and financial instruments.

Unlike European countries and North American countries, in Russia, the Law on social entrepreneurship was adopted only in 2019. This Law defines social entrepreneurship and methods and types of support for this type of activity. Thus, according to Law, a social enterprise is defined as a small or medium-sized business entity carrying out social entrepreneurship activities.

According to the Agency for Strategic Initiatives, only 1% of small and medium-sized companies are engaged in social entrepreneurship in Russia. In Europe, this figure reaches 5% (Tjutjunin et al., 2015). Sociological surveys conducted by VCIOM (Russia Public Opinion Research Center) show that women are inclined to engage in this type of entrepreneurship in Russia - 64% versus 36% of men. The average age of a social entrepreneur is between 30 and 50 years old. In terms of education, 85% of social entrepreneurs have a university degree. People who already have experience in business, or have previously had experience in various social spheres, are more inclined to engage in social business (Urbanaeva, Iltakova, 2016). Today in Russia, there are more than 2,500 registered enterprises with "social entrepreneurship." These socially oriented organizations received this status

in 2020 during the first wave of registration. However, although there is unified legislation on social entrepreneurship throughout Russia, there is an uneven distribution across Russia's regions. In the Chuvash Republic, Magadan Region, Krasnoyarsk Territory, there are several social entrepreneurship organizations. At the same time, in the Republic of Bashkortostan, Moscow Region Khanty-Mansi Autonomous Region, this number reaches several hundred. The dispersion of socially oriented organizations across Russia's regions significantly exceeds the maximum permissible value. Thus, we can conclude that legislation is not the only factor in the development of social entrepreneurship.

Supportive institutional environment. However, in addition to legislative instruments, the government can create favorable conditions for social entrepreneurship development. These steps will include creating and maintaining a flexible regulatory framework, supporting social entrepreneurs, developing an enabling environment for entrepreneurship, and fostering a culture of innovation through government educational institutions and the media.

Thus, the supportive environment plays an essential role in defining and shaping entrepreneurial outcomes. According to the concept of S. Seelos, the institutional environment through the systematization of norms of behavior creates mechanisms that form the context of the activities of social entrepreneurs (Seelos et al., 2011). Supporting mechanisms arise from social structures and are responsible for the formation of good entrepreneurial behavior. Entrepreneurship research shows a positive correlation between entrepreneurship and economic growth, prosperity, and wealth. At the same time, markets play an essential role in managing entrepreneurship processes, and appropriate institutions are needed for their successful emergence and functioning (Fligstein, 2001). Concerning social entrepreneurship, based on a review of scientific literature, we identified the following institutions of a supportive environment: institutions of economic development, institutions for financing social entrepreneurship, social welfare institutions in the regions, and the investment climate.

In scientific research, scientists determine the impact of various economic indicators on various types of activities. For example, J. Hwang et al (2017) used his work to assess a country's wealth, competitiveness, resource allocation efficiency, and GDP indicator. However, the question of whether GDP affects entrepreneurship remains open. At the same time, J. Kerlin, T. Pollak (2010), and J. Mair et al. (2012) argue that differences in socially oriented activity cannot be explained solely by economic factors; instead, they depend on society and institutions' social development. In this study, the GRP indicator was used to establish the region's economic development.

One of the most important indicators of the socio-economic development of regions is wages' level, reflecting the regional production and trade sphere's ability to pay for its own workers' labor. Average per capita income includes the salary fund, and social benefits distributed among the entire population of the region can characterize the general standard of living of the population in the regions. The need to consider these indicators is associated with our past studies' results, which revealed a positive correlation between living standards and social entrepreneurship development (Popov et al., 2018).

> ***Hypothesis 1.*** *The standard of living in the region has a positive impact on the development of social entrepreneurship.*

Resource acquisition is an essential component of any business process. An entrepreneur needs to provide resource support (for example, financial capital) to his organization at all development stages. Social entrepreneurs face several difficulties in this matter. The availability of programs to support social entrepreneurship development in the regions is an essential in this activity type's growth. According to the research consortium SEFORIS, the survey of social entrepreneurs in Russia for 2015–2016. showed that the most demanded measures to support social and entrepreneurial activities are preserving the federal support program and ensuring capital availability. Finding financial support is one of the critical issues that need to be addressed by the developer of a social and entrepreneurial project.

> ***Hypothesis 2:*** *The presence of programs supporting social entrepreneurship in the region, including financial support, contributes to social entrepreneurship.*

The theory of institutional voids, formulated by M. Dacin, J. Mair, I. Marti suggests the need for social entrepreneurship with little state participation in solving enterprises' social problems (Dacin, Goodstein, Scott, 2002; Mair, Battilana, Cárdenas; 2012). Thus, socially-oriented organizations fill the gaps in the existing social

security system. The government's active involvement in solving social problems leads to a decrease in the demand for socially-oriented organizations. Content analysis of a survey of 200 entrepreneurs conducted by J. Mair confirms this point of view (Kerlin&Pollak, 2010; Mair, Battilana&Cárdenas, 2012). Social enterprises in areas in which the state is unable to meet the needs. In a study by S. Estrin, a negative correlation was found between state actors and social enterprises).

W. Stefan et al investigated institutional voids and social entrepreneurship. They assessed the impact of institutional voids, institutional support, and institutional structures on outreach activities and concluded the prospect of researching supportive institutions. Despite the ability to attract institutions to compensate for low state activity, social entrepreneurship is usually more developed in countries where there is a high state activity in solving social problems (Stephan, Uhlaner, Stride, 2015).

Whereas in the literature, the term institutional void typically refers to the absence of strong rule of law, in the social entrepreneurship literature the term describes conditions of limited government support especially for social programs. Under such conditions, social needs such as poverty or environmental pollution are more abundant, triggering greater demand for social entrepreneurship. According to this perspective, government inactivity motivates social enterprises and others in the private sector to fill this gap, or "void."

> ***Hypothesis 3.*** *Institutional voids in the social sphere play an essential role in social entrepreneurship development.*

The investment attractiveness of a region is determined by considering a combination of factors affecting the feasibility, efficiency, and level of risks of investment investments in the region's territory. The concept of investment attractiveness of a region is broader than the concept of an investment climate. It includes aspects of regulation and support of investment activities and fundamental factors characterizing Russian regions' resource and infrastructure potential. Since social entrepreneurship has appeared relatively recently, the spread of successful experience is a prerequisite for its development and scaling.

> ***Hypothesis 4.*** *Investment region attractiveness has a positive impact on the social entrepreneurship development.*

3. Methodology

Since social entrepreneurship is a relatively new phenomenon for Russian practice, the statistical data are relatively scarce. Simultaneously, the federal policy on the development of social entrepreneurship initiated creating registers of social entrepreneurs, the data of which were used. In the course of the analysis, 66 regions of the Russian Federation were considered. However, Moscow and St. Petersburg's cities were excluded from consideration due to a significant gap in both the standard of living in this region and social entrepreneurship development. As a data source, we used the data presented on the website "New Business. Social Entrepreneurship "(http://nb-forum.ru/), data from the State-Federal Statistics of the Russian Federation, the Annual Rating of the Region's Investment Attractiveness, regional sites of the Federal Support for Small and Medium Business in Russia" My Business."

To test hypothesis 1, we used indicators such as the level of average wages (X_1) and GRP level in the region (X_2). For testing hypothesis 2, such an indicator was used as the presence of a program for the development of social entrepreneurship in the region (X_3). A significant part of the characteristics of the evaluated objects is qualitative, i.e., they are described by quality parameters. Dummy variables are used to account for qualitative parameters in the model. This method is more efficient because it becomes possible to assess the statistical significance of the influence of this factor on the dependent variable against the background of other parameters included in the model and increase the model's reliability by including more analogs. A dummy variable is a model variable in econometrics obtained by transforming information containing qualitative and non-numerical values. The dummy variable is used as a simple means to include such information in regression analysis.

So, for testing hypothesis 2, such an indicator was used as the presence of a program for the development of social entrepreneurship in the region (X_3); to test hypothesis 3 - investments in the social sphere and health care (X_4); to test hypothesis 4 - the rating of the investment attractiveness of the region (X_5). We used X_1,X_2,X_3,X_4,X_5 as independent variables. As a dependent variable, we used an indicator characterizing the number of registered enterprises in the region per capita (Y), obtained by calculating the number of registered social enterprises to the region's population. We used data of 2020 for dependent variables and data of 2019 for

independent variables. In other words, we took into account the lag that is necessary for the formation of social entrepreneurship institutions. The table 1 includes the title of the each indicator and the source (table 1).

Table 1: Description of variables

Title	Description	Source
Y	the number of registered enterprises per capita in the region	Federal State Statistics, 2020
X_1	the level of average wages in the region	Federal State Statistics, 2019
X_2	the level of Gross regional product	Federal State Statistics, 2019
X_3	the presence of the program for the development of social entrepreneurship in the region	Websites of organizations "My Business» in regions; http://nb-forum.ru/
X_4	Investments in the social sphere and health	Federal State Statistics, 2019
X_5	the rating of the investment attractiveness of the region.	VCIOM: Russia Public Opinion Research Center, 2019

Figure 1 schematically shows the logic of our research. We have shown how the hypotheses described above will allow us to draw a conclusion about the influence of various parameters of the formal institutional environment on the development of social entrepreneurship.

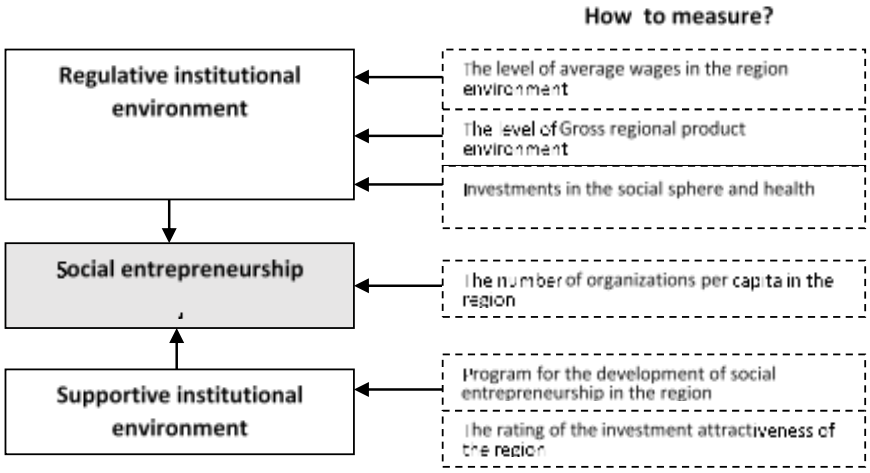

Figure 1: The logic of the research

We used correlation and multifactor linear regression analysis methods to identify social entrepreneurship dependence on the region's institutional environment. At the first stage, we carried out a preliminary analysis of the initial statistical data and identified the most appropriate functional dependence between the economic processes under consideration. At the second stage, a correlation analysis of the investigated factors was carried out, making it possible to identify the factors eliminating from the model that formed such an unfavorable phenomenon as multicollinearity. At the third stage, a multifactor model was constructed directly; at the fourth stage, the constructed model's quality was investigated. The fifth stage involved checking and eliminating the autocorrelation of the residuals in the model. At the data processing stages, software products such as MS Excel and E-views were used.

4. Results

As a result of a preliminary analysis of the initial statistical data, we determined that the relationship between these variables is linear. The results of the correlation analysis (stage 2) are presented in Table 2.

Table 1: Correlation matrix

	Y	X_1	X_2	X_3	X_4	X_5
Y	1					
X_1	0,4432	1				
X_2	0,3820	0,842	1			
X_3	0,3774	0,0589	0,0795	1		
X_4	-0,2369	0,1827	0,0728	-0,2121	1	
X_5	-0,0957	-0,5677	-0,4222	-0,0520	-0,4667	1

In the course of testing hypothesis 1, using correlation analysis (Table 1), the influence of the gross regional product (r =0,38) and the level of average wages in the region on the level of development of social entrepreneurship (r =0,44) was established, which confirms the confirmation of this hypothesis. Simultaneously, in checking the obtained data for multicollinearity, the presence of a relationship between these variables was established, which was why only the average wage level in the region was taken into account in the final model. In the course of testing hypothesis 2, the influence of the binary variable "presence/absence of a program for the development of social entrepreneurship in the region" on the value of the dependent variable (r =0,37) was found. Hence follows the conclusion about the partial confirmation of hypothesis 2.

Hypotheses 3 and 4 are due to the lack of connection between the development of social entrepreneurship in the region. Such indicators as the region's investment attractiveness (r =-0,23) and investments in the social sphere of health care were refuted.

Then we constructed a linear regression model (stage 3). The correlation matrix analysis has established multicollinearity, and therefore, we excluded such indicators as GRP in the region.

The importance of the coefficient of determination (F-statistic = 0.0000052) allows us to conclude that the model is reliable and confirms the representativeness of the sample (stage 4). The coefficient of determination R2 = 0,32 indicates that the variation of social entrepreneurship development indicators by about 32% depends on the indicators selected at the stage of modeling the matrix of paired correlation coefficients. Verification of the null hypothesis of the insignificance of regression coefficients showed that the selected factors that influence their regression coefficients are statistically reliable and significant. The value of the F criterion and the significance level p demonstrate that the constructed model is significant at a significance level of $\alpha = 0.05$. At the final stage, the fulfillment of the assumptions of the Gauss-Markov least squares method was carried out. In particular, the mathematical expectation of a random deviation of the remainders for all observations tends to 0. The Durbin-Watson test used to test the residues' autocorrelation model (d = 0.734) showed no relationship between the residues. They are randomly distributed.

The results of the regression analysis are presented in Table 2 (stage 5).

Table 2: Results of regression analysis

Regression statistics	
Multiple R	0,5668
R-Square	0,3213
Adjusted R Square	0,2997
Standard Error	0,1721
Observations	66

ANOVA								
	df	*SS*	*MS*	*F*	*Significance F*			
Regression	2	0,884	0,442	14,913	0,00			
Residual	63	1,867	0,0296					
Total	65	2,751						
	Coeff-icients	*Standard Error*	*t-Stat*	*P-Value*	*Lower 95%*	*Upper 95%*	*Lower 95,0%*	*Upper 95,0%*
Intercept	-0,117	0,068	-1,731	0,0881	-0,253	0,018	-0,2536	0,0181
X_1	8,3E-06	2,04E-06	4,0741	0,00013	4,246E-06	1,21E-05	4,24E-06	1,21E-05
X_3	0,1447	0,042	3,407	0,00114	0,0598	0,2295	0,0598	0,229

The following model can describe the resulting dependence (1).

$$Y_1=-0,117+8,3*10^{-6}\times X_1+0,144*X_3 \quad (1)$$

Y_1 - social entrepreneurship development in the region
X_1 – the level of average wages in the region
X_3 - the presence of a program for the development of social entrepreneurship in the region

5. Discussion and conclusion

In the course of testing the hypotheses described above, it was found that social entrepreneurship in Russian regions depends on the level of development of supporting institutions, which is reflected in the confirmation of the importance of programs for the development of social entrepreneurship in the region, as well as the level of development of the region as a whole.

The findings are in part consistent with our previous study carried out internationally in 2018 (Popov et al., 2018). This study showed that social entrepreneurship is more developed in countries with a high standard of living. We obtained a similar result within the framework of this study (hypothesis 1). Concerning the influence of the supportive environment, the results are slightly different. The investment climate included in the final model in the cross-country analysis is significant for developing social entrepreneurship. However, in Russian practice, no such dependence has been identified. In our opinion, this may be due to the low investment literacy of the population and the high risks of this type of activity. At the same time, a positive result is the impact of support programs for social entrepreneurship development, which indicates that supporting institutions' activities are practical and in demand.

The analysis made it possible to formulate the following trends in social entrepreneurship development in the Russian Federation and at the international level.

- 1. Social entrepreneurship can develop only in developed territories. In other words, the conditions of developed regions to a greater extent stimulate social entrepreneurship development. In regions with a high level of economic development, there is more freedom for entrepreneurial activity. The main theoretical contributions are from Henrekson (2005; 2007) on institutions and the far-reaching "An Eclectic Theory on Entrepreneurship: Policies, Institutions, and Culture" by Verheul et al. (2002). It is worth noting that freedom is sometimes treated as an indicator of institutional quality (e.g., Gwartney et al., 2004), i.e., the different aspects of economic freedom might be reflecting a more general development of institutions. Thus, the economic freedom expressed in the development of the region contributes to social entrepreneurship growth.
- 2. Despite the opinion of researchers regarding the emergence of social entrepreneurship solely in response to society's needs, this phenomenon's development is observed in those regions and countries where investments in the social sphere, health care, and education are at a high level. Thus, this type of activity is facilitated by a favorable socio-economic climate in this region and not vice versa. It indicates that society's social needs are more efficiently resolved not in acute shortage of resources but because of their surplus.
- 3. The development of social entrepreneurship in Russia is due to state initiatives and European countries' predominance. This feature is associated with historical development in Russia throughout the XX century. The solution to all social problems of society was on the side of the state; also, the lack of entrepreneurship for such a long time negatively affected the initiative of the society. However, in the last decade, the state has been actively developing small, medium-sized businesses, including financial support.

One of the main limitations of this study is the lack of statistics on social entrepreneurs. With the development of social entrepreneurship and the number of socially oriented organizations in Russia, it is assumed that further study of this phenomenon, including its informal institutional environment, is possible.

The theoretical significance of the results obtained consists of modeling the development of this type of activity in Russia's regions. The practical significance lies in justifying the feasibility of applying general trends in the development of social entrepreneurship in foreign countries, subject to their adaptation to institutions' current system, which includes formal and informal rules and norms.

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References

Alter, S.K.(2007) *Social Enterprise Typology. Virtue Ventures* LLC. 2007. Available at: http://www.4lenses.org/setypology (04.10.2018)

Araj, Ju.N.(2013). Social'noe predprinimatel'stvo v nachale XXI veka: osnovnye ponjatija i stranovye osobennosti [Social entrepreneurship at the beginning of the XXI century: basic concepts and country characteristics], *Rossijskij zhurnal menedzhmenta [Russian Management Journal]*., No. 1. P. 111–130 (in Rus)

Crimmings, J., Kiel, M. (1983). *Enterprise in the Nonprofit Sector*. Washington, DC: Partners for Livable Places.

Dacin, M.T., Goodstein J., Scott W.R.(2002). Institutional theory and institutional changes, *The Academy of Management Journal*, Vol. 45, no. 1, pp. 45–57. doi: 10.2307/3069284.

Dees, J. (1998). The Meaning of Social Entrepreneurship. *Stanford University: Draft Report for the Kauffman Center for Entrepreneurial Leadership.*

Emerson, J., Twersky, F. (1996). *New Social Entrepreneurs: The Success, Challenge and Lessons of Non-Profit Enterprise Creation*. San Francisco: Roberts Foundation.

Estrin S., Mickiewicz T., Stephan U. (2013). Entrepreneurship, social capital,and institutions: Social and commercial entrepreneurship across nations , *Entrepreneurship Theory and Practice,* Vol. 37, no. 3, pp. 479–504.

Fligstein, N., 2001. Social skill and the theory of the fields. *Sociological Theory*, vol.19, no.2, pp.105–125

Gartner, W. B. (1985). A conceptual framework for describing the phenomenon of new venturecreation. *Academy of Management Review*, vol. 10, no 4, pp. 696-706. DOI: 10.5465/amr.1985.4279094

Gwartney, J.D., & Lawson, R.A. (2004). *Economic freedom of the world: 2004 annual report*. Vancouver: The Fraser Institute.

Henrekson, M. (2005). Entrepreneurship: A weak link in the welfare state? *Industrial and Corporate Change*, Vol. 14, No. 3, pp. 437–467.

Henrekson, M. (2007). Entrepreneurship and Institutions, *Comparative Labor Law & Policy Journal*, Vol.28 No.3, pp.717−742

Hwang, J. , Hwang, J., Griffiths, M.A., Griffiths, M.A. (2017). Share more, drive less: Millennials value perception and behavioral intent in using collaborative consumption services, *Journal of Consumer Marketing*, No.34 (2), pp. 132–146.

Kerlin, J., Pollak, T. (2010). A Replacement for Declining Government Grants and Private Contributions?, *American Review of Public Administration*, Vol. 41, No. 6, pp. 686–704.

Mair J., Martî I. (2006). "Social entrepreneurship research: a source of explanation, prediction, and delight". *Journal of World Business*, no 41 (1), pp. 36-44. DOI: 10.1016/j.jwb.2005.09.002

Mair, J., Battilana, J., Cárdenas J. (2012). Organizing for society: A typology of social entrepreneuring mod-els, *Journal of Business Ethics*, Vol. 111, No. 3, pp. 353–373.

Moskovskaya, A.A., Alaricheva, M.A., Albutova, A.I., Lytkina, T.S., Mamuta, M.V., Popova I.P., Silaeva V.L., Sorokina O.S., Sykalov I.A., Shlykova O.V. (2011). *Social'noe predprinimatel'stvo v Rossii i v mire: praktika i issledovanija [. Social entrepreneurship in Russia and in the world: practice and research]* ed. by A.A. Moskovskaya. M.: NIU VShJe, 2011. 286 s. (in Rus).

North, D. (1990). *Institutions, Institutional Change and Economic Performance*, Cambridge University Press. DOI: https://doi.org/10.1017/CBO9780511808678

Popov A., Solovieva T. (2020). Potencial razvitiya social'nyh innovacij v Rossii iv stranah ES [Potential for the development of social innovation in Russia and in the EU countries], Sovremennaya Evropa [Modern Europe], 2020, no.1, pp. 170-181 (in Russ) DOI: http://dx.doi.org/10.15211/soveurope12020170181

Popov, E. V., Veretennikova A. Y., Kozinskaya K. M. (2018). Formal institutional environment influence on social entrepreneurship in developed countries, *Montenegrin Journal of Economics*, Vol. 14, No.4, pp. 045-056. — DOI: 10.14254/1800-5845/2018.14-4.3.

Popov, E.V., Veretennikova, A.Y., Kozinskaya, K.M. (2019). Research schools and stages of social entrepreneurship development in the global space, *Proceedings of the European Conference on Innovation and Entrepreneurship, ECIE*, Vol.2, pp.814–822.

Seelos, C., Mair, J., Battilana, J., Dacin, T.M.(2011). The Embeddedness of Social Entrepreneurship: Understanding Variation Across Local Communities. *Research in the Sociology of Organizations*, vol. 33, No. 4, pp. 333-363.

Smirnov, V. A. (2021) Regional'nye sistemy social'nogo predprinimatel'stva v Rossii: tipologiya, faktory razvitiya, klyuchevye protivorechiya [Regional systems of social entrepreneurship in Russia: typology, development factors, key contradictions], The Journal of Social Policy Studies, 19 (1), pp. 23-40. doi: 10.17323 / 727-0634-2021-19-1-23-40.

Spear, R., Defourny, J., Favreau, L., Laville, J.-L.(2001). *Tackling social exclusion in Europe. The contribution of the social economy*. Aldershot: Ashgate.

Stephan, U., Uhlaner, L., Stride, C. (2015). Institutions and social entrepreneurship: the role of institutional voids, institutional support, and institutional configurations, Journal of International Business Studies, Vol. 46. No. 3, pp. 308–331

Tjutjunin, V. V., Zelinskaja, E. V., Konjuhov, V.Ju., Kochneva, E. V., Pivovarova, V. O.,Holodilova E. V. (2015). Razrabotka Strategii RazvitijaInzhiniringovogo Predprijatija [Development of the Development Strategy of the Engineering Enterprise]. *Molodezhnyjvestnik IrGTU* [ISTU Youth Messenger], No. 2, pp. 32 – 36 (in Rus)

Umnov V.A., Plyukhina A.A., Matveev M.V. An analysis in the system of state support for social entrepreneurship in Russia. RSUH/RGGU BULLETIN. Series Economics. Management. Law. 2018;(3):77-89. (In Russ.) https://doi.org/10.28995/2073-6304-2018-3-77-89

Urban, B. and Kujing, L. (2017) The institutional environment and social entrepreneurship intentions, *International Journal of entrepreneurial behavior and research*, Vol. 23, no. 4, pp 638-655.

Urbanaeva E. G., Iltakova N. V. (2016). Istoricheskie i social'nye korni predprinimatel'stva (V. Z. Ombart, M. Veber) [Historical and social roots of entrepreneurship (V. Z. Ombart, M. Weber)].*Social'naja kompetentnost' IrGTU* [Social competence of ISTU], No.2 (2), pp. 97 – 104 (in Rus)

Verheul, I., Wennekers, A. R. M., Audretsch, D. and Thurik, R. (2002). An Eclectic Theory of Entrepreneurship: Policies, Institutions and Culture. In: Audretsch, D., Thurik, R., Verheul, I., & Wennekers A.R.M. (eds.), *Entrepreneurship: Determinants and Policy in a European–US Comparison*, Boston/Dordrecht: Kluwer Academic Publishers, pp.11–81.

Zvereva N.I. (2014). Politicheskie jeffekty social'nogo predprinimatel'stva [Political Effects of Social Entrepreneurship], *Izvestija Saratovskogo universiteta. Novaja serija. Serija: sociologija, politologija [Izvestiya Saratov University. New series. Series: sociology, political science*], No. 1, pp. 111–115. (in Rus)

Commercialisation Models for R&D Organisations

Beata Poteralska and Marzena Walasik
Łukasiewicz Research Network – Institute for Sustainable Technologies, Poland
Beata.Poteralska@itee.lukasiewicz.gov.pl
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Abstract: Technology commercialisation, understood as the design, development, manufacture, and marketing of products based on new technologies, is presently perceived as a key factor towards the increase of innovativeness and economic development. R&D organisations are successfully involved in the transformation of new knowledge into products and services; however, a key to success is to effectively conduct the process of technology commercialisation. Unfortunately, in this area, the effectiveness of R&D organisations is still limited. To address this problem, the authors of the paper investigate how to support the commercialisation of the results of research work carried out in R&D organisations. They indicate that the remedy could be the application of commercialisation models, which is understood as a sequential decision process of coordinating and optimising all of the technical and business decisions required for the successful introduction of a new product or service into the marketplace (McCoy et al 2008). The model development process was preceded by a literature review. Against the background of the literature review and on the basis of the authors' experience in conducting research and implementation projects, the authors of the paper propose a set of original commercialisation models 7MWwBP for the use in R&D organisations. The models are created while taking into account the input criteria: the type of innovation (services, materials, systems, technologies, devices) and its character (individual, short series, mass production). In the case of each model, the commercialisation path and a set of adequate marketing tools are proposed. The designed models are applied in practice in the process of commercialising innovations developed at an R&D organisation. Their application enables appropriate preparation and execution of the process of the diffusion of innovations into the economy.

Keywords: technology commercialisation, commercialisation models, R&D organisation, marketing tools

1. Introduction

The processes of the creation, improvement, and implementation of innovative technological solutions in a form of new products are the main activity of many contemporary entities, including R&D organisations. The importance of the application of research results in the economy, a high level of complexity, and the numerous barriers that make it difficult to effectively use innovations in enterprises determine the significance of commercialisation (Kirchberger, Pohl 2016, Mazurkiewicz et al 2021).

In publications, the topic of commercialisation is popular and is gaining meaning in recent years. Different commercialisation models are developed or analysed. Scholars describe the commercialisation models involving organisational structures supporting the use of research results in economic practice (e.g., an internal model, a separated model, and an independent model – Flisiuk, Gołąbek, 2015), as well as commercialisation models describing decision-making processes relating to technical, marketing, and business aspects necessary to carry out the process of launching a new product or service on the market (among others Goldsmith Commercialisation Model, 1995, Stage-gate model, Cooper 1990). The article refers to the second group of models mentioned, although the authors of the paper understand and appreciate the crucial importance of organisational structures that determine the effective execution of commercialisation processes as responsible for creating cooperation networks of R&D sector and industry and stimulating the practical application of research results in economic applications, in particular, in the SME sector.

Detailed commercialisation models are, in practice, often developed by individual organisations. Today's models (excluding the Stage-gate model, which has long been an object of interest to many authors (Grönlund et al. 2010, Barringer, Gresock 2008, Cooper 1990)), were mostly created as a result of applying the experience of consultants in the area of the commercialisation of new technologies (Jolly model, Goldsmith model, De Geeter model, CTC University of Southern California (Gwarda-Gruszczyńska 2013)). Many of them were designed for use by particular organisations or groups of innovators who wanted to commercialise research results or products (services).

Although many contemporary scientific publications concern the subject area of the commercialisation models, the scholars do not take into account, in a comprehensive manner, the relationship of the models with the type of a technological solution, the production scale, the commercialisation mechanism, and the marketing tools

used in the course of R&D results commercialisation. There is a research and empirical gap in this area, especially in relation to commercialisation of innovations developed and implemented by R&D organisations.

Thus, the paper attempts to answer the following research questions: "What dedicated commercialisation models, assuming the interrelation of the model with the type of a technological solution, the envisaged production scale, and commercialisation mechanism, can be applied at R&D organisations involved both in innovation development and implementation?" and "What marketing tools should particular models be equipped with?"

The article is aimed at presenting original commercialisation models of advanced technologies and services to industry for application at an R&D organisation. The use of the proposed models is focused on enabling the proper preparation and running of the diffusion process of innovative solutions into the economy, which increases the chances of implementation success.

The paper is structured as follows: At first it draws on the literature review and discusses the results by presenting selected commercialisation models developed by scholars or applied in practice. Against the conducted literature analyses, the authors present assumptions for commercialisation models 7MWwBP for application at an R&D organisation and a set of models themselves in which each of them is equipped with appropriate marketing tools. The paper is summed up with conclusions indicating the main characteristics of the models and future directions of their development.

2. Method

The process of developing original commercialisation models 7MWwBP for an R&D organisation was preceded by literature reviews in two areas: commercialisation models and processes of New Technology Development. The analysis took into account a wide range of organisations involved in commercialisation processes with particular attention paid to R&D organisations. As a result of the state of the art analysis, examples of commercialisation models used for the needs of R&D results commercialisation were selected. The literature review indicated that many contemporary scientific publications concern the issue of developing and improving commercialisation models; however, the existing scientific research does not comprehensively take into account the relationship of commercialisation models with a type of a technological solution, the production scale, the commercialisation mechanism, and the marketing tools used in the course of commercialising R&D results.

The literature review was performed with the use of a search strategy comprising academic literature (including mainly two databases: ISI Web of Science and Scopus) and grey literature (reports, working papers, government documents, white papers). In the course of searching, the keywords, i.e. 'commercialisation models, 'New Product Development, 'New Technology Development', were used. In total, approximately 120 papers were collected, which were analysed in 2 stages. In the first stage, abstracts were read and the whole papers were roughly reviewed. After this stage, approximately 80 papers were selected for detailed reading. In the second stage, they were analysed with respect to tools, approaches, methods and models used for facilitating commercialisation processes at R&D organisations, universities, and enterprises. As a result, 7 examples were selected for presentation in the paper and as a background for presenting a set of commercialisation models 7MWwBP for an R&D organisation, developed by the paper's authors. The selected 1st group of models comprise recognised models, often constituting a base for models developed for individual organisations. The 2nd group of models includes dedicated models developed for individual R&D organisations or other scientific communities while taking into account their specific characteristics. On the basis of the authors' experience in participation in research and commercialisation projects and while considering literature review results, a set of 7 Models for the implementation of research results and products (7MWwBP) achieved at an R&D organisation was proposed. The main characteristics of the models are described and sets of marketing tools are proposed for each of them. The paper sums up with conclusions indicating the main advantages of the proposed models and areas for their possible further development.

3. Literature review: Commercialisation models

For the purposes of developing the commercialisation models for the needs of an R&D organisation, studies on the state of the art and good practices in the area of the commercialisation of innovative solutions to industry were carried out. The analysis took into account commercialisation models and the processes of New Technology Development. A commercialisation model is understood as a sequential decision-making process

enabling the coordination and optimisation of technical and business decisions necessary for a successful launch of a new product or service on the market (McCoy et al. 2008). New Product Development is defined as a process aimed at developing a new R&D result and conducting marketing (dissemination) activities, which are focused on the implementation of a new R&D result into a market economy (Walasik, Poteralska 2020). The literature analysis took into account a wide range of organisations involved in commercialisation processes, including the following: universities, companies, R&D organisations, business environment institutions, as well as considered commercialisation carried out at a project level.

As a result of the state of the art analysis, the following commercialisation models (Table 1) were selected as examples that are useful as a background for developing original models 7MWwBP for an R&D organisation.

1st group of models: recognised models, often constituting a base for models developed for individual organisations:

- Goldsmith Commercialisation Model (Goldsmith 1995) designed for the needs of entrepreneurs and innovators aimed to facilitate the commercialisation process; and,
- Stage-gate model (Cooper 1990) applying the process management methodologies for the needs of the innovation process and supporting the process of moving a new product from an idea to launch.

2nd group of models: dedicated models developed for individual R&D organisations or other scientific communities:

- Sustainable innovation academic entrepreneurship process model (Qian et al. 2018) concerning the performance of various functions by representatives of the scientific community in the creation of enterprises based on new technologies;
- Research and Development-Commercialisation Bridge (R&D-C Bridge) model (Budi, Aldianto 2020), enabling a detailed analysis of the succeeding stages of the successful commercialisation process, while taking into account the characteristics of the relationship and integration between the institutions involved in different phases of the commercialisation process;
- Technology-Product-Market (TPM) model (Minseo et al. 2019), focused on analysing the succeeding stages of commercialisation in terms of assessing the target market, which provides the tools needed to see how technology and product developments are perceived by potential consumers;
- Model with the use of the TTRI_MP method (Jou, Yuan, 2016) used to guide technology development, improve NPD decision-making processes, and support management of the process of new products development and commercialisation; and,
- RIPI's New Technology Development Process from Idea to Market (Bandarian 2007) supporting the staff of research institutes and universities in effective planning of the commercialisation process of technologies.

Table 1: Examples of commercialisation models

Name	Authors	Actors	Main characteristics
Goldsmith Commercialisation Model	Goldsmith 1995	Entrepreneurs and innovators	Roadmap for those who want to create and develop a strategic plan for a new technology; a tool in commercialisation steps that can be used by every institute on developing a new product
Stage-gate model	Cooper 1990	Firms	Model for moving a new product from an idea to launch, commercialisation tool that transforms new ideas into commercialised products in an organisation
Sustainable innovation academic entrepreneurship process model	Qian et al., 2018	Scientists, universities	Involvement of the scientific community in entrepreneurial activities; creation of enterprises and commercialisation of new technologies
Research and Development-Commercialisation Bridge model (R&D-C Bridge)	Budi, Aldianto 2020	Academics, government R&D institute, R&D regulator /	Commercialisation model in conjunction with organisations dealing with technology transfer and with tools needed to execute the process of technology commercialisation

Name	Authors	Actors	Main characteristics
		coordinator, research-based company	
Technology-Product-Market (TPM) Model	Minseo et al. 2019	Developers, suppliers of new technologies	Analysis of commercialisation steps in the context of the assessment of the target market
TTRI_MP Method	Jou, Yuan 2016	R&D organisations	Facilitating the process of new technologies development and improving the efficiency of implementation in practice
RIPI's New Technology Development Process from Idea to Market	Bandarian 2007	R&D organisations, universities	Supporting researchers in effective planning of the commercialisation process of technologies

Source: Authors

In the selected models, the approach of indicating the stages of the commercialisation process is quite popular (among others Jou, Yuan 2016, Bandarian 2007, Caetano et al. 2012). For example, the model proposed by Goldsmith (1995) assumes the division into three phases, with six stages: technology concept analysis, technical feasibility, prototype development, technology introduction, production start-up, and maturity. The Stage-gate model also divides the commercialisation process, but into five stages, from overall concept assessment to product launch on the market, noting that each stage should be preceded by an appropriate decision-making process (Edgett 2021). The Stage-gate model (Cooper, Edgett 2012) is used as inspiration and many research organisations and enterprises are developing their own success methodology based on this model, as a mechanism to change the idea into a new product, successfully launched on the market (Budi, Aldianto 2020, Minseo et al. 2019).

The analysed models do not propose an analysis of commercialisation in terms of the type of solution, and they do not take into account the relationship of the model with a possible production scale or a commercialisation mechanism (indirect sales, direct sales, service, licence, or spin-offs), which translates into the degree of involvement of the organisation (in this case – an R&D organisation) which, depending on the commercialisation mechanism chosen, must be sufficiently involved in the execution of the entire commercialisation process. It is assumed that the lowest level of the involvement of the organisation is achieved through indirect sales, and the highest one occurs while implementing the spin-off formula. Moreover, in the case of the analysed models, the marketing tools that should be used while commercialising the results of R&D work, adjusted to the specific character of each model are not proposed. A new 7MWwBP concept (7 Models for implementing research results and products) builds on the existing commercialisation models, but it approaches the commercialisation issue in a comprehensive way while taking into account the type and character of a technological solution that determine the commercialisation path in conjunction with the marketing tools needed to execute the commercialisation process of a technology. Comprehensive matching of marketing tools and the selection of appropriate forms of marketing communication are an indispensable part of managing the commercialisation process.

The results of the state of the art analysis were used in the course of the following:

- Selecting input criteria that result in the choice of the commercialisation path; and
- Creating a set of commercialisation models 7MWwBP.

The presented 7MWwBP concept understood as a holistic element of the market-oriented NPD/NTD project can serve as a path to develop an individual strategy of transforming technological capabilities into a new product, while taking into account market analysis. Although the risk associated with the development of innovations is relatively high, it can be limited to some extent by implementing a market-oriented process of a new product development and with taking into account the input criteria indicated by the paper's authors.

4. Results

On the basis of a literature review while taking into account the specific characteristics of R&D organisations, a set of 7 marketing and business models for the implementation of research results and products (7MWwBP) was created, namely: The Innovation Model, The Niche Model, The Sub-supply Model, The Comprehensive Model, The Market Model, The Infrastructure Model and The Phase Model.

The initial stage of models design consisted in the proposition, on the basis of the state of the art analysis, the authors' experiences, and consultations with experts, of a set of input criteria for individual 7MWwBP commercialisation models. A set of input criteria includes: the type of solution (product) and the character of the solution. With the use of the classification applied in the course of the implementation maturity assessment SDW (Mazurkiewicz et al. 2015), the following types of solutions were distinguished:

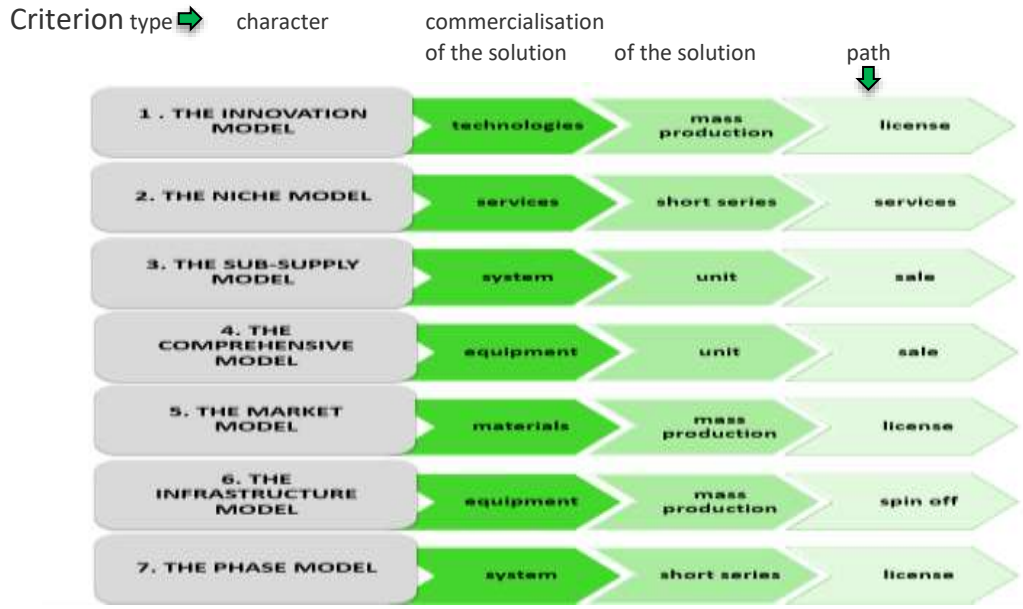
- Services (e.g., IT, surface engineering);
- Materials (e.g., chemical, textile, composites);
- Systems (e.g., software, computer systems);
- Technologies (e.g., chemical, mechatronic); and
- Equipment (e.g., research and testing apparatus).

The inclusion of so detailed types of solutions is an unusual approach in literature. At the same time, it is in line with the approach used in the analysed *Technology – Product – Market* model (Minseo et al. 2019) indicating differences between a product and a technology. The work carried out by the authors of this paper takes into account a wide range of categories of solutions, which makes it possible to develop detailed models.

The second criterion adopted is the character of the solution, which is indicated on the basis of the results of market segmentation (considered as an important element in other models, e.g., the TTRI_MP model, Jou, Yuan 2016), determined by the *pull* or *push* model (Van Trijp et al. 2014). Taking into account this criterion, solutions of the following character are identified (Walasik, 2018):

- Unit;
- Short series; and
- Mass production.

Taking into account the input criteria, a set of 7MWwBP models for an R&D organisation is proposed (Fig. 1).



Source: Authors

Figure 1: Commercialisation models for an R&D organisation

Here is an interpretation of the proposed models:

M1 – The Innovation Model is based on gaining and maintaining technological advantage. This is achieved through regular observation of the external environment, intensive research and development aimed at creating innovations, and designing innovative products that meet the needs of customers**.** Innovations should be converted into a specific utility for the customers and have unique performance characteristics that are absent from products currently available on the market. The success of the implementation on the market is based on

a combination of a perfect technology and the highest quality of products based on it, which ensures the obtaining of innovative solutions. The model can be applied when the overall scientific result is transformed into a specific revenue-producing product. The costs of applying new materials by enterprises (in a form of services provided by R&D organisations) are covered from their day-to-day business costs. On the other hand, it is important that the implementation of new technologies in individual companies, due to a high cost-intensity of processes, takes place in a formula of projects. The granting of licences is not excluded for companies already operating in this area as an extension of their portfolio of technologies and new innovative services produced on their basis.

M2 – The Niche Model is suggested when the results of on-going R&D work are new ways of conducting processes and solving important problems. It is often based on conducting research for companies in a form of outsourcing. It is useful when niches are growing and there is a need to keep up with a growing demand. It is appropriate when cooperation is spread over time. It is dedicated to creating a market for small, fast orders, which, due to the involvement of knowledge and capital, does not pay entrepreneurs to participate intensely in their companies. In addition, their execution (and obtaining a certificate) by R&D organisations increases the reliability of the tested products and affects the achievement of a competitive advantage through proven quality, achievement of described parameters, etc.

M3 – The Sub-supply Model focuses on configuring the offer to meet the unique needs of the customer. This is achieved by presenting a specific customer a good or service specially prepared for him. It includes the design and execution of systems and equipment for individual customer orders. The model is dedicated for solving atypical problems, with moderate prices, the availability of service, and acceptable deadlines. The model is recommended for complex products that require close cooperation with buyers. It involves both building close and lasting bilateral relations and cooperation with the recipient in the course of designing and executing the offer. The model can be used both in commercial orders and in the formula of joint projects due to its direct impact on the increase in production effectiveness (e.g., more efficient production, zero-waste system, limited necessary human resources). This model expects the ability of a team of scientists to adapt to changing market conditions and a readiness to perform tests in a production environment (among others: noise, dust, high temperatures, etc.).

M4 – The Comprehensive Model is meant for complex products, processes or technologies. It is dedicated to solutions consisting of many interrelated elements, accompanied by various additional services that are offered both at the time of the purchase and later at the stage of operation. It promotes a focus on gaining customer's loyalty, high quality service, and individualisation.

M5 – The Market Model is used when the results of R&D work are aimed at solving social, civilisational, and environmental problems. It is supported by the analysis of market trends that attract public attention. The information to potential customers should highlight how a solution can contribute to solving the above-mentioned types of problems that are currently relevant for society. In this model, R&D results are usually introduced into the market as a result of exclusive or non-exclusive licensing of know-how, e.g., materials that are subject of commercialisation.

M6 – The Infrastructure Model is based on the design and delivery of a complete technology along with new technological capabilities that enable new ventures to be started to provide mass access for potential customers. The model ensures the standardisation of previously personalised services and offers them at a lower cost. This model may assume the introduction of advanced structural/organisational changes, e.g., a separation of a so-called 'an organised part of the enterprise' (in this case – R&D organisation) and its transfer to a new firm.

M7 – The Phase Model is designed for solutions that, after their testing in the laboratory and the semi-production phase, have a chance to be implemented into mass production by launching a new area of activity for an existing firm, ensuring that it expands its product portfolio. It is dedicated for new technological solutions for which the market is just being created, which, with a strong research team and highly innovative technological background, increases the potential success of economic implementation. In this model, commercialisation should take place by granting a license, and the implementation process itself can be carried out in a formula of a project.

In order to make practical use of the 7MWwBP concept in the innovation diffusion process, adequate sets of marketing tools were selected for each model, first to improve the dissemination process of research results achieved at R&D organisations, and then to facilitate commercialisation of these results. In the process of creating these sets of tools, there was applied a concept of dividing marketing instruments into ALT (above the line) and BTL (below the line) groups, presented in many contemporary publications (Tarasova at al. 2020).

ATL covers traditional campaigns, aimed at the mass audience mainly through mass media (advertisements in radio, television, printed advertising materials). The aim of ATL activities is to increase brand recognition, build the image of a given product or service, and simultaneously build the image of an entire R&D organisation (horizontal approach). Traditional forms of ATL marketing communication are effective when there is a target group and the result of R&D works itself is of massive character. The second type of marketing activities, BTL, refers to campaigns targeted at deliberately selected audiences. BTL campaigns focus on the direct transmission of relevant information about the product and include promotions, guerrilla marketing, advertising correspondence, the organisation of marketing events, and study visits. The main advantages of BTL activities comprise the ability to reach a specific audience, effective and personalised communication, the measurability of the effects. Thereby, direct application of these activities has a greater impact on the success of commercialisation activities than in the case of ATL activities. The paper focuses on the presentation of BTL instruments.

For each of the 7 models, a set of dedicated BTL marketing tools was selected on the basis of the paper authors' and other scholars' experience in conducting commercialisation processes. They are presented in division into three areas (Tarasova at al. 2020) (Table 2):

- Sales promoting (tools 1-4);
- Public relations (tools 5-8); and
- Internet advertising (tools 9-14).

Table 2: BTL tools dedicated for 7MWwBP model

BTL tools	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6	Model 7
Promotion action with image-based communication	+	+++	++	++	+++	+++	+
Distributional actions (direct sale)	+++	+	+	++	+	+	+++
Actions focused on the growth of purchases (e.g. discounts for exceeding the volume of purchases)	+++	+	+	+	+	+	++
Incentive schemes for employees	++	++	+++	+	++	++	++
Study visits	++	+++	++	+	+	+++	+++
Presentations – direct meetings	+++	++	+++	+++	+	+++	++
Show marketing (events)	+	+	++	+	+++	+++	+
Conferences	++	+	+	+	+++	+	++
Content marketing (e.g. blogs)	+++	++	++	+	+++	++	+++
E-mail marketing	+	++	+	++	++	+	+++
SMM (Social media marketing)	+	+	++	++	+	++	+++
Contextual advertising	++	+++	+	+++	+	+++	+
Media advertising	+	+	+	+	+++	+	++
Native advertising	+++	+++	++	++	+++	+	+++

Legend : +++ recommended tools, ++ advisable tools, + tools of minor importance

Source: Authors

The proposed BTL tools are dedicated to the commercialisation mechanism indicated in Fig. 1. In the case when market implementation is successful, it is reasonable to modify the set of used marketing tools. For example, the BTL tools proposed for model 6 (Table 2) include marketing activities aimed primarily at finding a potential investor who would be willing to invest in it through contributions (cash or in kind) in exchange for having shares in the spin-off company being created. In this case, marketing activities should be concentrated in the area of public relations. On the other hand, in the case of a newly created entity, activities should be focused on sales promotion.

A modern approach to the management of marketing is an important factor contributing to the success of the market implementation of R&D results. A complex matching of marketing tools (in particular BTL) determining the selection of appropriate forms of marketing communication is an important element of managing the commercialisation process. Depending on the type of the R&D result, the expected production scale, and the proposed commercialisation mechanism, activities should be intensified in one of the three areas of BTL.

The development of an information environment with the use of marketing tools to support commercialisation is an element of substantial importance. Based on the feedback obtained from the market, it is possible to ensure a more effective commercialisation process by correcting the scope of the carried out marketing activities.

5. Conclusions

The proposed set of 7 models takes into account different situations occurring in the course of research results commercialisation. The 7MWwBP model includes input criteria and, on this basis, proposes commercialisation paths. The models are equipped with marketing tools. This is a comprehensive approach that allows for individual treatment of each research result and product developed at an R&D organisation for the needs of its commercialisation. The advantage of 7MWwBP is the approach to the commercialisation process, which takes into account both market and technical utility actions and decisions, as well as issues related to establishing and maintaining relationships with stakeholders, with the use of dedicated marketing tools. The reference point for the main and accompanying actions can be generation of an added value for all stakeholders.

The authors of the paper have ambition to continue the development of the models. The proposed further areas of their development comprise among others an inclusion of additional input criteria. Such criteria have already been indicated as a result of the state of the art analysis and comprise:

- Input criterion relating to Technology Readiness Level – TRL (Budi et al. 2020, Jou, Yuan 2016);
- Other (apart from TRL) indicators used for market-related technology assessment: Technology Needs Value (TNV), Integration Readiness Level (IRL), Innovation Readiness Diagram (IRD) (Budi, Aldianto 2020);
- Environmental performance measures (Caetano et al. 2012); and,
- The roles played by researchers in the framework of undertaken entrepreneurial activities (Qian et al. 2018).

Furthermore, a set of marketing tools are going to be modified in the case of changing conditions on the market or a character of an R&D result. Moreover, the authors assume a possibility to add further types of models. Such an addition is foreseen in the case when, on the macro level, breakthrough innovations would emerge or the area of conducted investigations and the scope of R&D results analysis would be extended and include, apart from technological solutions (as it is now) also organisational and social innovations. On the micro level, inclusion of additional input criteria, that may influence the refinement of the stages of the commercialisation process (implementation paths) may result in the need to introduce additional models. The authors of the paper assume that new types of models may also be designed as a result of received feedback from the market and the authors' own observations concerning market implementations carried out by R&D organisations, and the emergence of new business models.

References

Bandarian, R., (2007), *From Idea to Market in RIPI: An Agile Frame for NTD Process*, Journal of Technology Management & Innovation, Vol. 2(1), pp. 25-41.

Barringer B. B., Gresock A. R. (2008), Formalizing the front-end of the entrepreneurial process using the stage-gate model as a guide, Journal of Small Business and Enterprise Development, Vol. 15 (2), pp. 289-303

Budi A. A., Aldianto L., (2020), Research and Development – Commercialization Bridge: A Refined Model. The Asian Journal of Technology Management Vol. 13 No 1, pp. 47-62

Caetano M., Bezerra de Araujo J., Capaldo Amaral D., (2012), *A Framework for the Application of Eco-efficiency to the Technology Development Process*, Journal of Technology Management & Innovation, Vol. 7(2).

Cooper R.G. (1990), Stage-gate systems: A new tool for managing new products, Business Horizons, vol. 33, issue 3, pp. 44-54.

Cooper, R. G., Edgett, S J. (2012), Best practices in the idea- to-launch process and its governance. Research Technology Management 55(2), pp. 43–54.

Edgett, S J. The Stage-Gate® Model: An Overview, [Online, access: 10.05.2021]. https://www.stage-gate.com/new-product-development-process/idea-to-launch-stage-gate-model-an-overview/

Flisiuk B., Gołąbek A. (2015), Możliwości komercjalizacji wyników badań naukowych w instytutach badawczych – modele, procedury, bariery oraz dobre praktyki. Zeszyty Naukowe Politechniki Śląskiej, Seria: Organizacja i Zarządzanie, Vol. 77.

Goldsmith H.R. (1995), A Model for Technology Commercialization, Mid-Continent Regional Technology Transfer Centre Affilliate's Conference, NASA Johnson Space Centre, Houston.

Grönlund J., Sjödin D. R., Frishammar J. (2010), Open Innovation and the Stage-Gate Process: A Revised Model for New Product Development, California management review, Vol.52 (3), pp. 106-131.

Gwarda-Gruszczyńska E., (2013), Modele procesu komercjalizacji nowych technologii w przedsiębiorstwach. Uwarunkowania wyboru – kluczowe obszary decyzyjne. Wydawnictwo Uniwersytetu Łódzkiego.

Jou Gwo-Tsuen, Yuan Benjamin J. C., (2016), Utilizing a Novel Approach at the Fuzzy Front-End of New Product Development: A Case Study in a Flexible Fabric Supercapacitor., Sustainability, MDPI, Open Access Journal, Vol. 8(8), pp. 1-18.

Kirchberger, M.A.; Pohl, L., (2016), Technology commercialization: A literature review of success factors and antecedents across different contexts. The Journal of Technology Transfer 41.

Mazurkiewicz A., Belina B., Poteralska B., Giesko T., Karsznia W., (2015), Universal methodology for the innovative technologies assessment, In: Dameri R.P., Beltrametti L. (eds.), Proceedings of the 10th European Conference on Innovation and Entrepreneurship, Academic Conferences and Publishing International Limited, Reading, UK, pp. 458-467.

Mazurkiewicz A., Poteralska B., 2017, Technology transfer barriers and challenges faced by R&D organisations. Procedia Engineering, Elsevier, Vol. 182, pp. 457-465.

McCoy, A.P., Thabet, W., Badinelli, R. (2008), Towards establishing a domain specific commercialization model for innovation in residential construction. *Construction Innovation*, 8(2).

Meijer L.L.J, Huijben J.C.C.M., van Boxstael A., Romme A.G.L., (2019), Barriers and drivers for technology commercialization by SMEs in the Dutch sustainable energy sector, Renewable and Sustainable Energy Reviews, Vol. 112.

Minseo Kim & Hyesu Park & Yeong-wha Sawng & Sun-young Park, (2019), "*Bridging the Gap in the Technology Commercialization Process: Using a Three-Stage Technology–Product–Market Model*," Sustainability, MDPI, Open Access Journal, tom. 11(22), pp. 1-16.

Qian Xiao-Duo, Xia Jing, Liu Wei, Tsai Sang-Bing, (2018), *An empirical study on sustainable innovation academic entrepreneurship process model*, Sustainability, MDPI, Open Access Journal, Vol. 10(6), pp. 1-15.

Tarasova E. E., Matuzenko E. V., Naplekova Yu. A. , (2020), "*Modern marketing instruments for the company's market promotion*," Journal of Research on Trade, Management and Economic Development, Vol. 7, nr 1(13), pp. 7-19.

van Trijp, H. C. M., Grunert, K. G., N. van Alfen, (2014), *Consumer oriented new product development*, Encyclopedia of Agriculture and Food Systems, Elsevier, pp. 375-386.

Walasik M., (2018), Marketing orientation of scientific-research units as support for the process of commercialization of R&D results, MINIB, Vol. 30, No 4.

Walasik M., Poteralska B., (2020). *Models of Implementing Innovative Technologies into Industry*, Proceedings of 11th International Scientific Conference "Business and Management 2020", Vilnius, Lithuania.

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Evaluation Methods and Practices Used by University Technology Transfer Offices

António Rocha[1], Fernando Romero[2, 3], Manuela Cunha[1], Rui Lima[2,3] and Marlene Amorim[4]
[1]IPCA Polytechnic Institute of Cávado and Ave, Portugal
[2]Department of Production and Systems, University of Minho, Portugal
[3]ALGORITMI Research Centre, University of Minho, Portugal
[4]GOVCOPP, Governance Competitiveness and Public Policies, University of Aveiro, Portugal
arocha@ipca.pt
fromero@dps.uminho.pt
mcunha@ipca.pt
rml@dps.uminho.pt
mamorim@ua.pt
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Abstract: Knowledge and technology transfer practices between universities and industry involves the evaluation, protection and marketing of research and development outcomes with the aim of translating invention into innovation that can benefit a wide scope of stakeholders, including the researchers and the university. The main objective and contribution of this paper is to provide evidence on what technology evaluation practices and methods are most in use by Technology Transfer Offices (TTOs). Qualitative and quantitative data was collected through extensive interviews to eight Portuguese Public University TTOs. Based on the collected data it was possible to perform statistical tests using One-sample T-tests for the means of relevant variables, which allowed to identify the most common technology evaluation practices and methods and instruments of evaluation. The research was essentially exploratory and descriptive, but it provided the basis to further research that may have a more analytical nature, such as understanding the importance of these practices in terms of TTO's performance. The research identified in a thorough manner the most important approaches and techniques for technology evaluation used by TTO's, an issue that the literature usually treats in a rather fragmented way. Checklists, scoring and predefined evaluation models are the most used methods among the TTOs, ensuring a quick assessment of the technical and market value of research results. Previous agreements and discounted cash-flow projections are mainly used when a spin-off firm is under consideration or when the TTOs receive an investor manifestation of interest. Royalty standards are used to prepare licence negotiations. Invention comparison analysis is used especially when considering incremental technical solutions.

Keywords: technology transfer, technology evaluation and licensing, university and industry relation, innovation

1. Introduction

Research and development (R&D) is the predecessor of new knowledge, patents and technology that might be translated into innovations, enhanced products or explicit or tacit knowledge. To seize the value of R&D outcomes, evaluation methods and practices can be used to combine the unique features of an invention or technology with the needs and interests of different organizations. Foreseeing this end, universities have adopted knowledge valorisation strategies to foster the practical application of research and development results. In this context, technology evaluation and licensing practices allow research staff and universities to receive revenues by the establishment of technology transfer agreements. To understand this process, and to get access to information on specific practices supporting the commercialization of inventive results, this paper provides evidence on what are the main technology evaluation methods and practices in use by university Technology Transfer Offices (TTOs). We noticed that the literature review on these issues are rather fragmented, in the sense that studies on this matters usually isolate a limited number of factors to treat them as independent variables (Wright, 2014). In the present paper we look at many evaluation methods and practices in use by TTOs, specifically Portuguese University TTOs, and through a series of tests, the ones that are most used are identified.

2. Methodology

The study involved an extensive literature review and the collection of complementary information by enquiring the heads of staff of eight University Technology Transfer Offices of Portuguese Universities, employing a semi-structured survey.

The eight TTOs that answered the semi-structured survey were associated to eight Portuguese Universities and they are indicated below:

- 1. TecMinho, associated to the University of Minho;
- 2. UPIN, associated to the University of Porto;
- 3. UATEC, associated to the University of Aveiro;
- 4. DITS, associated to the University of Coimbra;
- 5. Innovation and Development Office, associated to the University of Beira Interior;
- 6. RIA – Research and Innovation Accelerator, associated to the University Nova of Lisboa;
- 7. Technology Transfer Office, associated to the University of Évora;
- 8. CRIA, associated to the University of Algarve;

This sample was purposefully chosen due to the high regional and national influence of the universities, and to the experience and ability of the TTOs to provide data that would expand the understanding of technology transfer processes. Five out of the eight universities appear regularly in world rankings of the top 1000 universities (CWUR, 2019).

The semi-structured survey was divided into two parts, one focused on technology evaluation practices, and the other one focused on methods and instruments of evaluation. On both parts we used a Likert scale to classify the frequency of use of each issue under analysis. The higher the value the higher was the frequency of use, in a scale between 1 and 5. The list of 50 evaluation practices included on the semi-structured survey was defined by reviewing the works of Eldermann (2012), Razgaities (2007) and Speser (2006).

The approach was exploratory and descriptive, but also analytical in the sense that besides identifying the frequency of use of both technology evaluation practices and methods and instruments of evaluation, it states the issues at stake related to each practice and technique. A statistical analysis was done using One-sample T-tests for the means of relevant variables. IBM SPSS Statistics 19 was used to perform this analysis. As a framework for the One-sample T-test analysis we used throughout the article two hypotheses, considering a 95% confidence interval:

> *H0 – the average frequency is equal to 4, meaning that the method or practice is quite frequently used.*
>
> *H1 – the average frequency is not equal to 4, meaning that the method or practice is not quite frequently used.*

This approach allowed us to identify the most used evaluation practices and also to determine which evaluation methods were in use at each moment of the main stages of the technology transfer process.

3. Identification and analysis of the frequency of evaluation practices and methods

3.1 Introduction

At an initial stage of the invention evaluation process, the TTOs tend to use quick evaluation methods, based on checklists and on the preparation of short reports about the invention market and return on investment (Table 1, a). At a posterior stage, a more in depth evaluation is carried, and comparable agreements (Table 1, b), royalty standards (Table 1, c) and cash flow projections are used (Table 1, d). A more in depth study is usually initiated when the TTOs receive a manifestation of interest from industry or when the TTOs needs to obtain additional information to strengthen the technologies' presentation to potential investors. The engagement of inventors is essential throughout the entire technology transfer process, as described by the TTOs who participated in this study, because of their deep understanding of the invention (Di Sante, 2007).

For the methods, a, b and c, in Table 1, we do not have evidence to reject the null hypothesis, meaning that their average frequency does not differ significantly from 4, a quite frequent method. For method d) in Table 1 we do have evidences to reject the null hypothesis, the p-value is smaller than 0,05, meaning that the average frequency is significantly different from 4.

Among the most important TTOs' activities to understand the invention are the analysis and description of the technology, its attributes and claims, the identification of new development stages and the definition of an action plan or an industrial map specifying what to do and what can be done to bring the technology to market (Table 2, e).

Table 1: Quick evaluation methods

Results: One-sample T-test Test-value = 4	p-value	t-value	Average	Std. Dev.
a) Checklists and predefined evaluation methods and matrices	0,329	-1,04	3,4	1,7
b) Comparable agreements	1,00	0,00	3,8	0,9
c) Royalty standards	1,00	0,00	4,0	0,9
d) Cash flow projection	0,01	-3,86	2,2	1,3

It is also important to identify competing patents with the same purpose of the invention, and to identify all the invention's applications for the patent protection to be as wide as possible and to identify the strongest link between the invention, its solutions and its market (Table 2, f). Applied R&D projects based on a deep patent search and understanding may enhance the link and the engagement with industry, lead to technologies and patents with higher profit potential, and may reduce project duration and bring down research costs (Smith, 2005).

Table 2: Invention analysis

Results: One-sample T-test Test-value = 4	p-value	t-value	Average	Std. Dev.
e) Support in the identification of new technology development stages and the definition of an action plan to gather the necessary resources for its implementation	0,516	-0,68	3,8	1,0
f) Analyse with the research team all product alternatives and technological applications, seeking to determine what applications or products have a stronger relationship between technology, product and market to define the protection strategy and to identify potential licensees	0,351	1,00	4,3	0,7

Among the most frequent evaluation practices of the TTOs are also the following ones, presented in Table 3. These practices have been analysed using the one-sample T-test for a Test Value = 4 (quite frequent), where a scale between 1 and 5 have been used, being 1 a not frequent practice and 5 a very frequent practice.

The data from Table 3 allow us to conclude that we do not have evidences to reject the null hypothesis for none of the practices, meaning that their average frequency does not differ significantly from 4, a quite frequent practice in use by TTOs.

When aiming to understand the technology and its market potential, TTOs want to know every aspect of the invention and to clarify all the tasks which are necessary to obtain the invention proof of concept (if not already attained) and to obtain a complete commercial product. The proof of concept is essential to develop products based on the technology. The lack of financial support or programmes that support a proof of concept is a weakness remarked by many TTOs.

Table 3: Assessing the technology

Results: One-sample T-test Test-value = 4	p-value	t-value	Average	Std. Dev.
g) Assess whether protecting intellectual property rights creates an efficient and effective barrier against current and potential alternatives	1,00	0,00	4,0	0,8
h) Assess to what extent there is a technology demand from companies or from target markets (market pull)	1,00	0,00	4,0	1,1
i) Prepare the technology value proposition	1,00	0,00	4,0	1,3
j) Analyse the possibility of licensing the technology to an organization willing to assume the costs of later developments	1,00	0,00	4,0	0,8

Results: One-sample T-test Test-value = 4	p-value	t-value	Average	Std. Dev.
k) Analyse the competitive and differentiating advantages of applications and products resulting from the technology	0,826	-0,228	3,9	1,6
l) Assess the technology maturity (Little achieved? Reduced to practice? Commercially proven?	0,763	0,317	4,1	1,1
m) Identify and select organizations interested in the technology	0,763	0,317	3,9	1,1
n) Assess the patent application management costs before its submission	0,763	-0,314	3,9	1,1
o) Assess whether the technology is new or a modification of an existing technology	0,732	0,357	4,1	1,0
p) Identify the availability of public funding sources to continue the technology development	0,732	0,357	4,1	1,0
q) Analyse whether the technology can improve development and production factors (avoid or reduce costs, promote stability and ease of production, increase scalability and production speed, or improve product quality)	0,516	-0,683	3,8	1,0
r) Assess the technology development costs incurred by the University	0,516	-0,683	3,8	1,0

After all aspects of the invention have been understood, and after the assessment of existing resources for new development stages, it is important to select the invention's most promising applications to deepen its market study. The market research is the starting point to analyse the relationship between the technology, its applications and its market, identifying its final consumers, needs, competitors, and the relevant firms and actors, so that an adequate market position can be found. It also enhances the invention value proposition and diffusion strategy. The market research starts immediately after reviewing the invention disclosure and an in-depth study is carried on after the patent application to decide whether to protect the invention country by country or to first submit a PCT application.

To obtain data about the invention and its potential market there are several methods with different levels of depth which can be applied at different times of the evaluation process.

The most common methods according to Razgaities (2007) are:

- Pre-defined evaluation models and matrices;
- Comparable licensing agreements and the observation of royalties practiced in industry;
- Evaluation based on development costs;
- Discounted cash-flow method;
- The 25% rule;
- Real options and Monte Carlo simulation methods;
- Patent auctions.

Each method is addressed below separately.

3.2 Pre-defined evaluation models and matrices

Methods based on checklists and on pre-defined models speed up the evaluation process and facilitate the consideration of multiple dimensions of the invention, from its intrinsic quality to its market potential and profitability. These methods are the most widely used in the evaluation of invention disclosures. In Table 4, the test presents a p-value=0,329 with a t=-1,04 which means that we do not have evidence to reject the null hypothesis, meaning that the average frequency does not differ significantly from 4, a quite frequent practice.

Table 4: Pre-defined evaluation models

Results: One-sample T-test Test-value = 4	p-value	t-value	*Average*	*Std. Dev.*
Predefined evaluation models and matrices	0,329	-1,04	3,4	1,7

Some of these models and matrices are:

- COAP – Commercial Opportunities Appraisal Process, developed by Warwick University, in which ten evaluation criteria are scored;
- Rapidscreen, it is a process supported by a web service to discover the opportunities associated with early stage technologies, which involves conducting interviews with the research team and with experts in the technical field under analysis;
- IPscore, developed by the European Patent Office, was designed to identify potential gains and opportunities, and to reduce the evaluation time and costs, and can be used to study ideas, R&D projects and patents providing reports about a patent or a set of patents and presenting a forecast of the net present value of the assets under analysis;
- Quicklook Commercialization Assessment, developed by the University of Texas, consisting in a four step study allowing the collection of information to prepare a final report about the technology commercial potential.

Each of these instruments, when analysed using the One-sample T-test for a Test value equal to 4, provide evidences to reject the null hypothesis. With a Test value equal to 3 (frequent), the T-test does not provide evidence to reject the null hypothesis:

- COAP: p-value=0,84; t=-2,07;
- Rapidscreen: p-value=0,356; t=-1,00;
- IPscore: p-value=0,805; t=-0,258;
- Quicklook Commercialization Assessment: p-value=0,846; t=0,203.

Beside these matrices, some TTOs have created their own evaluation methods that usually group a set of indicators into four major categories: the technology stage of development, the innovation potential, the market potential, and its strategic importance.

3.3 Comparable licensing agreements and the observation of royalty standards

The analysis of previous licensing agreements (Table 5, a) and royalty values practiced in industry, known as royalty standards (Table 5, b), may provide guidance to define and defend the payments structure and its value during the negotiation of a technology transfer agreement (WIPO/ITC, 2005; Nabulsi & Belt 2015; Stevens, 2016; Pressman *et al*, 2017; Heiden & Petit, 2017). The search for comparable licensing agreements and royalty standards is an effort which usually pays off (Razgaities, 2003), although the specificity of each technology does not call for standard agreements. But it is important for the TTOs to build and maintain a portfolio of reference agreements which can be used if needed (Dodds & Somersalo, 2007).

Databases and publications with royalty standards and licensing agreements are a good source of information to understand the invention value and potential return. The *Royaltystat* of the US Securities and Exchange Commission, based on the Edgar Archive, is a well-known database where payment structures for many technologies acquired by US firms can be consulted (Table 5, c).

Table 5: Similarity assessment

Results: One-sample T-test Test-value = 4	p-value	t-value	Average	Std. Dev.
a) Comparable agreements	1,00	0,00	3,8	0,9
b) Royalty standards	1,00	0,00	4,0	0,9
c) Royaltystat of the US Securities and Exchange Commission	0,02	-5,46	2,1	0,9

In Table 5, for a) and b) we do have evidence to accept the null hypothesis, meaning that their average frequency does not differ significantly from 4, a quite frequent method. For c), in Table 5, we do have evidence to reject the null hypothesis, meaning that their averages differ significantly from 4, meaning that the use of *Royaltystat* is not very frequently used.

3.4 Evaluation based on development costs

Evaluation based on development costs is rarely a base on which firms negotiate licensing agreements (Razgaities, 2003; Lagrost, 2010). Firms are interested in obtaining technology in an easy and cheaper way than it would cost if they developed the technology by themselves, and the cost of creating a technology may have little to do with its value (Speser, 2006). The market value is a more appropriate metric to evaluate a technology (WIPO/ITC, 2005). The evaluation based on development costs should not be used to put a price on a technology, and instead it should be used before the start of a project as a way to estimate future costs and future investment.

The evaluation of the technology development costs for a Test-value equal to 4, the null hypothesis is rejected, the average frequency is not equal to 4, meaning that the evaluation of the technology development costs is not very frequently used by TTOs.

3.5 Discounted cash-flow method

The discounted cash-flow method is used by organizations who deal and license technology (Degan & Horton, cited by Kemmerer and Jiaquing, 2008). The discounted cash-flow calculus is important for business profitability discussions and to provide a basis for setting up royalties and other payments. It is also important when the deal involves a single lump sum payment for the utilization of a technology during a specified period of time, or when the creation of a firm is under consideration, providing a basis for equity participation (Wirtz, 2011).

The discounted cash-flow method when tested with the On-sample T-test for a Test-value equal to 4, the null hypothesis is rejected, the average frequency is not equal to 4, meaning that the discounted cash-flows is not very frequently used by the TTOs.

3.6 The 25% rule

The 25% rule is usually applied to the EBIT – Earnings before interests and taxes (Kemmerer & Jiaquing, 2008), suggesting that the licensee pays a fee equivalent to 25% of the invention contribution to the operational results obtained by the product that embodies the technology. The 25% rule divides the value of a technology in four parts: the creation of the invention, the preparation of the invention for industrial reproduction, industrial reproduction, and the sale of the invention, per se, or incorporated in a larger product. Each one of these parts represents one fourth of the invention value and, in this sense, the invention is one of four parts by which the commercialization gain is distributed. If the invention is already prepared for commercialization, it makes sense to define a lager value, say 33% or more, since the invention has already attained a threshold that includes production. In the case of software, these values can ascend to 50%, since the technology is ready for commercialization (Razgaities, 2003).

The rule is a good starting point, adopted by licensors and firms, for royalties' negotiation, thanks to its simplicity, intuitive reasonability and diffusion by several authors (Razgaities, 2003; Grandstand, 2006; Parr, 2007; WIPO/ITC, 2005, Kemmerer and Jiaquing, 2008).

The 25% rule when tested with the On-sample T-test for a Test-value equal to 4, the null hypothesis is rejected, the average frequency is not equal to 4, meaning that the use of the 25% rules is not a very frequently used by the TTOs.

3.7 Real options and Monte Carlo simulation method

The real options method allows the separate evaluation of all the assumptions involved in a cash-flow projection, each assumption having a different level of uncertainty for which different risk-adjusted hurdle rates are defined. This is a more complex and time consuming approach, but it contributes to a more complete and exact analysis of the investment return (Soares, *et al.*, 2007; Lazzolino, 2015). The Monte Carlo simulation is more frequently used than the real options method. The probabilistic model generates multiple scenarios regarding the profitability of the investment and the probability of attaining a predefined critical value.

The real options and the Monte Carlo simulation method are not frequent methods in use by the TTOs: both methods when tested with the One-sample T-test for Test Value equal to 4, the tests present a p-value=0,000

with a t=-9,354, and their average frequency of use is 1, 5 which means that we do have evidence to reject the null hypothesis, real options and the Monte Carlo simulation method are not frequently used by the TTOs.

3.8 Patent auctions

Patent auctions are gaining increasing importance on technology transfer processes (Jarosz, 2010). Auctions are a quicker way of commercializing patents, provided they are of high quality (EPO, 2008). Auctions can be a way to license patents that otherwise would fall for absence of payments of patent fees, or to commercialize and define territorial extension rights of patents which are in the final stage that precedes the PCT application stage. The planning of auction events requires a considerable organization and advertising effort and it is not easy to have several bids for just one piece of technology (Perchorowicz et al, 1991).

Patent auctions are not frequent: when tested with the one-sample T-test for Test Value equal to 4, the test presents a p-value=0,000 with a t value of -16,803, and their average frequency of use is 1,25 which means that we do have evidence to reject the null hypothesis, patent auctions are not frequently used by the TTOs.

4. Conclusions

The main research objective of this paper was to identify and describe evaluation practices and methods sweeping across the technology transfer process, from invention disclosure to licensing, providing statistical data on the frequency of use of methods and practices by University technology transfer offices, resorting to case studies of Portuguese TTOs.

Checklists, scoring and predefined evaluation models are the most used methods among the TTOs ensuring a quick assessment of the technical and market value of research results.

Previous agreements and discounted cash-flow projections are mainly used when a spin-off firm is under consideration or when the TTOs receive an investor manifestation of interest.

Royalty standards are also in use to get to know the payments value range in certain industries to prepare negotiations.

Invention comparison analysis and positioning against existing solutions, which may overlap on their purposes without having the same characteristics, is one of the main evaluation methods in use among the TTOs specially when considering incremental technical solutions.

The 25% rule is hardly ever used, due to doubts on whether a 25% value is adequate, since this value can vary according to the rights granted, the invention development stage, and depending on production and distribution requirements. This rule is based on an average distribution of license agreements, but each agreement is unique and this rule may cast some doubts on its effectiveness (Speser, 2006). However, it may serve as a starting point for the negotiation process.

Real options and Monte Carlo simulation methods are hardly ever used. TTOs prefer evaluation methods meant for a quicker inspection of several variables, instead of going through a deeper analysis of entire scenarios that may affect the invention profitability. The same happens with patent auctions, they are hardly ever used, since their value relies exclusively on investor bids, and there is no space for negotiations, but nevertheless they can be useful, as previously discussed, for some technologies.

Figure 1 summarises the main evaluation methods and the stage when they are usually applied. The dashed square represents the moment when the TTOs receives a manifestation of interest from a firm and, to prepare negotiations, several evaluation methods may be used. Patent auctions may be used at a later stage, usually after the patent publication. The months indicates a typical duration for the process.

Having identified the main practices and techniques of technology evaluation used by technology transfer offices, there are some avenues of research that may seem appropriate.

One avenue of research is to better understand how the TTOs articulate the use of the different practices and methods, and if there are significant differences between methodological mixes, and how such differences may

impinge on the efficacy of the TTOs. For instance, at an initial stage patent databases may be used to understand the invention and the state of the art, and scoring matrices and rapid report models may be used to understand the invention's technical and market potential. In a later stage, comparable agreements, royalty standards and discounted cash-flow projections may be preferred. In general, eventually promising avenues of research, which are now being pursued, are to better understand how the use of the identified practices and techniques is related to performance measures of the TTOs.

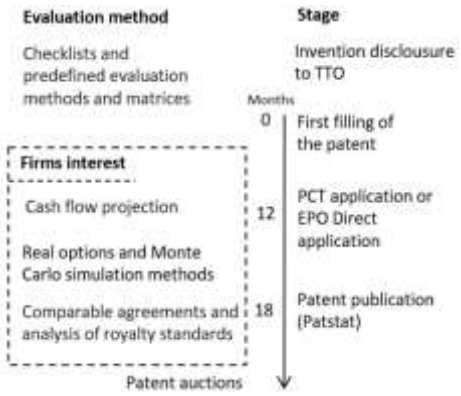

Figure 1: Main evaluation methods and stages of the technology transfer process

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References

CWUR (2019). Center for World University Rankings. https://cwur.org/2018-19.php

Di Sante (2007) The role of the inventor in the technology transfer process, in Intellectual Property Management in Health and Agricultural Innovation: A Handbook of Best Practices (eds. A Krattiger, RT Mahoney, L Nelsen, et al.). MIHR: Oxford, U.K., and PIPRA: Davis, U.S.A.

Dodds, J. and Somersalo, S. (2007) Practical Considerations for the Establishment of a Technology Transfer Office, in Intellectual Property Management in Health and Agricultural Innovation: A Handbook of Best Practices (eds. A Krattiger, RT Mahoney, L Nelsen, et al.). MIHR: Oxford, U.K., and PIPRA: Davis, U.S.A.

Eldermann, J. (2012) Experiences in using structured method in finding and defining new innovations: The strategic options approach. Thesis for the degree of Doctor of Science, Lappeenranta University of Technology, Finland.

EPO (2008) Patents up for auctions. European Patent Office.

Grandstrand, O. (2006). Fair and reasonable royalty rate determination. When is the 25% rule applicable? Les Nouvelles, September, 179-181.

Heiden, V. and Petit, N. (2017) Patent Trespass and the Royalty Gap: Exploring the Nature and Impact of "Patent Holdout". Hoover Institution Working Group on Intellectual Property, Innovation, and Prosperity. Stanford University.

Jarosz, J., Heider, R., Bazelon, C., Bieri, C. and Hess, P. (2010) Patent Auctions: How Far Have We Come? Patent auctions. Les Nouvelles, September.

Kemmerer, J. E. and Lu, J. (2008) Profitability and Royalty Rates Across Industries: Some Preliminary Evidence. KPMG Global Valuation Institute, Available at SSRN: https://ssrn.com/abstract=1141865 or http://dx.doi.org/10.2139/ssrn.1141865

Lagrost, C., Martin, D., Dubois, C. and Quazzotti, S. (2010) "Intellectual property valuation: how to approach the selection of an appropriate valuation method", Journal of Intellectual Capital, Vol 11, No. 4, pp 481-503.

Lazzolino, G. and Migliano, G. (2015) The Valuation of a Patent through the Real Options Approach: A Tutorial. Journal of Business Valuation and Economic Loss Analysis. Vol 10, No. 1.

Nabulsi, B. and Belt, E.. (2015) The patent is dead; long live the royalties! in VIVO – The business and Medicine Report. Informa Business information Inc.

Parr, R. L. (2007) Royalty Rates for Licensing Intellectual Property. John Wiley & Sons. New Jersey.

Pressma Perchorowicz, J. T., Dakin, K. J., & Lindsey, J. (1991). Technology transfer—Financing and commercializing the high tech product or service from research to roll out. Journal of Technology Transfer, 16(3), 62.

n, L., Planting, M., Yuskavage, R., Okubo, S., Moylan, C. and Bond, J. (2017) The Economic Contribution of University/Nonprofit Inventions in the United States. Association of University Technology Managers and Biotechnology Innovation Organization.

Razgaitis, R. (2007) Pricing the Intellectual Property of Early-Stage Technologies: A Primer of Basic Valuation Tools and Considerations, in Intellectual Property Management in Health and Agricultural Innovation: A Handbook of Best Practices (eds. A Krattiger, RT Mahoney, L Nelsen, et al.). MIHR: Oxford, U.K., and PIPRA: Davis, U.S.A.

Razgaities, R. (2003) Valuation and Pricing of Technology-Based Intellectual Property. John Wiley & Sons, New Jersey.

Smith, H. (2005) What innovation is – How companies develop operating systems for innovation. CSC White Paper. European Office of Technology and Innovation.

Speser, S. (2006) The Art and Transfer of Technology Transfer. John Wiley & Sons, New Jersey.

Soares, I., Moreira, J., Pinho, C. and Couto, J. (2007) Decisões de Investimento. Análise Financeira de Projectos. Edições Sílabo . Lisboa.

Stevens, A. (2016). Intellectual property valuation manual for academic institutions. WIPO – World Intellectual Property Organization. https://www.wipo.int/meetings/en/doc_details.jsp?doc_id=332588.

WIPO/ITC (2005). Exchanging value: negotiating technology licensing agreements. A training Manual. World intellectual Property Organization.

Development of Socio-Economic Systems in the Context of Information Technology Development

Dmitriy Rodionov[1], Evgenii Konnikov[1], Yulia Dubolazova[1], Olga Konnikova[2] and Polina Polyanina[1]
[1]Peter the Great St. Petersburg Polytechnic University (SPbPU), Petersburg, Russia
[2]St. Petersburg State University of Economics, Russia, St. Petersburg, Russia
rodion_dm@mail.ru
konnikov.evgeniy@gmail.com
julia005@mail.ru
olga.a.konnikova@gmail.com
polyanina.pv@outlook.com
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Abstract: The formation of information capital is directly related to the process of accumulating and disseminating of information and is aimed at developing socio-economic conditions for its spread and use. In the context of globalization, national information capital is turning into a leading structural element of the national wealth. In this study we will divide the countries according to their level of development and consider such indicators as migration, education, health care. The aim of the current study is to assess the impact of information capital on socio-economic indicators of countries (such as employment, poverty, migration, GRP, education, etc.) As a result, conceptual models with reliable links between indicators were obtained using regression equation modeling.

Keywords: information capital, socio-economic indicators, level of media freedom, level of internet development

1. Introduction

The formation of information capital is directly related to the process of accumulating and disseminating of information and is aimed at developing socio-economic conditions for its spread and use. By the information capital the authors mean all accumulated, renewable, and solvent information resources that contribute to an increase in positive effects for individuals, their aggregates, national economies or for the world community (Rodionov et al., 2020). It should be noted the importance of the development of socio-economic institutions that regulate the economic relations of subjects of intellectual activity, on which the efficiency of reproduction of intellectual and information capital depends, due not only to the level of development of the productive forces of society, but also to the degree of specification of proprietary rights. In the national information capital, the most significant component is the scientific information capital, represented by educated information developers that produce information products based on scientific research and development. China and the United States are leading in this indicator; therefore, these countries are more likely to be able to create new technologies and innovations.

The use of information capital based on the introduction of modern information technologies is the core for ensuring economic growth of countries. The self-growth of information capital shows, for example, the growing importance of the education system, when students should take maximum use of not only traditional forms of studying educational material, but also modern information resources and educational content. The essence of self-growth of information capital is that this process leads to the emergence of a new product with information properties. The growing importance of information in the modern economy expresses both in theoretical studies and at practical level, e.g., in the development of concepts and programs for the socio-economic development of countries. With the transition to the information economy, the importance of information capital has become as high as ever. In the context of globalization, national information capital is turning into a leading structural element of the national wealth of the countries. Therefore, countries with a more developed information economy have higher indicators of socio-economic development. Obviously, there is a big difference between the countries in such indicators as the level of literacy, the level of incomes, the level of development of education and health care systems. This fact makes some countries more popular for migration than others. According to Bradshaw, Van de Graaf and Connolly (2019) ones of the most popular countries for migration are as Saudi Arabia, Germany, Russia and, by a long shot, the United States. These countries will be taken as objects of research for the current study.

The aim of the current study is to assess the impact of information capital on socio-economic indicators of countries (such as employment, poverty, migration, GRP, education, etc.). According to the above, as parameters characterizing information capital, we will consider the level of media freedom and the level of Internet development.

2. Literature overview

Firstly, it is worth considering what parameters characterize socio-economic development, and how these parameters are interconnected between each other.

The problem of poverty is typical for third world countries, but this does not exclude poverty in highly developed countries. Pechenaya, Tolkacheva and Domarev (2017) consider what indicators affect poverty. According to the authors, poverty is influenced by the standard of living of the population, the level of income of the population, as well as living conditions. In order to reduce the level of poverty in the country, it was proposed to ensure economic growth, as well as expand the scale of employment.

The number of migrants around the world is growing every year. People are looking for a better place to live and work. For example, Iskhakov et al. (2015) touch on the topic of mass labor migration in the media. The authors say that the editorial policy of most media is aimed at creating a negative image of a labor migrant (the average indicator is 62% of materials that are negative in tone of voice).

Barysheva (2017) speaks about such important problem as the need to reduce the information gap between countries. Today the level of technology development is rapid and occupies an integral part of our life. The rapid spread of new technologies leads not only to the emergence of new progressive opportunities for the media, but also brings new threats to the security of individuals and society.

It is no secret that many lives depend on the level and quality of medicine. Berezina et al. (2017) investigates three factors that affect expected lifespan: the economic situation of the country, the development of medicine and the absence of hostilities. In countries that pay great attention to the development of medicine and the provision of medical services to residents, the average human expected lifespan is higher.

Digital economy affects the state of the labor market, the number and composition of the potential labor force as well as the scale and structure of unemployment. Kuznetsov (2020) believes that modern information technology has a significant impact on informal employment. In addition, the introduction of modern information technologies in the future will lead to the replacement of workers with robots and, accordingly, to their release, which may lead to mass unemployment. Wang et al. (2020) discuss the progress of internet technologies which directly contributes to employment in various industries. Digital economy based on Internet technologies has given an important impetus to economic growth, but also created opportunities and challenges for stabilizing macroeconomic employment.

Level of crime is also an important indicator characterizing socio-economic development. For example, Phillips and Land (2012) talk about the impact of unemployment on crime. If the economic conditions are worsened, it entails social tension among the population. People who lose their jobs and are in a hopeless situation resort to committing crimes. Shotkinov (2003) describes how the media affects crime. It turned out that the influence of the media has a negative character and has an impact on the everyday consciousness of people. The greatest impact is exerted on minors by displaying, for example, aggressive advertisements.

Modern problems require modern solutions, and the Internet helps modern children to learn. Nurmuratova (2019) argues that being on the same wavelength with the students, the teacher will be able to quickly get response from the children, and online programs allow to involve shy students in the educational process and simplify the mastering of educational material.

Thus, an analysis of the literature showed that to achieve the aim of the study (to assess the impact of information capital on socio-economic indicators of countries), it is advisable to analyze the following indicators: poverty rate, migration level, the level of education, medicine level and life expectancy, employment rate and unemployment rate, crime level. Therefore, basic research hypotheses can be formulated as follows:

Hypothesis 1: a country's information capital affects its socio-economic development (which will be assessed through a number of traditional parameters),

Hypothesis 2: socio-economic development is systemic, and its indicators are related to each other.

3. Research methodology

For the study, we used a sample survey of the year 2018 by countries. The sample includes 14 countries (USA, Saudi Arabia, Germany, Russian Federation, UK, UAE, France, Canada, Australia, Spain, Italy, China, Finland, and Sweden), which were selected in accordance with their place in the world ranking in terms of migration and GDP per capita.

This study presents 3 conceptual models, each with a unique core.

Conceptual Model 1 (Figure 1)

This conceptual model describes the influence of the level of media freedom (as an indicator of information capital) on the set of parameters of the country's socio-economic development. The level of migration was chosen as the first influencing parameter based on the assertion that the level of freedom of the media affects the competition between political and economic subjects of the country, since it is the consumer who determines both the representatives of state power and generates demand within the framework of democratic systems. It therefore leads both to intensive socio-economic development and to an increase in the intensity and quality of its coverage in the media, which in turn affects the attractiveness of migration. As the consequence of the formulated hypothesis, we included in the conceptual model such factors of socio-economic development as:

- GDP,
- crime rate,
- level of education,
- level of employment.

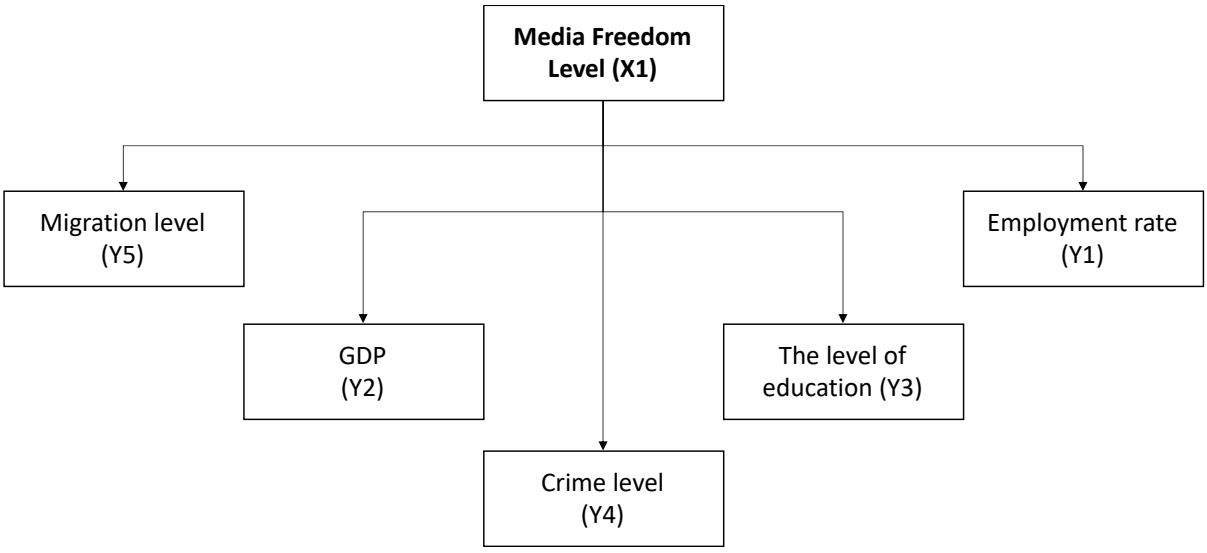

Figure 1: Conceptual model 1

As one can see in Figure 1, the conceptual model consists of one exogenous variable and five endogenous variables. Therefore, this conceptual model can be verified by constructing and optimizing five pairwise regression models. Regression models are built using the least squares method. In this case, several possible forms of the equation are tested - linear, logarithmic, exponential and polynomial. To determine the most representative model, the following indicators are considered:

- The significance of the models is assessed using Fisher's F-test. Within the framework of this study, the limiting value of this criterion is taken as 0.1 or 10%. Such rather free boundary of significance is determined primarily by small sample sizes, as well as by the macro-specificity of the equations being formed.

- The quality of the model is determined primarily by the volume of the explained variance of the endogenous variable, indicated by the coefficient of determination (R2). The specificity of the sample and the macro-specificity of the described dependence determine a rather low level of need for the explained variance. As a result, the conditionally small value of the coefficient of determination is accepted as permissible.
- The most significant binary quality criterion for the regression model is the logical substantiation of the direction of influence of the exogenous variable on the endogenous one. If the described nature of the relationship (direct or reverse) contradicts formal logic, the model is recognized as insignificant.

The construction of models is carried out using the MS Excel software. Data for analysis was collected using official statistical resources - World Bank, the United Nations database, Freedom House, United Nations Development Program, Numbeo.

Conceptual Model 2 (Figure 2)

This conceptual model describes the dependence of the indicators of the country's socio-economic development on the level of Internet development (as an indicator of information capital). This dependence is based on the hypothesis that the Internet acts as one of the basic tools for effective dissemination of information, which in turn leads to the emergence of new jobs, an increase in the availability of educational resources, an increase in the freedom of media, and the appearance of fundamentally new professions. Thus, the level of employment and the level of unemployment, the level of poverty, the level of education and GDP (as an integral indicator of the socio-economic development of the country) can act as endogenous in relation to the level of development of the Internet.

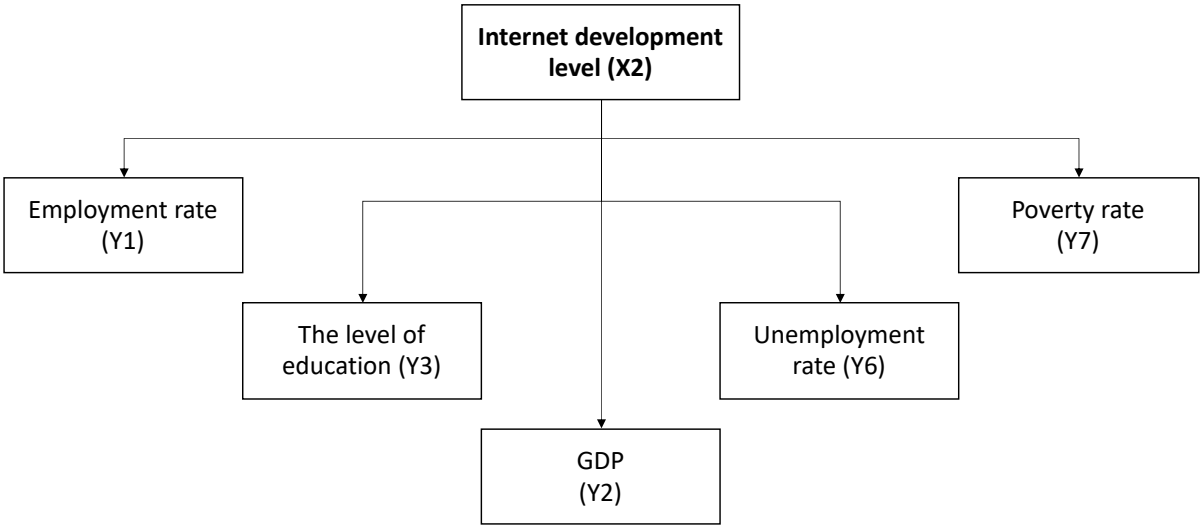

Figure 2: Conceptual model 2

As one can see in Figure 2, this model also consists of five endogenous variables and one exogenous variable. Therefore, the methodology for testing this conceptual model is identical to the methodology for testing conceptual model 1.

Conceptual Model 3 (Figure 3)

Conceptual models 1 & 2 pursue the goal of proving the relationship between the indicators of information capital of the country and indicators of its socio-economic development. However, the indicators of the country's socio-economic development themselves should also be systemically linked. The integral indicator of the country's development is GDP. In accordance with the conclusions formulated earlier, it was determined that GDP affects the level of economic development, education, and social development. At the same time, indicators of this development can also act as mediators of other indicators. Figure 3 shows a conceptual model of the relationship between GDP and a set of private indicators of the country's socio-economic development.

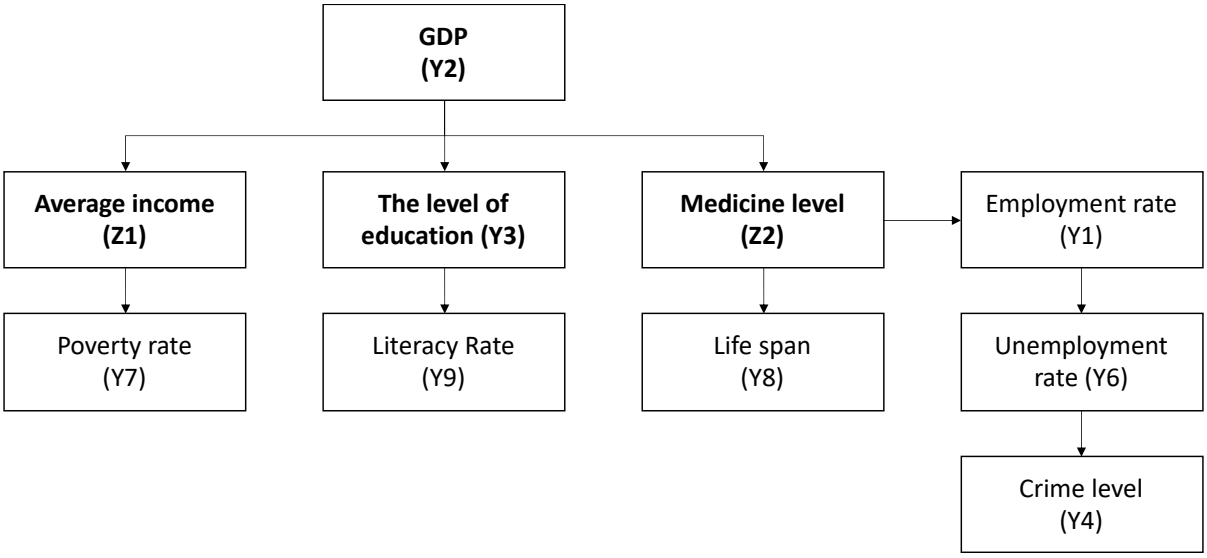

Figure 3: Conceptual model 3

As one can see in Figure 3, this model can be tested using seven paired regression models and one multiple regression model. The methodology for testing this model is identical to that described above.

The summary set of indicators is presented in Table 1.

Table 1: Conceptual models parameters

Indicator	Symbol	Variable type	Units
Employment rate	Y1	Endogenous	%
GDP	Y2	Endogenous	$USA
The level of education	Y3	Endogenous	score
Crime level	Y4	Endogenous	score
Migration level	Y5	Endogenous	score
Unemployment rate	Y6	Endogenous	%
Poverty rate	Y7	Endogenous	%
Life span	Y8	Endogenous	year
Literacy Rate	Y9	Endogenous	%
Media Freedom Level	X1	Exogenous	score
Internet development level	X2	Exogenous	score
Average income	Z1	Exogenous-endogenous	$USA
Medicine level	Z2	Exogenous-endogenous	score

Thus, the presented conceptual models pursue the goal of confirming and quantitatively describing the hypothesis mentioned above. Thus, the simultaneous confirmation of these hypotheses will make it possible to use the resulting regression equations for the purposes of managing the socio-economic development of the country.

4. Research results

First, let's consider the model, the core of which is the Level of media freedom. While studying the influence of the level of freedom of media on the crime rate, it was not possible to establish the reliability of the connection, and therefore we cannot use it in future. An important indicator in assessing the relationship is the p-value, which in this case is higher than the established norm. Therefore, if the p-value is greater than 0.1, then such a model is considered unreliable, and we cannot fully trust it. For the presented model, R2 is only 0.6%. Maybe it is because the media level in the selected countries has not yet reached the required level to influence the crime rate.

The influence of the media on the level of employment was not so high to prove that the relationship between these indicators is reliable. This relationship was also not confirmed, the p-value turned out to be much higher

than the normative value and amounted to 0.65 with an acceptable value of 0.1, the coefficient of determination was only 7%.

For the model in which we took GDP as the dependent variable and the level of media freedom as the independent variable, the power function has the highest level of determination coefficient. To better analyze the resulting relationship, we need to optimize the model by taking the logarithms of the x and y exponents. It can be noted that the coefficient of determination is quite high and amounts to 0.23. F-actual is less than tabular, and p-value is in the acceptable range, therefore, this relationship is reliable, and we can trust it. The approximation error is 14%. Elasticity limits are: lower = -0.088, and upper = 0.002. Analyzing the obtained results of the boundaries, we can say that within the upper and lower boundaries of all variables is 0. This means that the level of media freedom has an unpredictable effect on GDP, but this is not a reason to abandon this indicator, since the influence is ambiguous. After checking for plausibility, we get the final regression equation (1):

$$Y_2 = 159.36 * {x_1}^{0.84} \text{ (1)}$$

Further, we will consider the level of education as a dependent variable, and the level of media freedom as an independent variable. The analysis was performed based on a linear function. The connection is explained by R^2=59%, and the p-value level is 0.001, which, in turn, tells that the connection can be trusted. The approximation error is only 9%. Elasticity limits are: lower = 21.551, and upper = 21.622. This means that we can predict the impact of the level of media freedom on the level of education. The final linear regression equation looks like (2):

$$Y_3 = 0.91 - 0.004 * x_1 \text{ (2)}$$

In the final connection, in the first model where the level of media freedom is the core, freedom of the media is taken as the independent variable, and the level of migration is taken as the dependent variable. This relationship turned out to be unreliable: despite a fairly good level of the coefficient of determination (20%), the p-value exceeds the permissible level. Thus, in the Conceptual Model 1, only 2 connections were confirmed.

In Conceptual Model 2, the core is the level of Internet development. Let's consider the impact of the level of Internet development on the level of employment. The determination coefficient turned out to be very low and amounted to only 1%. The p-value is much higher than the established norm and is 0.82. This connection is unreliable.

Let's then consider the level of education as a dependent variable, and the level of Internet development as an independent variable. The analysis was performed based on a linear function. This connection is explained by 46%, which is very good. The p-value level is 0.008, which, in turn, tells that the connection can be safely trusted. The approximation error is 10%. Elasticity limits are: lower = 40.06, and upper = 40.23. This means that we can predict the impact of the level of development of the Internet on the level of education. The linear regression equation looks like (3):

$$Y_6 = 0.5893 - 0.0029 * x_2 \text{ (3)}$$

Next, let's consider the impact of the level of Internet development on the unemployment rate. The coefficient of determination of this relationship is 9%. In addition, the F-actual value is almost equal to the F-tabular value. The p-value is also higher than the established norm and is 0.317. This connection is unreliable. The influence of the level of Internet development on GDP and the level of poverty can be characterized in the same way. Thus, based on the analysis of Conceptual Model 2, only one relationship was validated.

In conclusion, we will consider Conceptual Model 3 in which GDP is the core. About considering the impact of the level of medicine on expected lifespan, the analysis was carried out based on a polynomial function. The connection is explained by 76%. The p-value level is 0.05, which, in turn, tells us that the relationship can be safely trusted. The approximation error is only 2%. Elasticity limits are: lower = -0.012, and upper = 0.033. This means that the level of medicine has an unpredictable effect on life expectancy, but this is not a reason to abandon this indicator, since the influence is ambiguous. The regression equation is as follows (4):

$$Y_8 = -53.7 + 3.5 * Z_2 - 0.02 * Z_2^2 \text{ (4)}$$

Next, let's consider the impact of the unemployment rate on the crime rate. The determination coefficient is 10%. The p-value level is higher than the established norm and is 0.28. This connection is unreliable. Then let's consider the impact of the employment rate on the unemployment rate. The analysis was performed based on a linear function. Connection is explained by 64%. The p-value is 0.0005, so the connection can be safely trusted. Elasticity limits are: lower = 5.998, and upper = 8.357. This means that the effect of the employment rate on the unemployment rate can be predicted. The regression equation looks like (5):

$$Y_6 = 0.5893 - 0.0029 * Y_1 \text{ (5)}$$

Next, let's consider the impact of average income on poverty. The analysis was carried out on a linear function. The connection is explained by 23%. The p-value is 0.076, which in turn tells that the relationship can be trusted. Elasticity limits are: lower = 68.126, and upper = 45.489. This means that the impact of the average income on the poverty rate can be predicted like (6):

$$Y_7 = 0.5893 - 0.0029 * Z_1 \text{ (6)}$$

However, the predicted values partially deviate from the actual ones, there are structural outliers and gaps. For example, the poverty rate in the United States is 25.7, but it was predicted that this level should have been 15.682. The same situation, but with a smaller difference between the indicators, occurs in Finland. The poverty rate turned out to be less than predicted earlier.

Further let's consider the impact of educational level on literacy rates. The analysis was performed based on a linear function. The connection is explained by 28%. The p-value is 0.05, which in turn tells us that the relationship can be trusted. The approximation error is 2%. Elasticity limits are: lower = -0.03, and upper = 0.035. This means that the impact of education on literacy is unpredictable, but this is not a reason to abandon this indicator, since the impact is ambiguous. The regression equation looks like (7):

$$Y_9 = 91.4 - 8.69 * Y_3 \text{ (7)}$$

At the same time, there are structural outliers and gaps. For example, literacy rates in Saudi Arabia and the UAE are below predicted levels. In Russia, Spain, and Italy, on the contrary, the literacy level turned out to be higher than predicted.

In the analysis of the impact of GDP, a significant relationship was identified exclusively in relation to the level of average income. The analysis was carried out on a polynomial function. The connection is explained by 45%. The p-value is 0.01, which in turn tells us that the relationship can be trusted. Elasticity limits are: lower = -0.64, and upper = 1.15. This means that the impact of GDP on income levels can be predicted. The regression equation looks like (8):

$$Z_1 = 2869.4 - 0.38 * Y_2 + (2E - 05) * Y_2^2 \textit{ (8)}$$

At the same time, there are many structural outliers and gaps. For example, income levels in Russia and Spain are below predicted levels. In Germany and Australia, on the contrary, the income level was higher than predicted. Thus, we have the following validated conceptual models with proven and reliable links. Figure 4 shows the validated version of Conceptual Model 1.

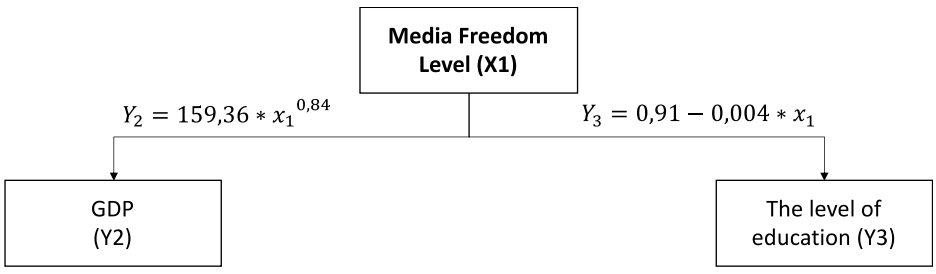

Figure 4: Validated concept model 1

As can be seen in Figure 4, only two connections between the level of media freedom and GDP and the level of education were confirmed. Thus, the influence of media freedom on the socio-economic development of the country is complex, as evidenced by the relationship with GDP. The quality of the obtained equations indicates that the level of freedom of the media, as a tool for managing socio-economic development, is not highly effective. This specificity is due to the potentially long-term effect of changes in this indicator. Consequently, the level of development of the Internet is potentially more efficient in terms of governance.

Figure 5 shows the validated version of Conceptual Model 2.

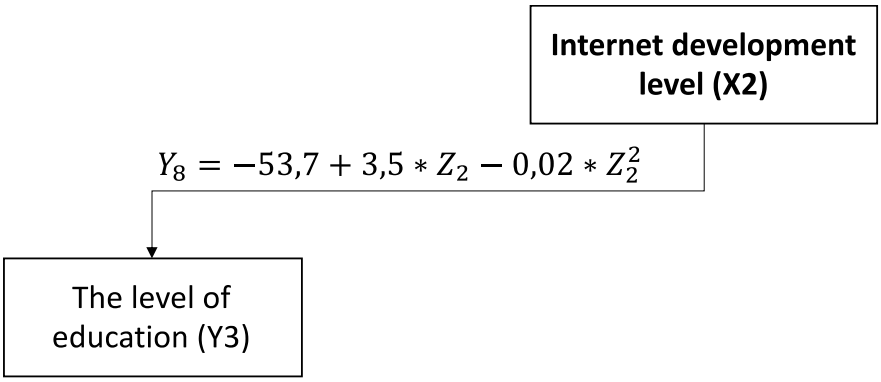

Figure 5: Validated concept model 2

As one can see in figure 5, the level of Internet development has the most significant impact on the level of education. This specificity is a consequence of the fact that an increase in the intensity of the dissemination and consumption of information invariably leads to an increase in the level of accessibility of academic knowledge, which in turn leads to an increase in the level of education. At the same time, the low significance of the level of development of the Internet and other indicators of the socio-economic development of the country can also be due to the long-term effect of this influence. This conclusion can largely substantiate the low significance of systemic connections of indicators of socio-economic development.

Figure 6 shows the validated version of Conceptual Model 3.

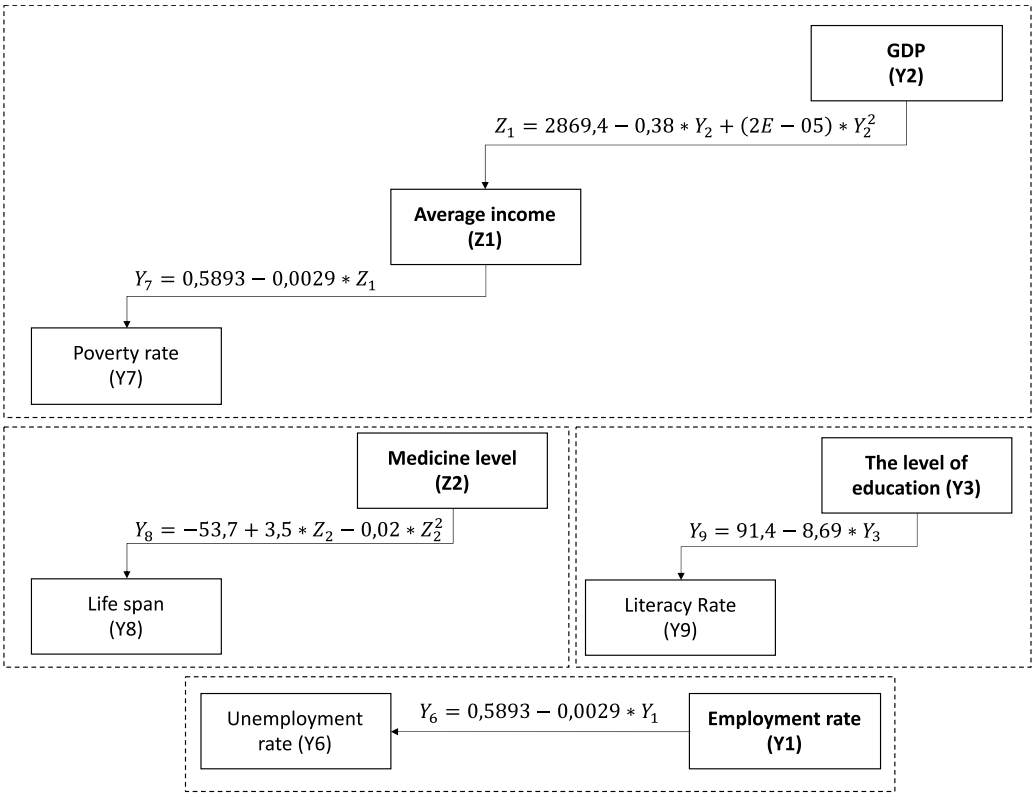

Figure 6: Validated concept model 3

As one can see in figure 6, the unified conceptual model has been divided into four separate models. Each of the confirmed links is logically justified, but the absence of a systemic link between them does not allow to speak of a potential synergistic effect of managing the country's information capital.

5. Discussion

In the first model, out of five connections, only two were confirmed. Let's start the discussion with the impact of media freedom on crime rates. This connection was not confirmed, so we can only agree with the opinion of Shotkinov (2003). In his point of view, people are subject to negative influence from the media. The most susceptible to this effect are minors. Fragile minds believe everything they see, their opinions and behavior are the easiest to control. Of course, not only children, but also adults can be influenced by the media. Perhaps because the effect of the impact is not constant, it does not cover a large percentage of viewers, and the connection between these indicators is not as strong as originally assumed.

The link between media freedom and GDP, on the contrary, was confirmed. First, it's worth saying that media is a business. The more information, the higher the competition. The smaller it is, the stronger is the fear of investing in something that may not pay off in the future and will not bring profit. It is assumed that countries with large media freedom have large GDP, as an example the United States, which is the largest country in the world in terms of nominal GDP. In 2020, there were massive fires in Australia, due to which more than 8.4 million hectares were affected. For this reason, the country suffered losses of $ 3.5 billion, GDP is expected to decline.

The next confirmed link in the first model is the impact of media freedom on education. It is possible to predict this connection and take the necessary measures for improvement. Countries such as Germany, Canada and Australia have high levels of education and high media freedom. The government of these countries practically does not restrict the flow of information received by the population. Thus, people can get more data of interest to them, as well as can improve their education.

The impact of media freedom on migration has not been confirmed. There is nothing left as to agree with the opinion of Iskhakov et al. (2015). After conducting research, they found out that there are such information agencies that are aimed at creating a negative image of the labor migrant. Although the UAE has an average level of media freedom, according to the UN, it is the country with the largest number of migrants in the world.

The impact of the Internet on employment has not been confirmed either. In the countries we are considering, the level of the Internet is good, only in the UAE and Saudi Arabia it is quite low, but this does not negatively affect the level of employment in these countries.

The study showed that with an increase in the level of development of the Internet the level of poverty decreases. The UAE has not only the lowest level of internet among the selected countries, but also the highest level of poverty. It can be assumed that countries that pay less attention to ICT development have a high level of poverty. An example is the countries of the South, where most of the population is engaged in agriculture and due to the lack of modern technology, manual labor is still used very often. However, the connection is unreliable, and the development of the Internet does not have a high impact on the poverty rate. Proof of this is the United States, a developed country with a high level of development of the ICT sector, despite this, there is a high level of poverty.

Let's move on to the next connection, the impact of the Internet on unemployment. According to Kuznetsov (2020) information technologies significantly affect informal employment, and the introduction of these technologies will lead to the replacement of workers with robots. Our model confirms Kuznetsov's opinion that with the growth of the Internet, the unemployment rate also grows.

As the level of development of the Internet grows, so does the level of education. China, one of the world leaders in terms of GDP, has a low level of Internet as well as a low level of education compared to other selected countries. It can be assumed that the lack of qualified staff hinders the development of the ICT sector and the spread of the Internet throughout the country. Many countries are introducing the format of online learning into education, and this requires a good level of Internet development.

An undeniable link is the impact of the level of medicine on life expectancy. It is difficult to predict this impact because every year there are more and more new diseases that affect our lives.

Logically, it is true that an increase in poverty leads to an increase in unemployment. However, according to the results of the study, this effect was not confirmed. Maybe it is because each country has its own factors that influence the level of poverty.

But with an increase in employment, the unemployment rate falls, this is also confirmed by our model. In the UAE, the number of migrants is almost 80% of the local population. Despite this, the employment rate is high, and the crime rate is low. This is also because order is strictly monitored in the country, each city is under the gun of surveillance cameras and for violation of the prescribed rules, one can get a tidy fine.

The influence of the average income on the poverty level has also been confirmed. In the United States, the number of poor people is much higher than in the rest of the studied countries. It is worth paying more attention to the standard of living in the country, increasing social benefits or providing more jobs. In Finland, on the contrary, the poverty rate is lower than predicted, and the average level is quite high. The country actively supports environmental business, develops the ICT sector.

The influence of the level of education on the level of literacy of the population is also undeniable. Low levels of education were found in Saudi Arabia, Spain, and China. Local literacy rates are also low. The state needs to support and develop education in the country. The construction of new educational institutions, more thorough training of future specialists and the introduction of new teaching methods will help to improve the level of education. More qualified specialists can make a huge contribution to the country's economy.

The impact of GDP on employment has not been confirmed. There is no definite relationship between these indicators, and for each country there are other factors affecting the employment of the population. The relationship between the level of GDP and medicine is also unreliable. The increase in GDP also does not affect the development of medicine.

Growth in the level of GDP can lead to an increase in the average income of the population. The level of economic development, reflected by the value of GDP, significantly affects the quality of life. Even though the connection is reliable, nevertheless, this connection is not unambiguous for each country. Russia has a rather high level of GDP, but a low average level of income. China is the world leader in terms of GDP, but the population has a slightly higher average income than in Russia.

In our study, an increase in the level of development of the Internet and the level of freedom of media entails an increase in the level of education and GDP. Thanks to the increase in GDP, an increase in the average income of the population is possible, which can significantly reduce the poverty level.

6. Conclusion

Within the framework of this study, the influence of information capital on the socio-economic development of the country was examined. The level of freedom of the media and the level of development of the Internet were determined as control variables describing the information capital of a country. The conducted quantitative research allowed to construct and describe regression equations according to which the level of media freedom and the level of Internet development primarily affect the level of education. At the same time, the influence of information capital on other indicators of socio-economic development is insignificant, which is most likely due to the potentially long-term effects of the impact. Thus, in this case, the level of education is the primary control indicator of socio-economic development. At the same time, the systemic relationship between indicators of socio-economic development has not been proven, which reduces the potential synergistic effect of managing the country's information capital. In the framework of subsequent studies, it is most advisable to consider a possible time lag both within the framework of the influence of information capital on the socio-economic development of the country, and within the framework of the systemic connection of indicators of the country's socio-economic development. The main conclusions based on the described specifics are the feasibility and significance of managing the level of development of the Internet, as the primary mediator of the development of education in the country.

References

Barysheva, N.R. (2017) Freedom of the mass information, Actual problems of the humanities in a technical university.
Berezina, T.N. (2017) Health as a factor in the individual life expectancy of Russians in the XX century, Psychologist, 3.
Bradshaw, M., Van de Graaf, T. & Connolly, R. (2019) Preparing for the new oil order? Saudi Arabia and Russia, Energy Strategy Reviews, 26, 100374.
Iskhakov, R.L., Starostin, A.N. & Shadrina, N.V. (2015) Coverage of labor migration in the Russian mass media (the image of a guest worker in the news agency feed), Izvestia of the Ural Federal University. Ser. 1, Problems of education, science and culture, 1 (135).
Kuznetsov, V.I. (2020) On forecasting unemployment rate in the digital economy, Digital economy: trends and development prospects, 45-47.
Nurmuratova, K.A. (2019) Functional literacy as the basis for the development of a harmonious personality in modern conditions, Pedagogical Science and Practice, 1 (23).
Pechenaya, L.T., Tolkacheva, S V. & Domarev, I.E. (2017) The problem of poverty in Russia and in the world: ways of assessment, ways of reducing, Economy: yesterday, today, tomorrow, 7 (6A), 78-100.
Phillips, J. & Land, K.C. (2012) The link between unemployment and crime rate fluctuations: An analysis at the county, state, and national levels, Social science research, 41(3), 681–694.
Rodionov, D.G., Konnikov, E.A., & Alferjev, D.A. Information capital of an enterprise as a target indicator of development within the framework of digital economic systems, Economic Sciences, 190, 131 - 137.
Shotkinov, S.A. (2003) Media and Crime: Specificity of Interaction, Bulletin of the Nizhny Novgorod University, 1, 6.
Wang, H. et al. (2020) Effects of advancing internet technology on Chinese employment: a spatial study of inter-industry spillovers, Technological Forecasting and Social Change, 161, 120259.

Factors Signalling the Value of European High Tech Startups at Acquisition

Elena Rogova[1], Elena Tkachenko[2] and Danil Kopysov[1]
[1]Saint-Petersburg School of Economics and Management, HSE University, Russia
[2]Saint-Petersburg State University of Economics, Russia
erogova@hse.ru
dskopysov@edu.hse.ru
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Abstract: The paper is dedicated to the effects of external (prior venture capital investments) and internal (education, prior work experience, number of founders) signalling effects of high tech European startups on the value of acquisition deals. The sample consists of 170 European high tech startups, which were acquired in the period from 2002 to 2018. Three hypotheses were developed: (1) both external and internal signals affect the value of acquisitions positively. (2) In different countries the effect of the signals is different. (3) When external and internal effects appear simultaneously, the effect is additive. To answer the research questions, we applied the regression analysis. The results show that (1) Some of the internal signals may have negative effect on the value of acquisitions. (2) In different countries the effects of the signals are different. (3) Such signals have a substantive effect.

Keywords: venture-backed startups, acquisitions as exits, CEO background, signalling theory, signalling effects

1. Introduction

The rapid development of technologies and the demand for these technologies among the population have made the perfect environment of high technology startups in the economy. Because of the high failure rate across startups, scientists try to define the determinants of startups' successful exit and to evaluate the "degree of success" of these exits (Wasserman, 2017; Kohn, 2018).

In the scientific environment, there are two main commonly accepted approaches to define if a startup has realized a successful exit: it could be done either by the initial public offering (hereinafter - IPO) or through the acquisition by another company (hereinafter – M&A) (Lee & Lee, 2015; Parastuty et al, 2016). The first way of exit relates to less uncertainty and information asymmetry. Moreover, the values of IPO are public and for researchers, it is much easier to use these values for their analyses. So, there is a huge body of literature that considers the determinants of IPO valuations (Arcot et al, 2015; Bell, Filatochev & Aguilera, 2014). However, because most of the studies are concentrated on the IPO valuations, the acquisitions sector remains understudied, even if it is now much more common than IPO.

What are these determinants, which allow us to determine the exit outcome? The most popular theoretical lens is the signalling theory (Spence, 1973). Scientists have investigated both internal signals relating to the human capital of entrepreneurs and board members (Certo, 2003), and the external signal given by backing by prominent investors or underwriters (Pollock et al, 2010) or by affiliation with prominent institutions like universities (Colombo, Meoli & Vismara, 2019). So, the good startups have some features, which bad startups are not able to imitate. The investors detect these features and offer a higher price.

This approach can be implemented to the M&A cases where signals can be used to reduce information asymmetries (Reuer, Tong & Wu, 2012; Wu, Reuer & Ragozzino, 2013). However, one cannot take for granted, that results valid in IPOs are also valid in acquisitions. While IPOs are characterized by a homogeneous pool of investors, acquisitions require a match between a target company and its acquirer. Information asymmetry is likely to vary across different acquiring firms (Reuer, Tong & Wu, 2012).

The goal of this study is to define which signals are relevant for acquisition of high technology startups and how do they affect the M&A values on the European market. The research addresses two main questions: What signals influence the value of high technology startup acquisition? How do they affect the value of high technology startups acquisition?

To investigate the drivers of acquisition valuation the authors rely on a cross-sectional database, built downloading from Zephyr by Bureau van Dijk database a complete list of high technology startups acquisitions, complemented with accounting figures from Orbis. The values of acquisitions were obtained from these sources. The independent variables were downloaded from VICO 4.0 database (data about external equity investors), and from Crunchbase and LinkedIn (the information about entrepreneurial team characteristics, their education and prior experience). The final dataset consisted of 170 Biotech and Software European startups, which were acquired in the period from 2002 to 2018.

First, an ordinary least squares (OLS) regression was performed, which was supported by Lasso regularizer with the value of acquisitions as a dependent variable. Then, an interaction analysis and Difference-in-difference analysis were introduced to evaluate the pure effect of external and internal signals.

2. Literature review

2.1 Uncertainty and the signalling theory for startup exits valuation

Signalling theory was chosen as a framework for this study. Spence (1973) focused on the employees' hiring procedure. When a firm hires an employee, it does not know about his future performance. The only way to know is to catch some signals, which this employee sends. These signals should be costly and difficult for imitation, to be sure that the receiver of the signal correctly recognizes and interprets it. In this situation, education may be a good signal – as an employee has spent a lot of time and money to graduate from university and did this successfully, it is the reason to highly assess his capabilities.

On the market with high uncertainty, investors could meet the lemon problem (Akerlof, 1970). When good and bad companies exist on the market without signals, it is impossible to differentiate ones from others. Investors will invest the average amount of money in all the companies, considering the risk to invest in the bad one and get lower returns. It is profitable for the bad firm, a good one will leave the market. Signals mitigate these risks and give an understanding of how much a company cost does. Too little amount of money would tend to disagreement and rejection of the target. Vice versa, if the bid is too high, it is very costly for the acquirer and may reduce the gains of the bidder (Li, 2009).

Recent works have investigated the different values of signals in different circumstances. Hsu and Ziedonis (2013) and Hoenen et al (2014) concluded that if the level of uncertainty is high, the signals from entrepreneurs are more valuable for venture capitalists. Such situation of high uncertainty may happen on the seed stage of the startups, who usually did not have enough time yet to receive a valuable number of connections and get external signals. From the acquirer's point of view, the startup's seed stage is also crucial because they may get a higher return. Therefore, investors value any signals, because "the wrong target can lead to subsequent integration difficulties and the eventual failure to realize intended synergies or opportunities in product markets" (Wu, Reuer & Ragozzino, 2013).

The previous statement works backward as well - the large amount of information decreases the information asymmetries and makes the overall values of signals lower (Stuart, Hoang & Hybels, 1999). That is why for public companies the problem of asymmetric information is less relevant as for the private ones, and publicly listed companies usually get significantly higher premiums in comparison with unlisted ones (Officer, 2007).

For high technology companies the problem of information asymmetries is very topical because they are often in high demand on their labour force (Wu, Reuer & Ragozzino, 2013). The qualified professionals constitute the most valuable intangible asset of such companies, and it is extremely difficult to value such startups under such conditions (Russel, 2016).

The geographical location also may be a determinant of the level of uncertainty. The international deals (both M&A and IPO) are always connected with the higher level of risk and information asymmetry (Kang & Kim, 2010; Moeller & Schlingemann, 2005). Balakrishnan, Vashishtha & Verrecchia (2019) argue that there is a "significant decline in the pricing of information asymmetries as countries remove regulatory restrictions on foreign ownership".

A major part of the scientific community defines the uncertainty and signals in the simple additive manner. The firms may mitigate uncertainty by sending and receiving signals, which reduce the informational asymmetry. The more signals may be received, the less is the level of information asymmetry and the less are the values of the next signals. However, not all the signals are perfectly additive to one another. Khoury, Junkunc & Deeds (2013) investigated the influence of social capital signalling and revealed that different social capital signals do not add their value to each other. While the target sends two signals at the same time, the value of less valuable one dilutes in the bigger signal, and its receiver does not perceive it with the same power. Pollock et al (2007) estimated the influence of appearance of several prestigious actors like prominent underwriters, investment banks, directors, executives etc. They also found out that the signals could be substantive, but some types of affiliates could be almost perfectly additive with a small marginal diminishing.

Colombo, Meoli & Vismara (2019) distinguished three domains of signals: science (affiliation with universities and scientists), business (affiliation with venture capitalists), and finance (affiliation with underwriters). When two signals from the same group appear at the same time, their effect is substantive.

2.2 Features of internal and external signalling

To internal signalling in this study, authors refer education degree, prior work experience, the size of the team. In the academic environment, there are several different points of view on such phenomenon. The people are the main intangible resource of the high tech startups that is why the highly educated and experienced employees make a strong positive signal. Some researchers define generic and specific skills, which could induce different signals to potential investors. Van Teeflen, Uhlaner & Driessen (2011) defined generic signals and specific for the company. To the first group such features as general education and work experience are related; to the second one - specific knowledge. The second group is not extremely important as a signal, but the first one is tightly connected with entrepreneurial skills and therefore extremely important.

From the other side, there are some possible external signals. To them in this paper we refer only amount of venture capital (hereinafter – VC) investments before the acquisition. Although there could be many more concrete signals as affiliations with banks, underwriters, etc, but they are not very relevant to our research.

According to the possible signals, the scientific literature is convinced that VC-backed startups are getting higher returns that not VC-backed ones (Colombo, Meoli & Vismara, 2019).

2.3 Hypotheses formulation

Based on prior body of research, there is an evidence that VC-backing usually has a positive effect on startups valuation. On the other side, academic points of view on education are not very aligned, but there is no evidence of negative signals connected to the education, and considering the HR dependency of high tech startups, the effect should be positive.

H1: both internal and external signals have positive effect on the value of M&A.

Signals may have different effect in different countries because of institutional, cultural, and other frameworks.

H2: In different countries, signals have different effect.

Considering uncertainty and informational asymmetry, we argue that external and internal signals are related to different domains, therefore the common effect of simultaneous external and internal signal appearance should be additive.

H3: Because of the different domains, external and internal signals together have an additive effect.

3. Research methodology

The effect of signals on M&A valuation (H1) was checked with OLS regression with the Lasso regularization support (for the backward feature elimination process). Like every other algorithm from the regression family, it is used to explain the variance of the numerical dependent variable, using any other variables as independent ones. Making variables transformation allows us to detect even non-linear dependencies. As an example of similar recent research, which uses OLS regression methodology, we can provide a paper of Jeong et al (2020),

who studied the influence of venture capital investment and the reputation of venture capitalists on startups returns and revealed a positive significant relationship between variables.

Lasso regularizer is used here as an addition to an OLS regression. It is used to penalize variables, which are unimportant for a model in terms of variance explanation (Kok et al, 2019). Firstly, the regression model is developed, and then the regularizer is applied in order to eliminate unimportant variables and make the model more accurate.

The influence of different countries (H2) was checked by the implementation of interaction terms in the previous OLS model. This step helps to notice the effect of the simultaneous presence of the variables, the interaction effect. Such an approach is also widely used when it is needed to assess some phenomena, which could happen together at the same time. For example, Cacciolatti et al (2020) studied the relationship between strategic alliances and startups performance and used the interaction analysis inside the OLS model, which showed a significant positive effect. In our research, such methodology is used to find the coefficient of interaction between geographical locations and the value of the signals.

The addition effect (H3) was measured by difference-in difference analysis (DiD). In the entrepreneurial finance literature, such a method was recently used by Colombo, Meoli & Vismara (2019). They investigated the influence of affiliation of startups with prestigious universities on their IPO value, and used the fact of affiliation with scientists as a treatment. In our research, we use this method for the same purpose. With DiD, we will estimate the "certification effect', associated to external and internal signals.

3.1 Data collection procedure

The data collection process was divided into 4 major steps:

The first step was an exploration of VICO 4.0 database, which contains geographical, industry, investment, and accounting information on companies founded starting from 1/1/1988, which have received at least one venture capital or angel investment starting from 1/1/1998, operating in seven European countries (Belgium, Finland, France, Germany, Italy, Spain, and the United Kingdom) and Israel. The choice of countries in Europe has been justified by their leading role in the economy of EU; Israel was added as one of the most entrepreneurial countries with highly developed venture capital. So, we have collected a subset of European (+ Israel) VC-backed and non-VC-backed companies belonging to the Software and Biotech industries. Moreover, VICO4.0 contains a control group made up of comparable non-VC backed companies (comparable to the VC-backed ones in terms of size, industry, age). These comparables were also included in the dataset.

We then matched this list of companies with information on acquisition deals from Zephyr database. Industry classification information comes from Orbis. After the vomiting of companies with undisclosed value of acquisition, there were 561 observations in a dataset.

On the third step, the human resources data was collected. Every company was checked manually in order to find the names of their founders. Then we found the web page of every available founder in the LinkedIn.com social network and collected the data about their education (universities, fields of studies, countries) and prior experience (the fields of companies, duration of work, the facts of founder/chief executive/ C-level experience before the founding of our target startup).

Finally, we have discarded the companies, for which there was no human resources data available. The final dataset contains 170 observations. All the data needed to be codified for further analysis (Table 1).

Table 1: Variables of the sample

Variable	Description	Variable	Description
N_founders	number of founders	N_woman	number of women founders
dummy_woman	= 1 if there is at least 1 woman in the founder's team	%woman	% of women in the founders' team
sum_BSc	sum of founders with bachelor's (BSc) degree	dummy_BSc	=1 if at least one founder has BSc degree
%BSc	% of founders with BSc degree in the founder's team	Sum_years_BSc	Sum of years of BSc education among founders' team

Variable	Description	Variable	Description
sum_MSc	sum of founders with master's (MSc) degree	dummy_MSc	=1 if at least one founder has MSc degree
%MSc	% of founders with MSc degree in the founders' team	Sum_years_MSc	Sum of years of MSc education among founders' team
sum_MBA	sum of founders with MBA degree	dummy_MBA	=1 if at least one founder has MBA degree
%MBA	% of founders with MBA degree in the founders' team	Sum_years_MBA	Sum of years of MBA education among founders' team
sum_PhD	sum of founders with PhD degree	dummy_PhD	=1 if at least one founder has PhD degree
%PhD	% of founders with PhD degree in the founders' team	Sum_years_PhD	Sum of years of PhD education among founders' team
sum_MSc2	sum of founders with the second MSc degree	dummy_MSc2	=1 if at least one founder has the second MSc degree
%MSc2	% of founders with the second MSc degree in the founders' team	Sum_years_MSc2	Sum of years of the second MSc education among founders' team
sum_studies	sum of years of study for all the founders	avg_studies	Average of years of study for all the founders
sum_jobs-pre	sum of years of work experiences for all the founders before the startup was found	sum_jobs-exit	sum of years of work experiences for all the founders before the startup was acquired
avg_jobs-pre	average of years of work experiences for all the founders before the startup was found (sum_jobs-pre / N_founders)	avg_jobs-exit	average of years of work experiences for all the founders before the startup was acquired (sum_jobs-pre / N_founders)
sum_CEO_pre	sum of years of work experience as a chief executive (CEO) of all the founders before the startup was founded	TargetCountryCode	The geographical location. North: Finland, Sweden, Danemark; South: Portugal, Spain, Italy; East: Bulgaria, Poland; West: France, Germany, UK, Belgium, Ireland, Netherlands; IE: Israel
dummy_CEO_Pre	= 1 if at least one founder was CEO of another company before the startup was founded	Tot_VC	= 1 if the Number of VC invested in the startup is higher than median
Industry	Industry	Deal_date	The year of acquisition
Sum_study_abroad	Sum of years studied abroad for founders' team	Dummy_study_abroad	=1 if at least one of founders has studied abroad
Sum_ind_exp and avg_ind_exp	Sum and average of years of work experience in the industry of startup		

4. Descriptive statistics and data analysis

The first step in the exploratory analysis was to check the distributions. After the implementation of three different scales - the quadratic one, the square root, and the logarithmic one – it was decided to turn the startup's acquisition value variable to a logarithmic scale.

To assess the potential connections of numeric variables, the correlation matrix was built and witnessed the absence of strong correlation with the dependent variable. Then we assessed the overall distribution of all the variables together. To avoid the disruption of the regression results, we standardized the values of all the numeric variables with the Python package StandardScaler. After eliminating the outliers, in dataset there remained 167 observations.

To check our hypotheses about the effect of external and internal signals on the value of the acquisition, the OLS regression model was run. After some iterations, we have achieved the best performing model in terms of R^2 and the number of significant variables. After running of the Lasso regularizer and deleting unimportant variables, we get the regression model (Figure 1).

	Dependent variable:
	(1)
Avg_ind_exp	0.175 **
	(0.083)
Deal_year	0.035 *
	(0.021)
Industry_Software	-0.588 ***
	(0.152)
N_founders	0.227 ***
	(0.068)
Targetcountrycode_IE	1.083 ***
	(0.34)
Targetcountrycode_North	0.331 *
	(0.196)
Targetcountrycode_South	-0.368
	(0.299)
avg_jobspre	-0.147 *
	(0.079)
const	-70.908 *
	(41.345)
dummy_MSc	0.265 *
	(0.147)
sum_years_PhD	-0.173 **
	(0.075)
tot_VC	0.459 ***
	(0.165)
Observations	167.0
R^2	0.358
Adjusted R^2	0.312
Residual Std. Error	0.8(df = 155.0)
F Statistic	7.843 ***(df = 11.0; 155.0)
Note:	*p<0.1; **p<0.05; ***p<0.01

Figure 1: Regression model after improvements

The hypotheses about external and internal signals was partially confirmed. Six significant variables (except of control ones) are: average experience in the field of startup (among founders); number of founders; average total experience before startup; fact of master's degree; sum years of PhD education; amount of VC investors. The Lasso regularizer defines the Number of founders and the number of VCs above the median as the most important variables. This conclusion could be used in the third hypotheses about the pure effect of the internal signals. Several evaluation tests of the model output showed that the model can be accepted, and it can work well both for predicting and generalizing.

For the second hypothesis (the one about different values of signals in different regions), the interaction analysis was done. The sense of the interaction term is aligning different variables via multiplication and assuming that they happen at the same time.

With the help of python libraries "PolinomialFeatures" we have iteratively checked all the combinations of variables, which are presented in the regression model (in its frames). As we see from Figure 2, the variables "Number of invested VC above the median", "Number of founders", "Sum of experience in the field of a startup", dummy "Study abroad" have interacted with geographical location variables. So, in Western countries (France, Germany, UK, Belgium, Ireland, Netherlands), according to the model, "The number of founders" and "the amount of VC invested before the acquisition" are more valuable. In southern countries (Italy, Spain, Portugal), more valuable are "The sum of prior experience in the field of startup" and "Dummy of Study Abroad". The second hypothesis has confirmed as well.

```
------------------------------------------------
                                    pval      beta
tot_VC:Targetcountrycode_South  0.051674  1.362495
------------------------------------------------
                                   pval      beta
tot_VC:Targetcountrycode_West  0.075599 -0.547383
------------------------------------------------
                                     pval      beta
N_founders:Targetcountrycode_West  0.055359 -0.257287
------------------------------------------------
                                       pval      beta
Sum_Ind_Exp:Targetcountrycode_South  0.039737 -0.721208
------------------------------------------------
                                          pval      beta
Dummy_studyAbroad:Targetcountrycode_South  0.051674  1.362495
------------------------------------------------
```

Figure 2: Values of interaction terms

To test the third hypothesis about additive effect of external and internal signals, the difference-in-difference approach was used, with the significant coefficients from the regression model. Every non-binary variable was transformed into binary by its division below and above the median. Then the dataset was sliced on two parts according to the treatment - "Number of VCs below/above median". Therefore, now in one subset, there are only observations, which correspond to the number of invested VC below the median and the second subset - above the median. Then we built the regression models for each subset, where the dependent variable is the acquisition valuation and independent - one of the previously chosen variables. The difference between the beta coefficients will be the difference in difference estimation. Only one variable remained significant for this type of analysis – "Dummy MSc". Figure 3 presents the model.

	Dependent variable:	
	VC above median	VC below median
	(1)	(2)
const	0.043	-0.552***
	(0.165)	(0.147)
dummy_MSc	0.355*	0.421**
	(0.201)	(0.208)
Observations	89.0	78.0
R^2	0.035	0.051
Adjusted R^2	0.024	0.039
Residual Std. Error	0.887(df = 87.0)	0.917(df = 76.0)
F Statistic	3.132*(df = 1.0; 87.0)	4.118**(df = 1.0; 76.0)
Note:		*p<0.1; **p<0.05; ***p<0.01

Figure 3: Difference-in-difference regression table

One can see that the coefficients of both subsets are significant. The coefficient for firms with amount of invested VC above the median is lower than in lower subset. It means, that the M&A investors value the master's degree lower if in the past the startup has received more amount of venture capital (or was invested by a larger amount of venture capitalists). Finally, one can conclude, that the third hypothesis remained not confirmed. The value of internal and external signals is not just additive in this case; the marginal effect has diminished.

5. Results and discussion

According to the first hypotheses, external (number of VC investments before IPO) and internal (education, prior experience, number of founders) signals have a positive effect on the high technology startups valuation. It has confirmed only partially because there was not simple effect between variables. OLS regression showed that according to education level only master's and Ph.D. degrees have significant effect on the value of the acquisition. The PhD variable negative coefficient was an unexpected result. This non-trivial conclusion can be explained in terms of specific human capital. The entrepreneurial success may depend not only on education

level but also on specific skills and "competences and agree upon the importance of the following set: perseverance, flexibility, opportunity recognition or market awareness, self-efficacy and social skills" (Markman, Baron; 2003; Driessen, 2005). Therefore, a master's degree may be enough threshold after which the relevant working experience is more important and gives more reliable skills. The slightly negative coefficient of average work experience before M&A may be explained as after a certain degree of experience it is more important to get specific but not generic skills (Van Teeflen, Uhlaner & Driessen, 2011). In any case, this topic can have a potential for further research.

The second hypothesis was totally confirmed. The interaction coefficients were different for different regions. A conclusion can be derived, that local institutional environment affects the level of information asymmetry and the types of signals, which can have a different value in different regions.

The third hypothesis was rejected. The difference in difference analysis has shown that internal and external signals have substantive, but non-additive effect. The conclusion is that the investors value MSc more in startups, where there were fewer VCs before. It can be explained via the paradigm, where strong signals are suppressing the weaker ones (Khoury, Junkunc & Deeds, 2013). In other words, every signal has two components: (1) a certification effect ("real" signal, meaning that just because the founders of a certain firm have MSc degrees, the investors make a higher valuation); and (2) a substantive benefit: with educated founders the firm will be better managed and it will reach higher performance and results, turning into a higher valuation.

For the firms that were VC-backed, we expect the certification effect associated to MSc to be null (if there is already a VC, information asymmetries are reduced and there is no need for the investors to look for other signals), while the substantive benefit will be present anyway, by definition. This means that making the difference between the coefficient of MSc obtained in the model for non-VC backed companies (certification + substantive benefit) and the coefficient for VC-backed companies (only sub benefit), we obtain the certification effect associated with MSc.

Finally, the work has a strong managerial implication. It provides the guide to young firms, which parts of their strategy they may focus on, to use the right signals, make the information asymmetry lower, and benefit from the higher exit prices of M&A valuation.

References

Akerlof, G. (1970) "The Market for Lemons: Quality Uncertainty and the Market Mechanism," *Quarterly Journal of Economics,* Vol. 84, pp 488–500.

Arcot, S., Fluck, Z., Gaspar, J.M. and Hege, U. (2015) "Fund managers under pressure: Rationale and determinants of secondary buyouts", *Journal of Financial Economics*, Vol. 115, No. 1, pp 102-135.

Balakrishnan, K., Vashishtha, R. and Verrecchia, R.E. (2019) "Foreign competition for shares and the pricing of information asymmetry: Evidence from equity market liberalization", *Journal of Accounting and Economics*, Vol. 67, No. 1, pp 80-97.

Bell, R.G., Filatotchev, I. and Aguilera, R.V. (2014) "Corporate governance and investors' perceptions of foreign IPO value: An institutional perspective", *Academy of Management Journal*, Vol. 57, No. 1, pp 301-320.

Cacciolatti, L., Rosli, A., Ruiz-Alba, J.L. and Chang, J. (2020) "Strategic alliances and firm performance in startups with a social mission", *Journal of Business Research*, Vol. 106, pp 106-117.

Certo, S.T. (2003) "Influencing initial public offering investors with prestige: Signaling with board structures", *Academy of Management Review*, Vol. 28, No. 3, pp 432-446.

Colombo, M. G., Meoli, M., & Vismara, S. (2019). "Signaling in science-based IPOs: The combined effect of affiliation with prestigious universities, underwriters, and venture capitalists", *Journal of Business Venturing*, Vol. 34, No. 1, pp 141-177.

Driessen, M. (2005) *E-scan Ondernemerstest: beoordeling en ontwikkeling van ondernemerscompetenties (E-scan Entrepreneurship Test: Evaluation and Development of Entrepreneurial Competences)*, Entrepreneur Consultancy, Gravenland.

Hoenen, S., Kolympiris, C., Schoenmakers, W. and Kalaitzandonakes, N. (2014) "The diminishing signaling value of patents between early rounds of venture capital financing", *Research Policy*, Vol. 43, No. 6, pp 956-989.

Hsu, D. and Ziedonis, R. (2013) "Resources as dual sources of advantage: Implications for valuing entrepreneurial-firm patents", *Strategic Management Journal,* Vol. 34, No. 7, pp 761-781.

Jeong, J., Kim, J., Son, H. and Nam, D. I. (2020) "The Role of Venture Capital Investment in Startups' Sustainable Growth and Performance: Focusing on Absorptive Capacity and Venture Capitalists' Reputation", *Sustainability*, Vol. 12, No. 8, 3447.

Kang, J.-K. and Kim, J.-M. (2010) "Do foreign investors exhibit a corporate governance disadvantage? An information asymmetry perspective", *Journal of International Business Studies*, Vol. 41, No. 8, pp 1415–1438.

Khoury, T.A., Junkunc, M. and Deeds, D. L. (2013) "The social construction of legitimacy through signaling social capital: Exploring the conditional value of alliances and underwriters at IPO", *Entrepreneurship Theory and Practice*, Vol. 37, No. 3, pp 569-601.

Köhn, A. (2018) "The determinants of startup valuation in the venture capital context: a systematic review and avenues for future research", *Management Review Quarterly*, Vol. 68, No. 1, pp 3-36.

Kok, B.C., Choi, J.S., Oh, H. and Choi, J.Y. (2019) "Sparse Extended Redundancy Analysis: Variable Selection via the Exclusive LASSO", *Multivariate behavioral research*, pp 1-21.

Lee, S.M. and Lee, B. (2015) "Entrepreneur characteristics and the success of venture exit: an analysis of single-founder start-ups in the US", International Entrepreneurship and Management Journal, Vol. 11, No. 4, pp 891-905.

Li, L. (2009), *Information asymmetry in the takeover market*. Doctoral dissertation, Hong Kong, The Hong Kong Polytechnic University.

Markman, G. and Baron, R. (2003) "Person-entrepreneurship fit: why some people are more successful as entrepreneur than others", *Human Resource Management Review*, Vol. 13, pp 281–301.

Moeller, S.B. and Schlingemann, F.P. (2005) "Global diversification and bidder gains: A comparison between cross-border and domestic acquisitions", *Journal of Banking and Finance*, Vol. 29, No. 3, pp 533–564.

Officer, M.S. (2007) "The Price of Corporate Liquidity: Acquisition Discounts for Unlisted Targets", *Journal of Financial Economics*, Vol. 83, No. 3, pp 571–598.

Parastuty, Z., Breitenecker, R.J., Schwarz, E.J. and Harms, R. (2016). *Exploring the reasons and ways to exit: The entrepreneur perspective*. In: D. Bögenhold, J. Bonnet, M. Dejardin, D. Garcia Perez de Lema (eds), Contemporary entrepreneurship. Springer, pp 159-172.

Pollock, T. G., Chen, G., Jackson, E. M. and Hambrick, D. C. (2010) "How much prestige is enough? Assessing the value of multiple types of high-status affiliates for young firms", *Journal of Business Venturing*, Vol. 25, No. 1, pp 6-23.

Reuer, J. J., Tong, T. W., & Wu, C. W. (2012). A signaling theory of acquisition premiums: Evidence from IPO targets. Academy of Management Journal, 55(3), 667-683.

Russell, M. (2016) "The valuation of pharmaceutical intangibles", Journal of Intellectual Capital, Vol. 17, No. 3, pp 484-506.

Spence, M. (1973) "Job market signaling", *The Quarterly Journal of Economics*, Vol. 87, No 3, pp 355–374.

Stuart, T.E., Hoang, H. and Hybels, R.C. (1999) "Interorganizational endorsements and the performance of entrepreneurial ventures", *Administrative Science Quarterly*, Vol 44, No. 2, pp 315–349.

Van Teeffelen, L., Uhlaner, L. and Driessen, M. (2011) "The importance of specific human capital, planning and familiarity in Dutch small firm ownership transfers: a seller's perspective", *International Journal of Entrepreneurship and Small Business*, Vol. 14, No. 1, pp 127-148.

Wasserman, N. (2017) "The throne vs. the kingdom: Founder control and value creation in startups", *Strategic Management Journal*, Vol. 38, No. 2, pp. 255-277.

Wu, C.W., Reuer, J. and Ragozzino, R. (2013) *Insights of signaling theory for acquisitions research*. In: C. Cooper, S. Finkelstein (eds). Advances in Mergers and Acquisitions, Emerald Publishing, pp 173-191.

The Role of Long-Term Orientation, Strategic Planning, and Family Involvement in CSR Policies: A Conceptual Framework

Nikola Rosecká, Ondřej Machek, Michele Stasa and Aleš Kubíček
Department of Strategy, Faculty of Business Administration, Prague University of Economics and Business, Czech Republic
nikola.rosecka@vse.cz
ondrej.machek@vse.cz
stam02@vse.cz
ales.kubicek@vse.cz
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Abstract: Corporate social responsibility (CSR) belongs to the leading topics of management research and is closely connected to corporate long-term orientation (LTO). At the same time, family firms represent the most prevalent organizational form of business. The goal of this paper is to theoretically investigate the interplay of possible predictors of the adoption of CSR policies: long-term orientation, strategic planning, and family involvement. Based on a literature review, this paper presents a conceptual framework focusing on corporate social responsibility policies' determinants. We present five theoretical propositions, which constitute a moderated mediation model. First, we argue that the relationship between LTO and CSR is partially mediated by strategic planning. We assume that because of futurity and perseverance, a positive direct relationship exists between long-term orientation and CSR. Through futurity and continuity, long-term orientation is also assumed to positively affect strategic planning, which, in turn, also affects CSR. Furthermore, we present arguments for the fact that both relationships are moderated by family involvement. Specifically, family involvement in the firm is assumed to weaken the above relationships because of the inherent long-term orientation of family firms and their quest for protection their socioemotional wealth. The paper's main value added is that we present a bridge between the management and the family business literature by considering three components of LTO: futurity, continuity, and perseverance. Unlike many authors, we consider that family involvement is not a binary variable but rather a continuous variable, and following some authors, we also consider that it is not a predictor but a moderator. The theoretical model is applicable to all kinds of firms, ranging from firms with no family involvement to pure family firms. For each variable in the proposed model, we suggested measurement and scales which have been already validated by the existing literature. In the last part of the paper, we mentioned limitations and future research directions

Keywords: corporate social responsibility, long-term orientation, strategic planning, family involvement

1. Introduction

The world is changing rapidly in recent years, and firms experience globalization and face environmental and climate issues on a daily basis. Companies can quickly share information and resources around the world in an unprecedented manner. According to Bénabou and Tirole (2010), corporate social responsibility (CSR) can be seen as one of the responses to these trends. Unsurprisingly, corporate social responsibility belongs to prominent management research areas (Turker, 2009). CSR activities brings many benefits, but at the same time, they require investments, not only monetary but also from human resources and time management points of view. Although many authors theorize that corporate social responsibility is particularly pronounced in family firms because of their strong ties with the community and care about corporate reputation, the idea is not unanimously supported by empirical evidence (Klein et al, 2018). On the other hand, there is a consensus in the literature that CSR is an activity with long-term consequences (Flammer and Bansal, 2017), and hence, it can be assumed that it strongly depends on a firm's long-term orientation (LTO). LTO is approached inconsistently in the current management literature and does not belong to frequently investigated constructs, as opposed to the family business literature, where LTO is investigated both theoretically and empirically on a very frequent basis (Chandler et al, 2016).

Long-term orientation seems to be a multi-level construct and can refer to attitudes of individuals, companies, or cultures (e.g. Hofstede et el, 2010). Among these, the temporal orientation received relatively less attention at the corporate level (Flammer and Bansal, 2017). Often, corporate LTO is considered to be a synonym for futurity. However, findings from family business literature suggest that futurity is merely one dimension of LTO and that LTO is a multi-faceted construct consisting of futurity, continuity, and perseverance (Brigham et al, 2014). In this regard, f*uturity* refers to the idea that owners derive utility from the focus on and planning for the

future. Continuity assumes that stability and durability over time create future value in the business, and perseverance refers to the current eagerness achieves the desired future states.

Even though the tripartite view of LTO was initially suggested for family businesses, there is no reason to believe that it is limited to family firms only. The general management literature offers many references to suggest the contrary. For instance, futurity is considered to be one of six dimensions of general strategic orientation (Venkatraman, 1989). Several authors highlight the strong link between long-term strategies and corporate stability (i.e., continuity) (Gong and Ho, 2018; Machek et al, 2019). Finally, perseverance is mentioned as one of the possible dimensions of entrepreneurial orientation applicable to all kinds of businesses (e.g. Gerschewski et al, 2016).

In this conceptual paper, we aim to bridge the family business and general management literature by theoretically investigating how LTO affects corporate CSR activities through the three dimensions of LTO. We present five key propositions, which constitute a moderated mediation model consisting of LTO, strategic planning, CSR, and family involvement. Besides showing how the general management literature can borrow from the family business literature, we also contribute to the stream of conceptual research which examines the effects of LTO on corporate behaviour (e.g. Lumpkin et al, 2010).

The first section presents five main propositions of the paper, and subsequently, we operationalize the model by suggesting suitable measures to test the framework. Finally, we provide a discussion along with concluding remarks.

2. Model development

Corporate social responsibility refers to sacrificing profits for others' well-being and social interest (Bénabou and Tirole, 2010). While being widely employed in managements studies, there is still a lack of understanding of its role within the firm's boundaries (Chatzoglou et al, 2017). The management literature mentions some of CSR's antecedents, such as external pressures, owner-manager values (Vázquez-Carrasco and López-Pérez, 2013), CSR costs or awareness (Chatzoglou et al, 2017). However, the literature clearly seems to prefer the prevalence of internal over external drivers of CSR (Vázquez-Carrasco and López-Pérez, 2013), and no study investigates the role of long-term corporate orientation in the adoption of CSR practices.

In the remainder of this section, we first elaborate on the relationship between LTO and CSR. Then, we discuss the relationship between LTO and strategic planning. Subsequently, we theorize about the strategic planning-CSR relationship. Finally, we discuss possible moderating effects of family involvement.

2.1 Long-term orientation and corporate social responsibility

CSR's importance differs across companies, industries, and countries, but socially responsible activities may generally improve the company's reputation and create business values. Specifically, CSR's known benefits are financial performance, reduced costs, enhanced quality, prestige, and consumer loyalty, among others (Chatzoglou et al, 2017). On the other hand, the CSR can be expensive. The benefits are not immediate and are likely to materialize in long term, while the costs are to be incurred in the short term (Graafland and Noorderhaven, 2020). According to Graafland and Noorderhaven (2020), LTO influences corporate social responsibility at two levels. At the societal level, LTO influences CSR policies through the firm's communication with its main stakeholders. At the company level, LTO may affect CSR more strongly through the decision maker's personality, including his/her beliefs, opinions, and personal values.

Long-term oriented companies adopt organizational values that emphasize the future and have the potential for better strategic decisions that recognize CSR investments' potential values and benefits (Wang and Bansal, 2012). As a consequence, long-term oriented businesses preferably adopt tools and technologies which support innovation, firms who apply LTO in corporate activities will align the interests of individual stakeholders, and lastly, for companies with LTO, it is easier to implement CSR (Wang and Bansal, 2012). Consequently, organizational LTO acts as a trigger that pressures managers to increase the efforts to engage in CSR practices (Bénabou and Tirole, 2010). Both the long-term view and the proactive behaviours oriented towards the future, which are signs of futurity and perseverance, can be expected to drive a firm's CSR activities. In other words:

Proposition 1: *Long-term orientation is positively related to CSR activities.*

2.2 Long-term orientation and strategic planning

Strategic planning is a dynamic process which, by definition, takes into account the factor of time. Strategic planning is a part of the strategic management and helps companies set the direction of the business. The management literature suggests that future orientation of executives is positively related to strategic planning. From that perspective, long-term orientation is a prerequisite for planning, and businesses with future orientation are more willing to assess the planning process with the aim to recognize and take into consideration potential long-term opportunities and threats. The degree of planning depends on executives' personality and their ability to use long-term perspective in decision-making processes (Harris and Ogbonna, 2006). The process of strategic planning includes the statement of long-term goals (Schendel and Hofer, 1979). Also, the detail and the degree of LTO are the key factors of implementing strategic planning and thinking into action (Stonehouse and Pemberton, 2002). From the psychology perspective, future-oriented individuals prefer patient actions that materialize in long-lasting outcomes (Das, 1987). As a result, at the company level, future-oriented firms are better prepared for possible future states (Lumpkin et al, 2010).

In firms with some family involvement, the need for securing the continuity in the family business (i.e. protection of socioemotional wealth in the form of renewal of family bonds through dynastic succession, see Berrone et al, 2012) will likely result in greater strategic planning (Saleem et al, 2019). Even in nonfamily firms, it can be expected that the desire for stability (or continuity) will result in more careful strategic planning (Powell, 1992). Therefore, we see two main components of LTO that drive the strategic planning activities: futurity and continuity. Overall, it can be assumed that:

Proposition 2: *Long-term orientation is positively related to strategic planning.*

2.3 Strategic planning and corporate social responsibility

The process of strategic planning has a specific goal – achieving a competitive advantage, while the sources of competitive advantage could be numerous and heterogeneous. By incorporating CSR into corporate strategy, businesses are able to enhance both social and corporate values. The way how corporations implement CSR activities differs between companies. These discrepancies are caused by many factors, for example by industry, size and culture. Tsoutsoura (2004) point out that CSR implementation is successful if CSR principles and policies are in line with strategic planning. Strategic planning is prerequisite for successful financial and CSR performance in all business organizations (McKiernan and Morris, 1994). Although CSR has received attention in recent years (Turker, 2009), there is not much empirical evidence about the causes of engagement in corporate social responsibility (Galbreath, 2010; Kalyar et al, 2013). Strategic planning sets the overall business direction and manages environmental adaption activities, including CSR (Kalyar et al, 2013).

Businesses with strategic planning are more willing but also more successful in creating awareness and incorporating CSR policies' needs to stakeholders (Galbreath, 2010). This is also supported by the findings of Kalyar et al (2013) who assume that the likelihood of developing CSR activities and policies is based on the degree in which employees and stakeholders are involved in the business. In addition, the identification of key stakeholders and their interest within the strategic planning process is the first step for successful CSR implementation (Falck and Heblich, 2007). As a result, assessing business stakeholders in strategic planning seems to be a crucial part of CSR. Apparently, strategic planning helps businesses engage in and be aware of CSR activities' importance, and thus, we expect the existence of a direct link between strategic planning and CSR. In other words, it can be assumed that:

Proposition 3: *Strategic planning is positively related to corporate social responsibility.*

2.4 Moderating effects of family involvement

In firms with family involvement, long-term orientation helps set the firm's strategic direction (Ward, 1988). Generally, family firms have an extended planning horizon (Zellweger, 2007) but do not necessarily engage in strategic planning. On the contrary, many family business researchers believe family firms are reluctant to do formal strategic plans (Quinn et al, 2018, p. 6). This reluctance is due to the fact that family firms' management systems and processes tend to be less formalized (and more flexible) than those of nonfamily firms. Thus, while it can be expected that generally, strategic planning is positively related to LTO (P2), in firms with strong family involvement, we expect that the relationship will be weaker, as expressed in Figure 1. Being inherently long-

term oriented (Lumpkin et al, 2010), with an additional "unit" of LTO, family firms do not engage to such an extent in strategic planning as do firms with no or weak family involvement. Thus, we propose that:

> ***Proposition 4:*** *The relationship between LTO and strategic planning is negatively moderated by family involvement.*

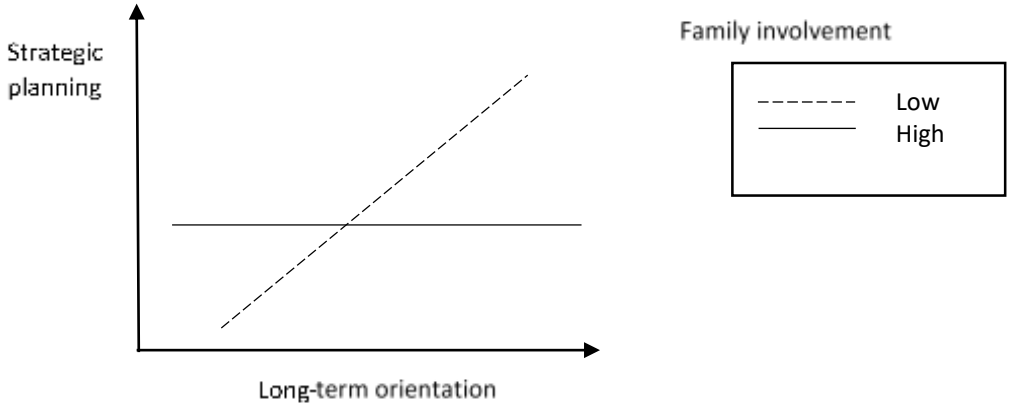

Figure 1: Moderating effect of family involvement on the LTO-strategic planning relationship

Family firms are sometimes believed to engage more in corporate social responsibility activities than nonfamily firms (Brunninge et al, 2020). This behaviour can be explained by their efforts to protect the socioemotional wealth, especially when it comes to the protection of firm's reputation and preservation of strong ties with the community (Berrone et al, 2012). Like in the previous paragraph, then, we expect that because family firms are long-term oriented (Lumpkin et al, 2010) and more tied to their stakeholders (i.e. willing to pursue CSR activities), an additional "unit "of LTO will not increase their propensity to engage in CSR, as opposed to firms with weak or no family involvement. Figure 2 illustrates the expected relationship. Alternatively, we suggest that:

> ***Proposition 5:*** *The relationship between LTO and CSR is negatively moderated by family involvement.*

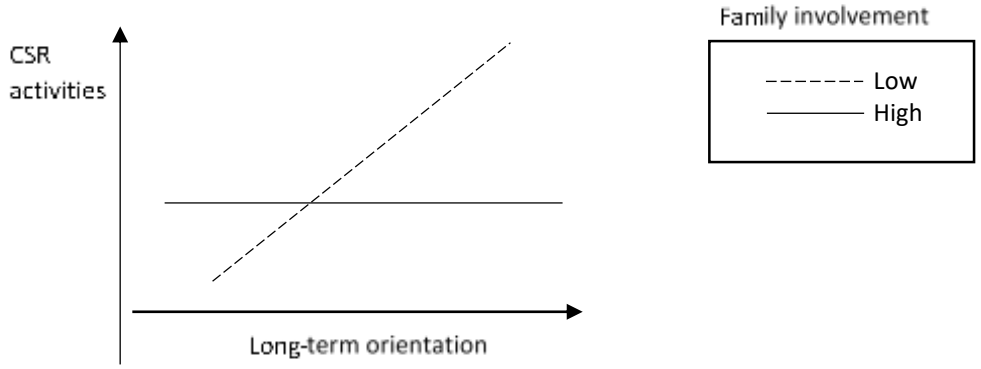

Figure 2: Moderating effect of family involvement on the LTO – CSR relationship

3. Model operationalization

Figure 3 displays the expected relationships. The five propositions constitute a moderated mediation model with four variables.

The propositions can be tested using a structural equation modelling tool, or alternatively, we suggest using IBM SPSS using Hayes' (2018) conditional process analyses (PROCESS) software. For measurement models, we assume using the following scales validated by the existing business research. To measure firms' *long-term orientation*, we suggest using Brigham's et al (2014) construct consisting of futurity, continuity, and perseverance. Despite having been developed for family firms, we suggest adapting the wording of the questions to all businesses. To assess *strategic planning*, we suggest using the three-item scale developed by Eddleston et al (2008). As *corporate social responsibility* is likely not a single-faceted construct, we suggest using the Turker's

(2009) CSR measure to four critical company stakeholders - customers, employees, government, and social and non-social stakeholders. Finally, to capture all firms' heterogeneity, including family firms, *family involvement* can be measured using the family firm identity scale presented by Uhlaner et al (2015). The analysis should also control for other variables that can affect the adoption of CSR practices, such as firm size, firm age, and firm industry affiliation.

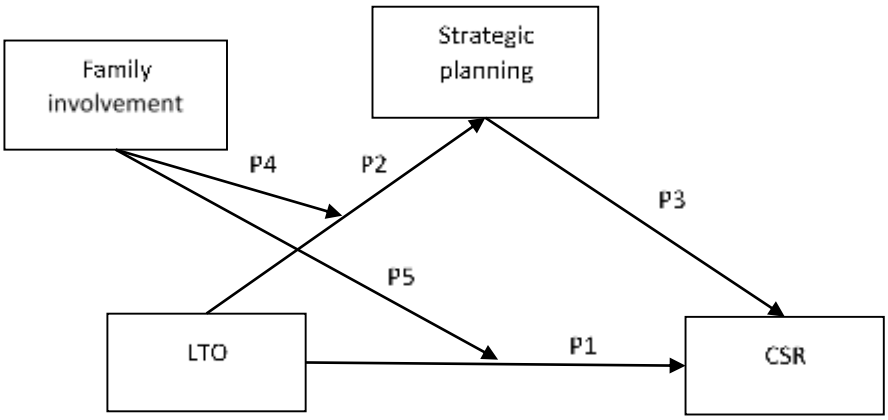

Figure 3: Proposed model

4. Discussion and conclusion

In this conceptual paper, we proposed a mediation model and expected relationships between selected predictors of CSR practices' adoption with a particular focus on long-term orientation. Activities, policies and actions which are in line with corporate social responsibility are being widely include in business's processes. Most of the companies realize that CSR is not only beneficial at the company level, but it is beneficial for employees, consumers, stakeholders and even more for communities. LTO affects the adoption of CSR, both directly and indirectly, through strategic planning. Directly, we assume long-term orientation may act as a trigger of implementing CSR activities. Indirectly, LTO is essential for successful strategic planning which in result positively influence awareness of CSR. Additionally, family involvement moderates the relationship between LTO and strategic planning, and between LTO and CSR, in the sense that it weakens these relationships.

For sure, a relevant issue to address is how to test the hypothesized relationships. Regarding data analysis, moderated mediations can be approached by a structural equation modelling tool, such as SPSS AMOS along with Hayes' (2018) PROCESS macro. For data collection, a survey, employing either the CATI or the CAWI method, could be carried out among key-informants (i.e. directors or CEOs), who are assumed to be well informed about the business processes. There is evidence justifying the appropriateness of the single-respondent design in studies related to family business (Herrero, 2018) and moreover, unlike sensitive constructs (e.g. conflicts), the proposed constructs in our model do not heavily suffer from an asymmetric perception.

The framework is novel in several ways and thus presents multiple contributions to the management literature. First, we present a bridge between the management and the family business literature by considering the role of three overlapping but not necessarily equal components of LTO: futurity, continuity, and perseverance. Second, we do not consider the family identity of a firm as a binary variable; instead, we assume that there is a broad range of business, some of which have no family involvement at all, some can be classified as "pure family firms", and other firms are heterogeneous with various degrees of family involvement. This way, we address the current need for capturing family firms' heterogeneity (Fang et al, 2019). Finally, we follow several recent authors who consider that family involvement can act as a moderator, not a predictor in research models (e.g. Uhlaner et al, 2015).

From the practical viewpoint, we build on the fact that strategic planning, making the right decisions, and focusing on long-term is crucial in all business organizations. Our model suggests that long-term orientation is not a sufficient condition for the adoption of CSR practices, nor is the family involvement. More specifically, in pure family firms, CSR is assumed to only be predicted by strategic planning, so if family firms wish to improve their CSR practices, they should focus on preparing and implementing formal strategic plans. In firms with no family involvement at all, CSR also depends on their long-term orientation, both through the long-term view and perseverance, i.e. proactive behaviours oriented toward achieving future goals. Thus, to implement and adopt

CSR practices, nonfamily firms should emphasize long-term values and continuity in their corporate culture along with an emphasis on strategic planning. Moreover, our findings can help companies identify how to quickly and more easily adapt CSR policies while using LTO and strategic planning in the proper manner. As a result, companies can achieve direct effects of CSR in a shorter time, making them more competitive. In addition, companies who are better at adapting CSR build awareness in the community, which may be reflected in financial performance. Especially for family firms, which are assumed to engage in CSR to a greater extent (Zeng, 2020), the awareness of how family involvement affects business and CSR implementation may help managers identify the appropriate level of family involvement from which the firm may benefit. This is very important for "pure family firms" because a high level of family involvement negatively affects CSR communication and performance (Venturelli et al., 2020).

However, we acknowledge that this paper also has several limitations. First, there can be other, lurking variables that represent possible drivers of CSR. Indeed, according to Galbreath (2010), strategic planning is not the only driver of developing corporate social responsibility; for instance, cultural characteristics may also influence the firm's ability to develop CSR (Kalyar et al, 2013). Second, taking into considerations specific interests and stakeholder's motivation could sufficiently explain the level and speed of incorporating CSR. The manner and effectiveness in CSR implementation can be crucial for public perception and thus be fundamental to differentiate from the competitors. Third, LTO of family businesses can also be dynamic; when the socioemotional wealth is threatened, family firms can lose their long-term orientation, which could change their behaviour (Chrisman and Patel, 2012), and ultimately, the myopic loss aversion could alter the expected moderating effects of family involvement in our model. Finally, the model is theoretical and needs to be addressed by future research. Consequently, further research should focus on testing the propositions.

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References

Bénabou, R. and Tirole, J. (2010) "Individual and corporate social responsibility", *Economica*, Vol 77, No. 305, pp 1-19.

Brigham, K. H., Lumpkin, G. T., Payne, G. T. and Zachary, M. A. (2014) "Researching long-term orientation: A validation study and recommendations for future research", *Family Business Review*, Vol 27, No. 1, pp 72-88.

Brunninge, O., Plate, M. and Ramirez-Pasillas, M. (2020) "Family Business Social Responsibility: Is CSR Different in Family Firms?", In Emotions and Service in the Digital Age. Emerald Publishing Limited.

Chandler, J. A., Zachary, M. A., Brigham, K. H. and Payne, G. T. (2016) "Long-term orientation: Reviewing the past and identifying future opportunities for family business research". In The Routledge Companion to Family Business (pp 100-119). Routledge.

Chatzoglou, P., Chatzoudes, D., Amarantou, V. and Aggelidis, V. (2017) "Examining the antecedents and the effects of CSR implementation: an explanatory study", *EuroMed Journal of Business*, Vol. 12 No. 2, pp. 189-206.

Chrisman, J. J. and Patel, P. C. (2012) "Variations in R&D investments of family and nonfamily firms: Behavioral agency and myopic loss aversion perspectives", *Academy of management Journal*, Vol 55, No. 4, pp 976-997.

Das, T. K. (1987) "Strategic planning and individual temporal orientation", *Strategic management journal*, Vol 8, No. 2, pp 203-209.

Eddleston, K. A., Kellermanns, F. W. and Sarathy, R. (2008) "Resource configuration in family firms: Linking resources, strategic planning and technological opportunities to performance", *Journal of Management Studies*, Vol 45, No. 1, pp 26-50.

Falck, O. and Heblich, S. (2007) "Corporate social responsibility: Doing well by doing good ", *Business horizons*, Vol *50*, No. 3, pp 247-254.

Fang, H., Kellermanns, F. W. and Eddleston, K. A. (2019) "Empirical Modeling in Testing for Family Firm Heterogeneity". In: Memili E., Dibrell C. (eds), The Palgrave Handbook of Heterogeneity among Family Firms. Cham: Palgrave Macmillan.

Flammer, C. and Bansal, P. (2017) "Does a long-term orientation create value? Evidence from a regression discontinuity", *Strategic Management Journal*, Vol 38, No. 9, pp 1827-1847.

Galbreath, J. (2010) "Drivers of corporate social responsibility: The role of formal strategic planning and firm culture", *British Journal of Management*, Vol 21, No. 2, pp 511-525.

Gerschewski, S., Lindsay, V. J. and Rose, E. (2016) "Advancing the entrepreneurial orientation construct: the role of passion and perseverance", *Review of International Business and Strategy*, Vol 26, No. 4, pp 446-471.

Gong, Y. and Ho, K. C. (2018) "Does corporate social responsibility matter for corporate stability? Evidence from China", *Quality & Quantity*, Vol 52, No. 5, pp 2291-2319.

Graafland, J. and Noorderhaven, N. (2020) "Culture and institutions: How economic freedom and long-term orientation interactively influence corporate social responsibility", *Journal of International Business Studies*, pp 1-10.

Harris, L. C. and Ogbonna, E. (2006) "Initiating strategic planning", *Journal of Business Research*, Vol 59, No. 1, pp 100-111.

Herrero, I. (2018) "How Familial Is Family Social Capital? Analyzing Bonding Social Capital in Family and Nonfamily Firms", *Family Business Review*, Vol 31, No. 4, pp 441-459.

Hofstede, G., Hofstede, G.J. and Minkov, M. (2010) "Cultures and Organizations: Software of the Mind". Revised and Expanded. New York: McGraw-Hill.

Kalyar, M. N., Rafi, N. and Kalyar, A. N. (2013) "Factors affecting corporate social responsibility: An empirical study*", Systems Research and Behavioral Science*, Vol 30, No. 4, pp 495-505.

Klein, J., Cruz, C. and Milanov, H. (2018) "Is social responsibility really "corporate"? The impact of family foundations on CSR". In Academy of Management Proceedings. Briarcliff Manor, NY 10510: Academy of Management.

Lumpkin, G. T., Brigham, K. H. and Moss, T. W. (2010) "Long-term orientation: Implications for the entrepreneurial orientation and performance of family businesses", *Entrepreneurship & Regional Development,* Vol 22, No. 3-4, pp 241-264.

Machek, O., Hnilica, J. and Lukeš, M. (2019) "Stability of family firms during economic downturn and recovery", *Journal of East European Management Studies*, Vol 24, No. 4, pp 566-588.

McKiernan, P. and C. Morris (1994) "Strategic planning and financial performance in UK SMEs: does formality matter?", *British Journal of Management*, Vol 5 (Special Issue), pp S31–S41.

Powell, T. C. (1992) "Strategic planning as competitive advantage", *Strategic management journal*, Vol 13, No. 7, pp 551-558.

Quinn, M., Hiebl, M. R., Moores, K. and Craig, J. B. (2018) "Future research on management accounting and control in family firms: suggestions linked to architecture, governance, entrepreneurship and stewardship", *Journal of Management Control*, Vol 28, No. 4, pp 529-546.

Saleem, I., Siddique, I. and Ahmed, A. (2019) "An extension of the socioemotional wealth perspective", *Journal of Family Business Management*, Vol 10, No. 4, pp 293-312.

Schendel, D. E. and Hofer, C. W. (1979) *Strategic management: A new view of business policy and planning*. Boston: Little, Brown.

Stonehouse, G. and Pemberton, J. (2002) "Strategic planning in SMEs – some empirical findings", *Management Decision*, Vol 40, No. 9, pp 853–861.

Tsoutsoura, M. (2004) "Corporate Social Responsibility and Financial Performance ", Working paper, Haas School of Business, University of California, Berkeley.

Turker, D. (2009) "Measuring corporate social responsibility: A scale development study", *Journal of business ethics*, Vol 85, No. 4, pp 411-427.

Uhlaner, L. M., Matser, I. A., Berent-Braun, M. M. and Flören, R. H. (2015) "Linking bonding and bridging ownership social capital in private firms: Moderating effects of ownership–management overlap and family firm identity", *Family Business Review*, Vol 28, No. 3, pp 260-277.

Vázquez-Carrasco, R. and López-Pérez, M. E. (2013) "Small & medium-sized enterprises and Corporate Social Responsibility: a systematic review of the literature", *Quality & Quantity*, Vol 47, No. 6, pp 3205-3218.

Venkatraman, N. (1989) "Strategic orientation of business enterprises: The construct, dimensionality, and measurement", *Management science*, Vol 35, No. 8, pp 942-962.

Venturelli, A., Principale, S., Ligorio, L., & Cosma, S. (2020) "Walking the talk in family firms. An empirical investigation of CSR communication and practices", *Corporate Social Responsibility and Environmental Management,* Vol 28, No. 1, pp 497-510.

Zellweger, T. (2007) "Time horizon, costs of equity capital, and generic investment strategies of firms", *Family business review*, Vol 20, No. 1, pp 1-15.

Zeng, T. (2020). Corporate social responsibility (CSR) in Canadian family firms. *Social Responsibility Journal*.

Disruptive Technological Innovation and Organizational Agility Development: Do They Build Workforce Resilience?

Nibedita saha[1, 1], Tomas Sáha[1], Aleš Gregar[2] and Petr Sáha[1,2]
[1]Footwear Research Centre, University Institute, Tomas Bata University in Zlín, Czech Republic
[2]University Institute, Tomas Bata University in Zlín, Czech Republic
nibedita@utb.cz
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Abstract: This paper deals with enlightening the significance of organizational learning and strategic human resource management's (SHRM's) impact on combining disruptive technological innovation for boosting workforce resilience and organizational agility development. Currently, disruptive technological innovation and organizational agility concept both the approaches are considered as a novel approach that plays a crucial role in enhancing organizational competitiveness as well as creating future workforce resilience. This study attempts to answer the research question on how disruptive technological innovation and organizational agility can enable workforces to strengthen their innovative capabilities and enhances their flexibility to adopt the challenges of interference. This paper also tries to demonstrate that learning agility essentially strengthens a human instinct to learn, adapt, unlearn, and relearn which reveals a progressive path to keep pace with the ever- changing conditions and figure out new ways to navigate them without knowing what to do. The main aim of this paper is to exemplify and highlight the significance of disruptive technology and its innovative approaches that foster organizational learning to take the lead in re-inventing the workforce and ensuring organizational stability through organizational agility development. As, organizational learning concept and organizational agility is the reinforcement of creating a unique environment for organizational knowledge and performance development within the organization that empowers existing workforces to face the competitive challenges of knowledge growth opportunities. Conclusively, this paper also explicates the conceptualization of organizational agility and organizational learning process, with the spirit of organizational innovativeness through agile features of an organization that enable firms to combine their existing tacit and explicit knowledge to respond the threat of disruptive innovation technologies by upgrading SHRM's capabilities and practices.

Keywords: disruptive technology, organizational agility, organizational innovativeness, organizational learning, resilience, strategic human resource management

1. Introduction

In the era of disruptive innovation (DI) and technological revolution, the implication of organizational learning (OL) concept and organizational agility (OA) concept has been viewed as an important gadget of high-performance oriented organizations (HPOs) which enable them to enhance their workforce resilience and restored better management system. This paper primarily contemplates the prominence and consequence of organizational learning (OL) and its impact on relating disruptive technological innovation for organizational agility (OA) development. Where, it also determines the significant perceptions of organizational agility and its values on SHRM that reflects on sustainable organizational learning as well as disruptive technological innovation (i.e., knowledge development). Essentially, this area of study is considered as an interdisciplinary as well as multidisciplinary research approach, where multi-stakeholders', (i.e., academic community, business community, industrialists, management experts, policy makers, scientific community, and technologists) took initiatives to combine their tacit and explicit knowledge to respond the technological surveillance promptly and flexibly. Research in this area displays that through organizational innovativeness business meets the challenges of the dynamic world. Where, the essence of organizational knowledge, organizational nimbleness and distinction of human resource management strategy is viewed as an eminent approach to face the inclusive encounters and gain global sustainability (Abul-Enein, 2020; Sutanto, 2017). To confront disruptive technological innovation's impact on workforce resilience and organizational agility development, this paper provides an excited insight of organizational learning and its significance that accelerate organizational agility. As, organizational agility concept has recently become a burning topic due to its importance at the organizational level which facilitate firms *to generate new knowledge (i.e., innovation);* enable firms to acquire new understanding rapidly during the period of technological turbulence, (i.e., agility). It facilitates firms either to create new knowledge or improve the existing ones, (i.e., the influence of disruptive technologies up gradation or technological surveillance). On the other hand, it is necessary to mention that during this transition period

1 Corresponding Author

organizational learning, (i.e., human resources learning capabilities, strategies within the organization) and organizational agility (i.e., firm's quick adopting, adjusting and accepting capability with the changing environment) and disruptive technological innovation are significantly inter-connected (Saha et al., 2020).

To envisage the considerable role of organizational agility in enhancing organizational competency, through organizational knowledge development, this paper highlighted that workforce resilience essentially strengthening organization's intellectual capital by equipping people with new skills for the future through implementing *innovative solutions that indirectly or directly forged in disruptive times*. Accordingly, Lelièvre et al. (2019) emphasized that technology and innovation, i.e., disruptive technological innovation deals with numerous solutions to discourse unwanted challenges through shared values within the organization that increases workforce resilience and awareness. Similarly, Abul-Enein, (2020), Hunt et al. (2018) also stated that currently human capital, workforce diversity, cultural diversity and leadership quality in an organization plays a vital role in overcoming disruptive challenges, surfacing threats, and steering difficulties. Research shows that generally when organisations and governments took initiatives to contribute to human resource development, they usually strained to reinforce their existing skills by problem-solving, business intelligence, creativity, coordination, and emotional intelligence. Hence, workforces gradually becoming highly agile, due to their social maturity and cognitive skills that give them the opportunity to gain and enhance their tacit knowledge (WEF, 2017). Baškarada & Koronios's (2018) also put emphasis on organizational agility's five distinctive quality such as sensing agility, searching agility, seizing agility, shifting agility and knowledge sharing agility. Activities of organizational learning and agilities are gaining its fame in the recent trends of organizational development strategy, due to their significant role in the new ERA of Knowledge for Growth (K4G) and Human Resources Strategy for Researcher (HRS4R) to ensure successful organizational development through organizational learning, organizational agility development, employees innovative knowledge development capabilities.

Furthermore, to discourse this knowledge gap, this paper intends to discuss the spirit of organizational innovativeness that stimulate the agile features of an organization i.e., flexibility, nimbleness, and speed of an organization as well as the key activities of human resources. It also explicates the conceptualization of organizational agility and organizational learning process that have been thrived through DTI and develops a thematic framework on disruptive technological innovation generates radical knowledge and organizational agility development. Which is based on the dual process (organizational learning and organizational agility) of justifying organizational rigidity and developing innovative capabilities through the agile features of an organization that enables firms to combine their existing tacit and explicit knowledge to respond to the threat of disruptive technological innovation.

2. Organizations agile capability and organizational learning perception

To exemplify organizational agility, Teece, Peteraf, and Leih, (2016) demonstrated that the perception of an agile organization has been emerged as a key business imperative in order to cope up with the rapid technological turmoil that transpired through disruptive technological innovation. Regarding this matter, Škare and Soriano (2021) expresses that nowadays organization's agile capability enhancement is not a crucial factor of organizational effectiveness. Rather, it is essential for an organization to gain the survival instrument to keep stride with the dynamic market conditions. Correspondingly, Shams et al., (2020) stated that the recent trend of digitalization along with the disruptive innovations and technological advancement, significantly transforming the role of firms' ability. Yet again, Harraf et al., (2015) specified that organizational agility perception become renowned during 1990's, when policy makers, management experts, professional as well as business practitioners and researcher community realizes the significance organizational change, i.e. required speed and swiftness (develop quickly adapting capability) in order to face the vibrant world.

Conversely, several studies deliberated that the concept of organizational learning has emerged initially during 1970s. Since, it articulates the normal curiosity and spontaneous desire of individuals in order to elaborate their knowledge through learning within the organizations. As, they consider that it will enable them to survive in the long run by enabling their capabilities with the diversified tasks, technologies, and environments. While mediating the organizational learning conception Saha et al., (2020) described that currently, the strategic part of HRM practices within the organization enlighten the success of the organizational performance that basically exist in developing positive attitudes of individuals, groups, and organizations. Which mainly put emphasis on enhancing individual competence as well organizational competence through organizational learning. Therefore, it is primarily to put an emphasis that the influence of organizational learning on organizational agility

development really enables organizations and its initiatives on disrupting innovations (DI) and their characteristics as well as its effects.

2.1 The notion of disruptive technological innovation

According to Professor Clayton M. Christensen, the notion of 'Disruptive Technological Innovation' can be reflected as an innovation that primarily creates a novel market opportunity by connecting different set of values, strategies and norms that suddenly surpasses an existing market condition (Bower,1995; Christensen, 2006). Continuing with the discussion, this study, represents that at present disruptive technological innovation and organizational agility development perception facilitates firms to build a new market position and strengthen their workforce's flexibility to gain sustainable competitive advantage in a hypercompetitive market economy. Whereas, during 1990's the trend of enhancing organizational competitiveness becomes so prominent with the aim of upholding the optimization techniques for improved business operations and procedures in the industrial sector. Though, Habibullah and Joel (2019) also mentioned that organizational learning has been noted as an irrelevant impact on supply chain agility, but it has a significant direct influence on organizational performance development. Henceforth, it is necessary to point out that this paper basically focuses the twin perspectives of organizational agility and organizational learning that unify the philosophy and concept of disruptive technological innovation (Saha et al., 2019a; 2019b). Relating to this discussion, Hamada and Yozgatb (2017) also pointed out that though organizational agility and learning capability are the most fundamental elements that plays a great role on organizational survival and organizational success, but we cannot ignore the key elements of disruptive technological innovation that strengthen and support firm's sustainability during the world-wide turmoil circumstance.

Disruptive technological innovation (DTI) is understood in the literature as a systematic scheme of innovation that encourages organizational workforce resilience and organizational agility development. To relate DTI during this pandemic COVID-19 period, it is needed to emphasize that organisations need to focus on these following key pillars that might be beneficial for them to gain global sustainability. Currently this topic becomes a burning topic in management science which, inspired authors to identify firm's capability, i.e., the way organizations develop new insight rapidly to tackle technological turbulence.

2.2 Relationship between disruptive technological innovation and organizational agility enhances workforces radical knowledge

To discuss the relationship between disruptive technological innovation that generates radical knowledge and enhance organizational agility development, it is important to demonstrate the significance of organizational learning and organizational agility development. Where, the potential contribution of organizational agilities distinguishing features that could be the benefits for organizations' capacity enhancement and organizational performance development in relation to the implementation of disruptive technological innovation (*setting innovative mindset, satisfying innovative needs, supporting innovative ability, sustaining innovative diversion) key elements and* strategies. Where, the idea of organizational agility has been realized one of the major components of this speculative article that expressing the essence of disrupting innovation and processes that are associated with the organizational agility development through organizational learning perception and influence workers' resilience. The below mentioned Fig. 1 also represents the organizational agility key enabling attributes, their role and impact on organizational knowledge development process during technological turbulence. Where, it illustrates about the best possible way organization can meet the dynamic challenges through gaining knowledge, relationship development and presentation of knowledge, i.e. by sharing knowledge (Saha et al., 2019b). In order to justify the relationship between organizational agility and disruptive technological innovation, Škare, and Soriano, (2021), illustrated that nowadays organizational agility insight is not only considered as an important aspect of enhancing organizational competitiveness but, it has now become a more vital element of ensuring organizations survivability in the marketplace due to the occurrence of disruptive technological innovations advancement, that influence to change the traditional role of an organizational effectiveness and workforce resilience.

Furthermore, Fig. 1 depicts the significance of disruptive technological innovation that generates radical knowledge and organizational agility development; encourage, enhance, and stimulate organizational learning capability. According to Linda Susan's, (2018) opinion nowadays organization's technological growth basically promotes organizational effectiveness that expanding organizational knowledge development process. Lu and

Ramamurthy (2011) also highlighted that organizational agility signifies an organizations capability to deal with unexpected challenges that enable them to move toward rapid and innovative responses.

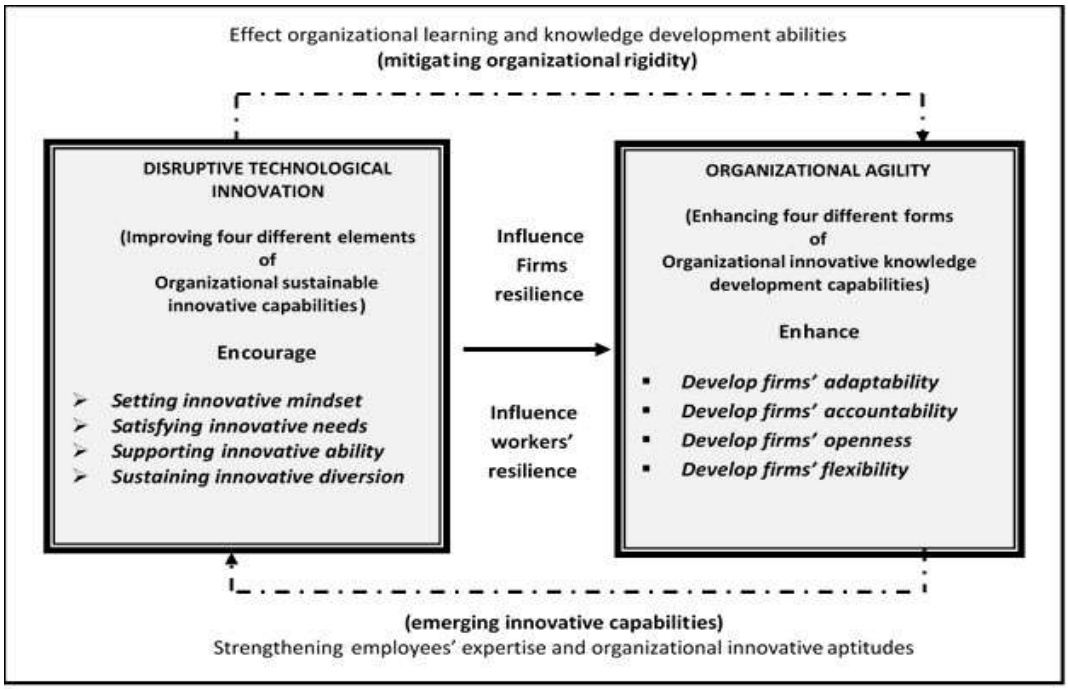

Figure 1: Relationship between disruptive technological innovation and organizational agility enhances workforces radical knowledge (own interpretation)

3. Research methodology

This study primarily addressed the rational knowledge (that obtained from various researchers distinguished ideas, opinions) and inductive reasoning. Rational knowledge signifies diverse approaches to gain information (knowledge). On the other hand, it can be accomplished that rational knowledge is prepositional knowledge (logical approach) that attained by conceptual understanding. Generally, inductive reasoning represents the degree of support in the sort of probabilistic reasoning and the underpinning of most debated scientific theories initiated on the modern approaches of both organizational agility, organizational learning and dynamic activities of disruptive technological innovations, relationship between disruptive technological innovation and organizational agilities, its influences that enhances workforce's flexibility to obtain essential knowledge.

Regarding this challenging topic, it is necessary to expose that the most important purpose of this study is not investigating (the development of disruptive technology, organizational agility, organizational learning capabilities) the emerging perceptions of 'organizational agility' and 'workforce's activities. Therefore, it strains largely on those accomplishments of organizational agilities initiatives that emerged during disruptive innovation and technological up gradation that empowers organizations to foster their workforces' knowledge within the given environment in order to create an environment for organizations innovativeness through radical knowledge (tacit and explicit) redevelops. On the other hand, the purpose of narrowing the definition of disruptive technology', 'organizational agility' is recognized in the fact that it is actually encouraging firms' existing workforces', their flexibility, i.e.(resilience) to compatible with the conceptual reinforcements of the innovative knowledge development strategy of an organization, during the turmoil market conditions. In this study the empirical and inductive reasoning methodology is appropriate for illustrating the objective of the study which is a phronetic (as organizational research and the study of management and organizations focusing on ethics and power) approach of organizational competitive advantages.

4. Results and discussion

The main investigation of this study explores organizational agilities distinguishing features, i.e., organizations' capacity enhancement and organization's performance development in relation to the implementation of disruptive technological innovation's key elements (i.e., setting innovative mind-set, satisfying innovative needs, supporting innovative ability, sustaining innovative diversion) and strategies. The findings from the evolutionary

economics, organizational behaviour and disruptive innovation literature, show the relationship between organizational agility influence on disruptive technological innovation, i.e., organizations innovative capabilities. To provide a descriptive overview this paper attempts to illustrate the influence of organizational agilities attributes as well as disruptive technological innovation's challenges on enhancing workforce resilience which has a great impact on organizational success that influence organizational knowledge development capabilities that strengthen organizational workforces' flexibility (resilience) and organizational innovative capabilities, i.e. (Sustainable Competitive advantage). To justify the below mentioning Fig.2 exemplify that organizational agility strategy could be a powerful instrument or key to fostering sustainable organizational learning. As, it empowers employees and encourage to be innovative that enable them to develop new knowledge and enhance the level of organizational performance development through adaptability, accountability, openness, and suppleness.

Furthermore, this impression has been highlighted by Kane, Palmer, Phillips, and Kiron, 2015; Chan et al, 2019 comprehended that due to the presence of organizational agilities understanding, presently firms become more capable to take the advantages of technological disruption. It encompasses workers' resilience and the processes of organizational knowledge development, i.e. organizational spirit, workers' capability, flexibility, nimbleness, and speediness. Endorsing this insight, Cuervo-Cazurra, et al., (2020) noted that worker's flexibility and their tactical skills along with the manifestation of disruptive innovation's advancement actually enable firms to activate and drive them to compete world-wide and thus dynamic managers efficiently implement their inventiveness and technical innovation in order to offer better goods and services to their customer and to enhance their competency.

4.1 Organizational agilities and disruptive technological innovations influence on workforce resilience and organizational competiveness development

To represent challenging perspectives of organizational agility and disruptive technological innovations influence on workforce resilience and organizational competitiveness development it is necessary to highlight organizations capability that supports them to face the technological turbulence, stimulates in improving knowledge and innovation-driven organizational competitiveness. Organizational agility and disruptive technological innovations influence on organizational learning issues (Ekekwe and Islam, 2012). Agreeing with this understanding, Christopher, (2000); Akaya and Tabak, (2020) pointed out that today's changeable and competitive environment strengthen organizations prerequisite to be more agile and successful. To justify organizational agility and disruptive innovation's collective effort on worker's resilience (flexible mind set development) organizational knowledge and capacity development, the below mentioned Fig.2 demonstrates organizations innovative activities organizational agility attributes within the organization, i.e. the prospective relationships between technological and digital and new knowledge development process. Where, the authors intend to identify whether the relationship between the interactions of the said two types of organizational learning enable organizations to create as well as develop new knowledge.

Correspondingly, Nafei (2016), stated that organizational agility is principally a set of procedures which let an arrangement to intellectual changes and react efficiently and effectively in a timely and cost-effective manner to face the external dynamic environments. Instantly, Holbeche (2018) also denoted that agility and resilience encourage organizations to enhance their innovative capacity to respond, adapt quickly and thrive in the changing environment based on their key five predictive components, i.e. future focus, customer-collaboration, iteration, experimentation and empowerment.

Conferring this Aghina et al., (2018) viewed organizational agility as a new paradigm of organizational development that enables organizations to achieve their organizational goals as well as facilitated to maintain a balance between the stable and dynamic condition at the same time. Simultaneously, Hays and Gupta (2018) also exposed that during this industrialization and digitalization period organizations need to adapt rapidly to accept change, seizing opportunities offered by disruptive technology in a globalized world affected by several infrequent challenges like pandemic. Additionally, Trinh-Phuong et al., (2010); Mikalef and Pateli (2017), too revealed that essentially organizational agility refers to a firm's ability to enhance and reinforce work knowledge to develop new products and services as well as to face the challenges of the new competitors. Felipe et al., (2016) indicated that during this transition period organization are mostly fascinated in sustaining their organizational competitiveness within the existing business environment that will enhance their workforces' knowledge and organizational capabilities to adapt and accept prompt action in order to respond the market turbulence (Downes and Nunes, 2013). Referring, to their opinion it is essential to mention that these qualities

are the dynamic capabilities and perspectives that enable them to develop new knowledge that spontaneously enhance *Organizational Knowledge, Organizational Flexibility, Organizational competency.* Moreover, Maier and Schmidt (2015) highlighted that organizational knowledge creation not only create an environment of continuous knowledge filtering and development process, but it also enables to develop the capacity of facing the unwanted turmoil conditions. Doz and Kosonen (2008); Ahammad et al., (2020) also indicated that organization's strategic agility enhances the ability to rediscover the organization's strategy in a dynamic manner to face the rapid changes and cope up with the external business environment (Neirotti and Raguseo,2017)

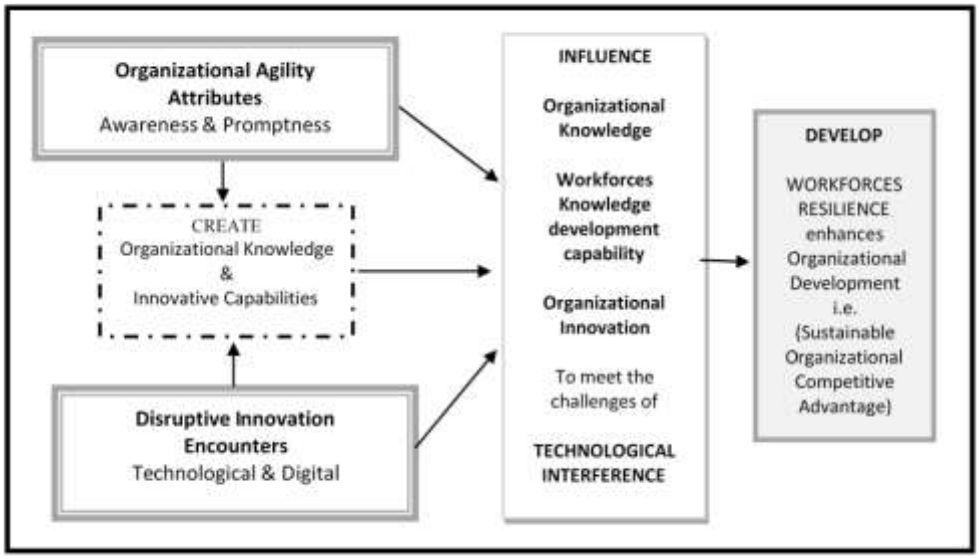

Figure 2: Relationship between disruptive technological innovation and organizational agility enhances workforces radical knowledge (own interpretation)

Therefore, it can be assumed that this study shows the approach of innovation-oriented organizations performance development capability which tends to be more innovative and dynamic due to the present organizational agility attributes and disruptive technological innovations encounters. concerning to the question of organizational agilities and disruptive technological innovations influence on workforce resilience and organizational competitiveness development this study leads to categorizes following three research propositions (RPs) that has been completed based on limited evidence on organizational agility, organizational learning phases and disruptive technological innovation systems as an introductory theme for further investigation. Such as:

- *RP1: which states that both* **the perceptions and approaches (organizational agility and organizational learning) enhance organizations' flexibility as well as organizational knowledge development capability and competitiveness** through disruptive technological innovativeness especially during this pandemic COVID-19 situation (i.e. know-what, know-why, know-how and know-who).
- *RP2*: Which indicates that both the approaches, **are responsible for achieving sustainable organizational effectiveness and excellence through generating radical positive knowledge development process** that enables organizations to create novel tasks, products, services, and proliferate new business models which are their implicit knowledge and cannot be imitated by other alternative investments.
- *RP3: Which specifies that* **organizational knowledge development perspective point of view, organizational learning can be considered as an opportunity to make changes and keep pace with the dynamically changing environment**. Though, this relationship can only become valuable if there are some resources **(human capital), some innovative system (technological up gradation) that can tap into the knowledge that has been created during this knowledge development process through research and technology;** which can provide the appropriate knowledge (expertise and organizational capability) for the innovation to take place and be implemented.

Moreover, it is significant to mention that though, this relationship can only become valuable if there are some resources (human capital), some innovative system (technological up gradation) that can tap into the knowledge

that has been created during this knowledge development process through research and technology; which can provide the appropriate knowledge (expertise and organizational capability) for the innovation to take place and be implemented.

5. Conclusion and recommendations

Finally, this paper indicated that the significance of disruptive technology and its innovative approaches that foster organizational learning and agility development as well as workforce resilience. The presentation of organizational learning concept in organizational agility is the keystone of creating a unique environment for organizational knowledge and performance development within the organization that enables the present organizations to face the competitive challenges knowledge development opportunities. Both Organizational learning and agility are gaining its fame in the recent trends of organizational development strategy, due to their significant role in the new ERA of Knowledge for Growth (K4G). To conclude, this study considers organizational learning concept and organizational agility as an effective performance development strategy that influences on developing organizational effectiveness and generate knowledge and innovation-driven organizational growth. Since, organizational flexibility and nimbleness has a great effect in creating and maintaining a high performance oriented organizational effectiveness within the same culture and across cultures. It indicates that the meaning of linking organizational learning and agility accentuates, national and international level of an organization that is one of the ways of making business and organizations more innovative and competitive.

This study suggested that – both the approaches (Organizational Learning and Organizational agility) have great impact on organizational competence to face today's technological turbulence dynamic market challenges. Organizational competency development enhances internal communication strategy in relationship with the organizational agility and sustainable organizational learning. Scientific perspective point of view, organizational agility and organizational learning is perceived as a coherent approach of innovation –driven organizations knowledge development strategy that along with the organizational philosophy act as a source of competitive advantage that enables organizations to implement an organization's development strategy. On the other hand, the challenging perception of organizational agility has been conducted in this study to explore the potential and its distinguishing features that enhances organizations' flexibility as well as capability and performance in relation to the implementation of organizational learning strategies through disruptive technological innovativeness (i.e. Know-what, know-why, know-how and know-who). To address the future direction of this research, it is essential to remark that organizational governance plays a vital role as management that mainly comprising the significant activities such as planning, budgeting, organizing, staffing, controlling, and problem solving. Consequently, the role of managers shows a greater impact where they can be able to handle more well-balanced situation in the world market especially in turbulence period.

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References

Abul-Enein, H. (2020). Strategic Security Analysis Resilience and Agility: Managing and Mitigating Evolving Threats in a Hyperconnected World. Geneva centre for Security Policy , 13 (1) https://reliefweb.int/sites/reliefweb.int/files/resources/resilience-and-agility-managing-and-mitigating-evolving-threats-in-a-hyperconnected-world.pdf

Ahammad, M.F., Glaister, K.W., and Gomes, E. (2020). Strategic agility and human resource management. *Human Resource Management Review, 30*(1), 100700.

Aghina W., De Smet, A., Lackey G., Lurie M. and Murarka M. (2018). The five trademarks of agile companies. McKinsey Report 2018. Retrieved from: https://www.mckinsey.com/business-functions/organization/our-insights/the-five-trademarks-of-agile-organizations

Akaya, B. and Tabak, A. (2020). The Link Between Organizational Agility and Leadership: A Research in Science Parks. *Academy of Strategic Management Journal*, *20*(1),1-17.

Baškarada, S. & Koronios, A. (2018) The 5S organizational agility framework: a dynamic capabilities perspective. *International Journal of Organizational Analysis, 26* (2), 331-342.

Bower, J. and Christensen, C. M. (1995). Disruptive technologies: Catching the wave. *Harvard Business Review, 73* (1).

Chan, C. M. L., Teoh, S.Y., Yeow, A., and Pan, G. (2019). Agility in responding to disruptive digital innovation: Case study of an SME. *Information Systems Journal, 29*(2), 436-455.

Christensen, C. M. (2006). The ongoing process of building a theory of disruption. *Journal of Product Innovation Management, 23*(1), 39-55.

Christopher, M. (2000). The agile supply chain: Competing in volatile markets. *Industrial Marketing Management, 29*(1), 37-44.

Cuervo-Cazurra, A., Doz, Y., and Gaur, A. (2020). Skepticism of globalization and global strategy: Increasing regulations and countervailing strategies. *Global Strategy Journal, 10*(1), 3-31.

Downes, L., and Nunes, P.F (2013), Big-Bang disruption. Harvard business review.

Doz, Y.L., and Kosonen, M. (2008). Fast strategy: How strategic agility helps you stay ahead of the game. Wharton School Publishing. 1st edition, 253 pages, ISBN-10: 0273712446.

Ekekwe, N., and Islam, N. (2012). Disruptive Technologies, Innovation and Global Redesign: Emerging Implications (pp. 1-602). Hershey, PA: IGI Global. doi:10.4018/978-1-4666-0134-5.

Felipe, C.M., Roldan, J.L., & Leal-Rodríguez, A.L. (2016). An explanatory and predictive model for organizational agility. *Journal of Business Research, 69*(10), 4624–4631.

Habibullah, K. and Joel D, W. (2019). Supply Chain Integration, Learning, and Agility: Effects on Performance. *Operations and Supply Chain Management-An International Journal, 12*(1), 14-23.

Hamada, Z.M.M. and Yozgat, U. (2017). Does organizational agility affect organizational learning capability? Evidence from commercial banking. *Management Science Letters 7*, 407–422.

Harraf, A., Wanasika, I., Tate, K. and Talbott, K. (2015). Organizational Agility. *The Journal of Applied Business Research, 31*(2), 675-686.

Hays, R., and Gupta, T. S. (2018). Developing a general practice workforce for the future. *Australian journal of general practice*, *47*(8), 502–505.

Holbeche, L.S. (2018). Organisational effectiveness and agility. Journal of Organizational Effectiveness: *People and Performance, 5*(4), 302-313.

Hunt, V., Prince, S., Dixon-Fyle, S. and Yee, L.(2018). Delivering through Diversity, McKinsey, January 2018, Retrieved from: https://www.mckinsey.com/~/media/mckinsey/business%20functions/organization/our%20insights/delivering%20through%20diversity/delivering-through-diversity_full-report.ashx

Kane, G. C., Palmer, D., Phillips, A. N., and Kiron, D. (2015). Is your business ready for a digital future? *Sloan Management Review*, *56,* 37–44.

Lelièvre,D., Radtke,P., Rohr, M. and Westinner, R. (2019). "Building Resilient Operations", McKinsey, 21 May 2019. Retrieved from: https://www.mckinsey.com/business-functions/operations/our-insights/building-resilient-operations

Linda Susan, H. (2018). Organisational effectiveness and agility. *Journal of Organizational Effectiveness-People and Performance, 5*(4), 302-313.

Lu, Y., & Ramamurthy, K. (2011). Understanding the link between information technology capability and organizational agility: An empirical examination. *MIS Quarterly, 35,* 931–954.

Maier, R. & Schmidt, A. (2015) Explaining organizational knowledge creation with a knowledge maturing model. *Knowledge Management Research & Practice 13*, 361–381.

Mikalef, P., and Pateli, A. (2017). Information Technology-Enabled Dynamic Capabilities and Their Indirect Effect on Competitive Performance: Findings from PLS-SEM and fsQCA. *Journal of Business Research, 70*, 1–16.

Nafei, W.A. (2016). The Role of Organizational Agility in Enhancing Organizational Excellence: A Study on Telecommunications Sector in Egypt. *International Journal of Business and Management, 11*(4), 121-135.

Neirotti, P., and Raguseo, E. (2017). Flexible work practices and the firm's need for external orientation: An empirical study of SMEs. *Journal of Enterprise Information Management, 30,* 922 –943.

Saha, N., Sáha, T., Gregar, A. and Sáha, P. (2020). Organizational agility and organizational learning: Do they accelerate organizational innovation and competency? In: *Proceedings of the European Conference on Innovation and Entrepreneurship, ECIE* [online]. Rome: Academic Conferences and Publishing International Limited, 578-586. ISSN 2049-1050.

Saha, N., Gregar, A., Van der Heijden, B. I. and Sáha, P. (2019a). The Influence of SHRM and Organizational Agility: Do They Really Boost Organizational Performance? In Ç. Doğru (Ed.), Handbook of Research on Contemporary Approaches in Management and Organizational Strategy (pp. 62-83). Hershey, PA: IGI Global.

Saha, N., Sáha, T. and Sáha, P. (2019b). Organizational agility and strategic HRM: A twin perspective strategy of organizational capacity and knowledge development. In: *Proceedings of the 33rd International Business Information Management Association Conference, IBIMA 2019: Education Excellence and Innovation Management through Vision 2020* [online]. Granada: International Business Information Management Association, IBIMA, 2019, s. 1132-1136.

Shams, R., Vrontis, D., Belyaeva, Z., Ferraris, A., and Czinkota, M.R., (2020). Strategic agility in international business: a conceptual framework for "agile" multinationals. *Journal of International Management,* 27(1), 100737.

Škare, M. and Soriano, D. R. (2021). A dynamic panel study on digitalization and firm's agility: What drives agility in advanced economies 2009–2018. *Technological Forecasting and Social Change*, *163*(2):120418. DOI:10.1016/j.techfore.2020.120418

Sutanto, E.M. (2017). The influence of organizational learning capability and organizational creativity on organizational innovation of Universities in East Java, Indonesia. *Asia Pacific Management Review, 22*, 128-135.

Teece, D., Peteraf, M., and Leih, S. (2016). Dynamic capabilities and organizational agility: Risk, uncertainty, and strategy in the innovation economy. *California Management Review*, *58,* 13–35.

Trinh-Phuong, T., Molla, A., and Peszynski, K. (2010). Enterprise Systems and Organisational Agility: Conceptualizing the Link. ACIS 2010 Proceedings. Paper 37.

World Economic Forum -WEF, Human Capital Report 2017, Geneva, WEF, 2017, Retrieved from: http://www3.weforum.org/docs/WEF_Global_Human_Capital_Report_2017.pdf

Assessment of Availability of Economic Resources in the Regions to Analyze Their Adaptability to Innovative Economy

Liudmila Samoilova[1], Alexander Litvinenko[2] and Olga Nadezhina[3]
[1]Saint Petersburg Institute (branch) All-Russian State University of Justice, Saint-Petersburg, Russia
[2]Saint-Petersburg University of the MIA of Russia, Saint-Petersburg, Russia
[3]Peter the Great Saint Petersburg Polytechnic University, Saint Petersburg, Russia
samoylovalk@mail.ru
lanfk@mail.ru
nadezhina_os@spbstu.ru
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Abstract: The established approaches to assessing the innovative potential of a region are based upon the use of methodological tools without regard to the integrity parameter. Many authors rely on a certain qualimetry method in their studies: absolute and relative statistical measures (Nureev & Simakovsky, 2017; Yusupov et al., 2019); integral assessment (Zemtsov & Baburin, 2016; Karavay, 2017); determination of functional dependencies (Rudskaya & Rodionov, 2017; Urasova, 2019). This position results in the formation of a truncated and, in certain cases, distorted idea of quantity and quality of production factors necessary for the adaptation of a territorial economic complex to conditions of an innovative economy. For the purpose of elimination of the biased approach to measuring the resource potential of a region, first of all, it is necessary to form a range of tools aimed at increasing veracity of the results of diagnosing the economic situation in meso-subjects. In this regard, the purpose of the study was to develop and test a system of mutually supported tools for assessing availability of economic resources in a territory as the foundation for its adaptation to innovative developments. Availability of economic resources in the region has been assessed using the statistical analysis methods, including absolute and relative statistical measures, time series, factor analysis, and regression analysis. In addition, ranking and classification methods have been employed. The system of mutually supported tools to assess resource availability in a territory with due regard to reasonable constraints on their use will improve objectivity of assessment of local innovative possibilities, since it is based on the combining of diversified analysis tools.

Keywords: innovative economy, region, economic resources, resource availability, production function, differentiation of territorial and resource potential

1. Introduction

Historically, the Russian Federation's model was tagged as commodity economy, however, until present times, revenue from extraction and sale of particular resources as part of income to the budget represent a significant proportion, in some years approaching 40 to 50%. In this regard, it is necessary to revise the directions of development of the national economy to maintain the identity between availability of resources and growing needs, using innovative technologies that combine the possibilities of saving raw materials and increasing labor efficiency. However, high degree of differentiation of economic development is characteristic of the Russian Federation, which is demonstrated by significance gap between performance indicators of a territorial economic complex such as gross regional product, investments to fixed capital, percentage of depreciated capital stock, average income per a head, and others. In view of this, a large-scale use of a standard approach to the modernization of regional economy can become a reason for disregarding local interests and priorities. Thus, for a state, which includes a significant number of administrative-territorial units, which typically differ, it is worth applying an economic model that considers the differences, in order to eliminate the negative consequences of neglecting the individual characteristics of the regions. In these circumstances, objectivity of determining resource availabilities in meso-subjects for transformational changes comes to the fore.

For this reason, the purpose of the study was to develop and test a system of mutually supported tools for assessing availability of economic resources in a territory as the foundation for its adaptation to innovative developments.

There are various methods for assessing the resource potential of territories (Rodionov et al., 2017; Yusupov et al., 2019; Urasova, 2019). However, the results obtained by a certain qualimetry method should not always be interpreted as absolutely veracious. For example, in certain cases, the formation of paired proportions between related indicators can cause erroneous perception of the economic "picture". As a rule, revenues should be

considered in conjunction with expenses, since the more funds remain at the disposal of an individual after satisfying his own needs, the more pronounced is the ability to save funds, which is one of the most important parameters of individual wealth. After calculating the ratio between the two indicators, "Average monthly nominal accrued wages of corporate employees" and "Consumer expenditures at average per capita", it turned out that in 2018 its maximum value was accounted for by the Rep. of Tuva. However, this is caused not so much by a high standard of living in the region, as by a large share of inhabitants with revenues below the minimum subsistence income, i.e. 34.4%. In addition, sometimes it can be inappropriate to apply tempo coefficients, since some indicators can significantly increase in certain years, which overlaps consequences of their insignificant volatility in the previous long-term period (for example, expenditures for technological innovation in the Rep. of Kalmykia in 2016 increased by more than 12 times compared to 2015, but until 2011 they amounted to zero). Yearly ranking of territories can also be uninformative, since the dynamics of most parameters is changeable, that is, it is characterized by significant drops, therefore it is important to consider these parameters at average over several years.

The circumstances listed above predetermine the necessity to comply with integrity when forming a range of tools for assessing the economic situation of a territory, including availability of production factors. In view of the above, the range of tools employed in the study combines qualimetry methods, which differ but mutually support each other.

Thus, for the purpose of elimination of manipulations with statistical data, it is necessary to employ a range of different types of measurement tools. This will allow not only to increase veracity of the assessment results, but also to eliminate inaccuracies caused by a significant range of deviations in the set of indicators selected for studying local economic processes.

2. Literature review

An innovative economy is associated with the production intellectualization, which is primarily reduced to supplying the consumer with the required goods of preferred quality (Romanova, 2017).

It can be noted that the innovative component, represented by a set of participating objects of production and non-production infrastructure, as well as production factors involved in the innovation process, is the basis for economic growth and economic development of public-territorial units (Golova & Sukhovey, 2017; Shevchenko et al., 2020). The statement about the fact that innovative activities, while stimulating the development of science, technology and engineering, affect the state of structural elements of the state economic system (Sukhovey, 2014), has a reverse interpretation. That is, it should be said that preconditions for the growth of activities in the field of innovation are formed under conditions of self-sufficiency of the national economy, which is expressed, among other things, through resource self-sufficiency. It should be noted that this model of economy is primarily based upon a combination of such production factors as labor, capital and technology. It is impossible to create an innovative product without each of them, when resources are limited and needs are infinite, therefore, they should be multiplied in aggregate. However, the labor force is especially noteworthy. A person is a special participant in economic relationships, having a dual position: firstly, as a person whose needs are the impetus to produce goods, and secondly, as a resource used at the initial stage of the production process. Being a labor unit, his professional activities can be associated with the technology creation, which becomes an independent economic resource when separated from its developer. For this reason, the key role of human capital in an innovative economy can be noted (Zemtsov et al., 2016). Thus, it is not just a basic economic resource, i.e. labor, but its ideas are also the basis for forming another resource, i.e. technology. Both of them are necessary for implementing each of the phases of the production cycle, within which economic benefits are created (Samoilova, 2020).

It is also undoubted that the inducement for the economy innovatization is the achievements of scientific and technological progress, which come into direct practical use (Vorontsovskiy, 2020), coming into all spheres of life of macro- and microeconomic entities. Generally speaking, developments in technology determine the dynamics of economic development (Sukharev, 2016).

But it is physical capital, combined with the real one, that forms the platform necessary to implement scientific research and development. In the event of a high degree of moral and physical deterioration of fixed assets,

mechanization and automation of production are futureless without appropriate renovation and eliminated with a lack of financial injections.

Thus, a change in the vector of the national economy functioning is connected with the transition to the innovative path, which is not feasible without significant investments of labor and capital (Rastvortseva, 2020).

An innovative economy is aimed at developing new ideas based upon an optimal recombination of the available resources consumed when producing goods in order to satisfy the needs of the state, society and an individual. However, the transition to an innovative economy with a discrepancy between the "starting" potential of the national economy in general and the business sector in particular and requirements of the implemented innovative management can cause a number of negative consequences for macro- and microeconomic entities. This determines importance of the implementation of procedures for the adaptation to innovations, which cannot be performed out of touch with the results of analyzing availability of economic resources in a territory, which is the "foundation" for transformational changes.

A typical tool for assessing availability of economic resources in a territorial-economic complex is a set of absolute and relative statistical values calculated per capita, as a percentage of the gross regional product (Nureev & Simakovsky, 2017; Rodionov & Rudskaya, 2017; Yusupov et al., 2019). However, under conditions of strong volatility of the national currency in parallel with the natural population decline persisting in the long term, positive dynamics can be seen, which is actually absent, since it is caused by the above reasons, and not by an increase in production volumes. The method of integral assessment is also actively employed, which is reduced to the development of indices used to assess the qualitative and quantitative state of individual production factors (Zemtsov & Baburin, 2016; Karavay, 2017). The authors also appeal to the determination of functional dependencies (Rudskaya & Rodionov, 2017; Urasova, 2019), a notable example of which, among other things, is the production function.

The standard production function and its modifications from the standpoint of revealing the economic potential of a socio-territorial entity have earned attention in many works (Kirilyuk, 2013; Vaseyskaya & Glukhov, 2019). Among them, a scientific paper devoted to the analysis of industrial availabilities in a region based upon the said function (Suvorov et al., 2020), the model of which was built by the authors for the Rep. of Bashkortostan (2006-2016), is of particular interest. As a result, they made a judgment about its inadequacy in the case of using static parameters of dependent and independent variables, since the economic interpretation of the character in front of the labor elasticity coefficient, which turned out to be negative, is not valid. Analysis of the data shows that the number of people employed in regional economies is a dynamically changing value, the fluctuation of which is determined by natural and mechanical movement of the population. Therefore, in more than half of the regions, the volatility of this indicator, as well as its decline in 2006-2016, combined with a simultaneous increase in the index of the physical volume of GRP as a whole for the constituent entities of the Federation, predetermined the negative value of the labor elasticity coefficient. Pertinently, the mathematical model reflects a visible regularity, i.e. a decrease in the number of the employed leads to an increase in GRP. However, this viewpoint is incorrect, since physical capital, like the GRP volume, is presented in value terms, though in comparable prices, but the volumetric-physical significance of such indicators is unknown. All this makes it necessary to formulate assumptions for using this tool in macroanalysis.

In addition, the possibility of using the production function as an auxiliary tool for assessing adaptability of regions of the Russian Federation to conditions of an innovative economy is not properly reflected in scientific papers. Thus, this study differs from the existing ones both in the goal of constructing the Cobb-Douglas production function and in the scale, since it covers 83 constituent entities of the Federation.

The listed methods of assessing the innovative "readiness" of a territory represent a mono-component approach, which in certain cases, as described above, can reduce the level of measurement objectivity. In this regard, it is advisable to simultaneously use several methods in order to verify the veracity of calculations. The combination of the methods, as proposed in this study, is aimed at achieving the veracity of calculations, on the one hand, and makes it possible to gradually determine qualitative and quantitative characteristics of the resource potential, from simple to complex, on the other hand. At the same time, the selection of these tools is caused by the appropriateness of operating them when identifying the sufficiency of production factors for the transition to an innovative economy.

3. Research methods

A characteristic of the methodology of the study in question was the use of standard political economic factors to assess the real macroeconomic indicators of a territory in order to determine its potential for innovative restructuring.

3.1 Absolute and relative statistical measures

The assessment of proportionality of resource availability in the regions of the Russian Federation was carried out using absolute and relative statistical measures (table 1).

The set of indicators presented above is caused by a number of factors.

- 1. There is a definite interdependence between economic growth and the volume of investment in capital, labor, and technologies, that is, the widespread innovations require increased investment activity; in this regard, the indicators such as “Investment in fixed capital”, “Costs of technological innovations”, “New fixed capital formation”, “Degree of depreciation of fixed capital” will form an idea of the adequacy of physical and real capital.
- 2. Human capital within the innovative economy is regarded as a set of knowledge, skills, competencies, and experience, but in the context of availability of labor force in the territories, it is worth considering its quantitative and qualitative characteristics in conjunction with one another. For certain regions, in view of the negative migration balance, it is of particular importance to preserve and increase professionally trained employees by providing employment and high labor incomes. In addition, the indicator “Number of the employed per one pensioner” is recommended to be employed as a parameter that establishes the attractiveness of a constituent entity of the Federation for the able-bodied population Labor resources as a “generator of innovations” can be assessed using the indicator “Percentage of the employed with higher education”.

Table 1: The list of indicators supporting the ranking of the regions in terms of availability of economic resources

№	Indicators: X-axis – “Labor”	№	Indicators: Y-axis – “Capital”
X_1	Number of the employed per one pensioner, persons	Y_1	Investments in fixed capital in terms of average annual number of the employed, mln rubles
X_2	Percentage of the employed with higher education, %	Y_2	Expenditure for technological innovations in terms of average annual number of the employed, mln rubles
X_3	Need for employees as declared by employers to the employment service authorities, persons	Y_3	New fixed capital formation in terms of average annual number of the employed, mln rubles
X_4	Average nominal accrued wages of employees in organizations, rubles	Y_4	Degree of depreciation of fixed capital, %

3.2 Method of integral assessment

As an additional tool, the “Index of Stability of Resource Availability for Innovative Initiatives” has been developed, which allows determining the changes in real capital allocated for the renewal and modernization of fixed capital, including through innovations, and changes in the quality of the labor force, which tool structurally consists of two elements, viz. the average rate of change in physical volume of investments in fixed capital and the average change in the percentage of the employed with higher education. It is calculated according to the formula:

$$I_{RS} = \sqrt[n]{\prod_{i=1}^{n} Ic_i} * \sqrt[n]{\prod_{i=1}^{n} Le_i}, \quad (1)$$

where I_{RS} is the index of stability of resource availability for innovative initiatives; I_c is the rate of change in physical volume of investments in fixed capital; L_e is the change in the rate of the employed with higher education; n is the number of periods.

The index calculated should be at least equal to one (the standard is $I_{RS} \geq 1$), otherwise, negative trend in the values of it structural components is observed.

3.3 Method of ranking and classification

To assess the degree of differentiation of the constituent entities of the Federation by resource availability and to make judgments about the possibility of introducing a "standard" model of economic development in their territory, their resource potentials should be compared, which has been done by means of ranking. On its basis, scatter diagrams of regions were constructed in a rectangular coordinate system, where the general rank according to indicators of adequacy of labor potential is indicated on the X-axis, and according to indicators of provision with physical and real capital, on the Y-axis. Since the trend data of most parameters is changeable, i.e. it is described by significant differentials, each of the indicated statistical measures was ranked on average for the periods: 2001-2008, and 2009-2016, which correlates with the lower limit of the duration of the "industrial" cycle (8 to 12 years).

The ranking has resulted in the division of the entire diversity of the constituent entities of the Federation into groups from the point of view of availability of labor, physical and real capital. The classification method has demonstrated that the regions are extremely heterogeneous in terms of adequacy of the resource potential.

3.4 Production function as a factor analysis tool

The type of economic development in a region has been determined by construction of a model of the following production function:

$$Y = a_0 * K^{a_1} * L^{a_2}, \quad (2)$$

where *Y* is GRP, mln rubles, *K* is average annual cost of fixed capital, mln rubles, *L* is labor expense, mln rubles, a_0 is a constant describing the influence of factors not covered by the model, including scientific and technological progress; a_1 – capital elasticity coefficient; a_2 – labor elasticity coefficient. The cost variables have been used in real prices. Calculations have been made using regression analysis.

If a_1 is greater that a_2, then the region is experiencing intensive economic growth, otherwise, the growth is extensive. The said tool is aimed at determining the state of the economy of the territory in terms of intensification of the reproduction process.

4. Research results

4.1 Results of calculating availability of production factors in the regions

In the course of the study, the indicators listed in table 1 have been calculated for each constituent entity of the Russian Federation (with the exception of the Chechen Rep., the Rep. of Crimea and Sevastopol). The aggregated results are shown in table 2. In the first place, the indicated statistical values are calculated at average for the periods of 2001-2008 and 2009-2016, which corresponds to the lower limit of duration of an "industrial" cycle (8-12 years), as stated above. If measured along the upper limit, the beginning of the first cycle would have occurred in 1997, but large-scale "breaks" in the Russian economy were observed in 1994-1996 and 1998, and in general, the 90s of the twentieth century can be called an "era" of systemic transformations. In the second place, only those regions, for which the values of the set of four indicators for both the "X-axis" group and the "Y-axis" group are either the best or the worst, are presented.

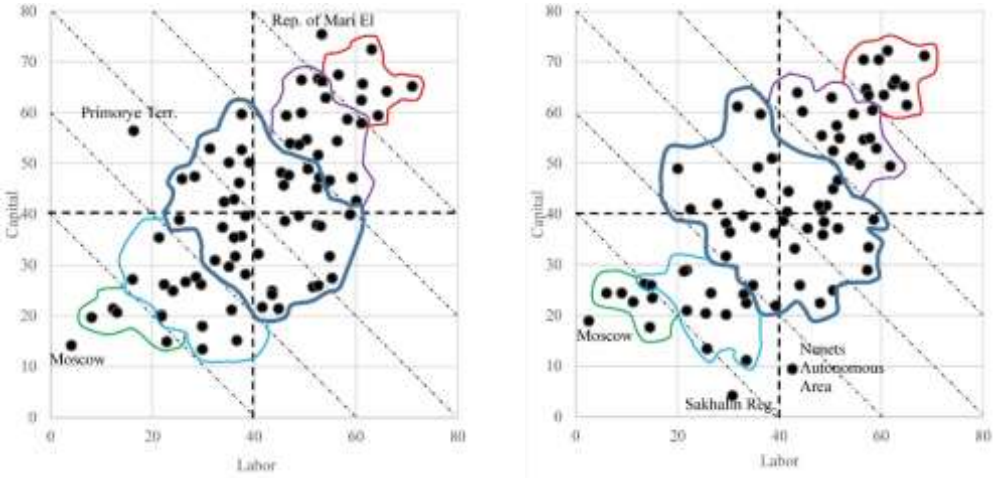
Table 2: Results of calculating coefficients characterizing availability of production factors in a regions

Regions	Calculated value of the indicator at average for the period: 2009-2016 / Rank by indicator*							
	X_1	**X_2**	**X_3**	**X_4**	**Y_1**	**Y_2**	**Y_3**	**Y_4**
Moscow	2.56 / **4**	48.36 / **1**	138826 / **1**	52235 / **4**	147776 / **37**	17562 / **15**	164777 / **13**	34.54 / **11**
Khabarovsk Terr.	1.87 / **12**	33 / **10**	17556 / **21**	31176 / **15**	200997 / **18**	8416 / **29**	162885 / **16**	31.9 / **8**
Rep. of Tatarstan	1.74 / **22**	30.66 / **20**	22994 / **15**	23687 / **30**	244821 / **13**	24172 / **7**	140288 / **25**	43.86 / **39**
Kirov Reg.	1.49 / **61**	22.65 / **79**	8481 / **45**	17831 / **66**	79899 / **77**	4030 / **51**	57482 / **76**	50.41 / **62**
Kurgan Reg.	1.32 / **77**	25.11 / **64**	4120 / **68**	17895 / **65**	83628 / **75**	2508 / **62**	65312 / **72**	57.91 / **76**
Altai Terr.	1.47 / **63**	24.18 / **72**	12493 / **28**	16439 / **79**	70177 / **79**	2259 / **67**	46071 / **82**	40.31 / **26**

*) Determination of a rank by indicator: 1 was assigned to the region with the best indicator value, which was revealed from the entire set of the studied territories; 82 was assigned to the region with the worst indicator value

4.2 Description of results of calculating the set of indicators (X_1 – Y_4)

The aggregate of the constituent entities of the Federation has been ranked according to two groups of indicators that reveal availability of labor in the region on the one hand, and availability of capital, on the other hand. For this purpose, an average rank was calculated separately for each of the groups of indicators "X-axis" and "Y-axis" for a certain period. The calculation data are shown in figure 1.



a) 2001-2008 b) 2009-2016)

Figure 1: Scatter diagram for the regions according to availability of economic resources: Labor, Capital

The high "density" of the constituent entities of the Russian Federation is worth mentioning, which made it possible to divide them into five groups according to the availability of certain economic factors (figure 2). However, Moscow stands out of the total number of regions; according to the selected criteria; it was rated as the first for all the indicated periods. Apart from Moscow, there are other territories, which are characterized by a significant spread in the overall rank according to the selected groups of indicators.

Types of regions	Periods	
	2001-2008	2009-2016
Optimally supplied	Moscow, Moscow Reg., St. Petersburg, Tyumen Reg., Khanty-Mansi Autonomous Area	Moscow, St. Petersburg, Tyumen Reg., Khanty-Mansi Autonomous Area, Khabarovsk Terr., Moscow Reg.
Adequately supplied	Kaliningrad Reg., Leningrad Reg., Murmansk Reg., Rep. of Tatarstan, Samara Reg., Yamal-Nenets Autonomous Area, Krasnoyarsk Terr., Irkutsk Reg., Tomsk Reg., Rep. of Sakha, Khabarovsk Terr., Sakhalin Reg., Chukotka Autonomous Area	Leningrad Reg., Rep. of Tatarstan, Yamal-Nenets Autonomous Area, Krasnoyarsk Terr., Irkutsk Reg., Tomsk Reg., Rep. of Sakha, Kamchatka Terr., Primorye Terr., Amur Reg., Magadan Reg., Chukotka Autonomous Area, Sakhalin Reg.
Acceptably supplied	Belgorod Reg., Kaluga Reg., Lipetsk Reg., Orel Reg., Ryazan Reg., Smolensk Reg., Tver Reg., Yaroslavl Reg., Rep. of Karelia, Komi Rep., Arkhangelsk Reg., Nenets Autonomous Area, Vologda Reg., Novgorod Reg., Krasnodar Terr., Astrakhan Reg., Volgograd Reg., Rostov Reg., Stavropol Terr., Rep. of Bashkortostan, Rep. of Mordovia, Udmurtian Rep., Chuvash Rep., Perm Terr., Nizhny Novgorod Reg., Orenburg Reg., Saratov Reg., Sverdlovsk Reg., Chelyabinsk Reg., Rep. of Khakassia, Kemerovo Reg., Novosibirsk Reg., Omsk Reg., Rep. of Buryatia, Trans-Baikal Terr., Kamchatka Terr., Amur Reg., Magadan Reg., Jewish Autonomous Reg., Primorye Terr.	Belgorod Reg., Voronezh Reg., Kaluga Reg., Lipetsk Reg., Tver Reg., Tula Reg., Yaroslavl Reg., Komi Rep., Arkhangelsk Reg., Vologda Reg., Kaliningrad Reg., Murmansk Reg., Novgorod Reg., Krasnodar Terr., Astrakhan Reg., Volgograd Reg., Rostov Reg., Rep. of Daghestan, Stavropol Terr., Rep. of Bashkortostan, Perm Terr., Nizhny Novgorod Reg., Orenburg Reg., Samara Reg., Saratov Reg., Sverdlovsk Reg., Chelyabinsk Reg., Rep. of Altai, Rep. of Khakassia, Kemerovo Reg., Novosibirsk Reg., Omsk Reg., Rep. of Buryatia, Trans-Baikal Terr., Jewish Autonomous Reg., Nenets Autonomous Area
Inadequately supplied	Bryansk Reg., Vladimir Reg., Voronezh Reg., Kostroma Reg., Kursk Reg., Tula Reg., Rep. of Kalmykia, Rep. of Daghestan, Rep. of Ingushetia, Kabardino-Balkarian Rep., Karachayevo-Circassian Rep., Kirov Reg., Penza Reg., Ulyanovsk Reg., Rep. of Altai, Altai Terr.	Vladimir Reg., Kursk Reg., Ryazan Reg., Smolensk Reg., Tambov Reg., Rep. of Karelia, Rep. of Adygeya, Rep. of Kalmykia, Kabardino-Balkarian Rep., Karachayevo-Circassian Rep., Rep. of Mordovia, Udmurtian Rep., Chuvash Rep., Penza Reg., Ulyanovsk Reg., Rep. of Tuva
Critically non supplied	***Ivanovo Reg., Tambov Reg., Pskov Reg., Rep. of Adygeya, Rep. of North Ossetia, Kurgan Reg., Rep. of Tuva, Rep. of Mari El***	***Bryansk Reg., Ivanovo Reg., Kostroma Reg., Orel Reg., Pskov Reg., Rep. of Ingushetia, Rep. of North Ossetia, Rep. of Mari El, Kirov Reg., Kurgan Reg., Altai Terr.***

Figure 2: Classification of the regions according to availability of labor force, physical and real capital

Analysis of figure 2 shows that about a third of the regions do not have the required quantity or quality of economic resources to build an operational model of the innovative economy, therefore, for them, the transition according to the typical scenario is impossible.

4.3 Results of calculating the integral indicator

Since the basic factors of production, consumed in the innovative activity process, are labor and capital, to characterize the resource availability of the region it is worth using an integral indicator reflecting their compliance with the needs of the innovative economy (table 3). At the same time, the "Index of stability of resource availability for innovative initiatives" was calculated for the same periods (except for the period from 2001 to 2008 due to the lack of data) as the set of indicators listed in table 1 in order to compare the calculation results.

Table 3: Calculation data for the integral indicator "index of stability of resource availability for innovation initiatives"

$I_{RS} = \sqrt[n]{\prod_{i=1}^{n} Ic_i} * \sqrt[n]{\prod_{i=1}^{n} Le_i}$, the index components are explained in **Section 3.2**	
The list of regions where the integral indicator "Index of Stability of Resource Availability for Innovation Initiatives" is below the standard <1	
Periods 2009-2016	Ivanovo Reg., Ryazan Reg., Smolensk Reg., Rep. of Karelia, Arkhangelsk Reg., Nenets Autonomous Area, Vologda Reg., Kaliningrad Reg., Rep. of Kalmykia, Chuvash Rep., Perm Terr., Kirov Reg., Nizhny Novgorod Reg., Penza Reg., Kurgan Reg., Chelyabinsk Reg., Rep. of Altai, Altai Terr., Kemerovo Reg., Novosibirsk Reg., Omsk Reg., **Tomsk Reg**., Rep. of Buryatia, **Chukotka Autonomous Area**

The testing of the developed index demonstrated that it can be used as a tool for express analysis, since the deviation from the general rank determined according to the set of indicators which describe availability of labor and capital in local economy is minimal (within 15%). For example, for the period from 2009 to 2016, the list of regions in which the integral indicator was below the norm included only the Tomsk Region and the Chukotka Autonomous Area, belonging to the groups of "optimal availability" and "sufficient availability" with an error of less than 10%.

The above calculations indicate the qualitative and quantitative heterogeneity of the potential of the territories from in terms of its being adequate for the implementation of the innovative economy model. The regions are characterized by a high degree of differentiation of intensification of production.

4.4 Results of calculating the production function

The mathematical and statistical facilities for assessing the type of economic growth that has been recorded in the sectors of the territorial economic complex is diverse and, in addition to absolute and relative statistical measures, includes factor analysis employed to establish the influence of certain factors on the resulting indicator (e.g., production function typically describes the relationship between the production output and production factors, and in some cases other parameters are introduced, e.g. the price of oil). As part of the study, a production function was constructed for all regions of the Russian Federation (with the exception of the Rep. of Crimea, Sevastopol), the generalized calculation data presented in figure 3. It is important to note that for the constructed models of the Cobb-Douglas production function, the hypothesis of the absence of residual autocorrelation is not rejected, which is explained by the inertia of the variables included in it – significant fluctuations in their values in any direction are impossible, since the socio-economic system and its structural elements change gradually influenced by economic laws.

In general, all model parameters and the characterizing tests are acceptable in 15 regions only. However, in 11 of the regions, an extensive type of economic growth is observed, since the coefficient of labor elasticity exceeds that for capital elasticity. The Durbin-Watson statistics aside, among the models constructed for 21 regions and subject to economic justification, the parameters indicate fund-saving growth in 12 constituent entities of the Federation. Apparently, intensification of production is extrinsic of 23 out of 36 socio-territorial entities.

It should be noted that attempts to calculate production function models for other periods (2001-2017, 2004-2017) to improve their quality by reducing time periods in order to level the consequences of the impact of negative political and economic processes of the late 1990s did not lead to any meaningful results.

Period of study: 2000-2017*)			
Determination coefficient value (R^2)	F-test	Durbin-Watson Statistic	Student's t-test
- Minimum value – 0.955 (Rep. of Kalmykia); - Maximum value – 0.998 (Kaluga Reg., Krasnodar Terr., Stavropol Terr., Ulyanovsk Reg., Rep. of Tuva); - Regression equation closeness is high	- Minimum value – 157 (Rep. of Kalmykia); - Maximum value – 3863 (Ulyanovsk Reg.); - The F-test value for all constructed models exceeds the reference value (F-criterion = 3.68, a = 0.05) several times – the hypothesis about the random nature of the estimated parameters is rejected and their statistical significance is recognized	- No autocorrelation, if the Darby-Watson statistics at the 5% significance level belongs to the interval - [1.53; 2.47]. The Durbin-Watson statistics corresponds to the reference value in the models constructed for 22 regions; - No autocorrelation, if the Darby-Watson statistics at the 1% significance level belongs to the interval - [1.26; 2.74]. The Durbin-Watson statistics corresponds to the reference value in the models constructed for 43 regions	- The systematic influence of both factors, viz. "capital" and "labor", on the resulting indicator at a significance level of 5% has been revealed in the models constructed for 40 regions; - The systematic influence of both factors, viz. "capital" and "labor", on the resulting indicator at a significance level of 5% has been revealed in the models constructed for 5 regions (Smolensk Reg., Rep. of Karelia, Astrakhan Reg., Magadan Reg.); - The systematic influence of a single factor, viz. "labor", on the resulting indicator at a significance level of 5% has been revealed in the models constructed for 34 regions; - No systematic influence of both factors, viz. "capital" and "labor", on the resulting indicator at a significance level of 5% has been revealed in the models constructed for 4 regions (Lipetsk Reg., Vologda Reg., Rep. of Kalmykia, Khanty-Mansi Autonomous Area)

Regions where $a_1+a_2 \geq 1$	Regions where $a_1+a_2<1$	Regions where $a_1>a_2$	Regions where $a_1<a_2$
36 regions (Belgorod Reg.; Bryansk Reg.; Vladimir Reg..; Voronezh Reg.; Kaluga Reg.; Kursk Reg.; Orel Reg.; Smolensk Reg.; Tambov Reg.; Tula Reg.; Rep. of Karelia; Arkhangelsk Reg.; Kaliningrad Reg.; Novgorod Reg.; Pskov Reg.; Rep. of Adygeya; Astrakhan Reg.; Rostov Reg.; Chechen Rep.; Stavropol Terr.; Rep. of Mari El; Rep. of Mordovia; Udmurtian Rep.; Kirov Reg.; Penza Reg.; Saratov Reg.; Kurgan Reg.; Sverdlovsk Reg.; Yamal-Nenets Autonomous Area; Rep. of Khakassia; Novosibirsk Reg.; Kamchatka Terr.; Khabarovsk Terr.; Magadan Reg.; Sakhalin Reg.; Chukotka Autonomous Area)	47 regions	18 regions (Bryansk Reg.; Voronezh Reg.; Orel Reg.; Smolensk Reg.; Tambov Reg.; Rep. of Karelia; Novgorod Reg.; Pskov Reg.; Astrakhan Reg.; Rep. of Ingushetia; Chechen Rep.; Stavropol Terr.; Rep. of Mordovia; Udmurtian Rep.; Saratov Reg.; Rep. of Khakassia.; Novosibirsk Reg.; Magadan Reg.)	65 regions

Regions where all tests characterizing the model are within reference values
Ivanovo Reg. – $Y=1.636*K^{0.536}*L^{0.464}$; Kursk Reg. – $Y=0.417*K^{0.469}*L^{0.531}$; Orel Reg. – $Y=0.187*K^{0.825}*L^{0.274}$; Nenets Autonomous Area – $Y=3.037*K^{0.294}*L^{0.606}$; Kaliningrad Reg. – $Y=0.773*K^{0.385}*L^{0.642}$; Novgorod Reg. – $Y=0.481*K^{0.533}*L^{0.518}$; Stavropol Terr. – $Y=0.592*K^{0.527}*L^{0.489}$; Rep. of Mari El – $Y=0.115*K^{0.531}*L^{0.64}$; Kirov Reg. – $Y=0.397*K^{0.559}*L^{0.53}$; Nizhny Novgorod Reg. – $Y=2.285*K^{0.444}*L^{0.598}$; Saratov Reg. – $Y=0.527*K^{0.553}*L^{0.469}$; Kurgan Reg. – $Y=0.764*K^{0.564}*L^{0.443}$; Rep. of Altai – $Y=0.917*K^{0.565}*L^{0.443}$; Rep. of Tuva – $Y=1.018*K^{0.586}*L^{0.43}$; Khabarovsk Terr. – $Y=0.49*K^{0.487}*L^{0.542}$
Region where model parameters defy economic justification
- Negative sign before the capital elasticity ratio in the models of the following regions: Kostroma Reg.; Moscow Reg.; Yaroslavl Reg.; Komi Rep.; Leningrad Reg.; Volgograd Reg.; Rep. of Daghestan; Karachayevo-Circassian Rep.; Rep. of North Ossetia; Chuvash Rep.; Perm Terr.; Orenburg Reg.; Rep. of Buryatia; Kemerovo Reg.; Omsk Reg.; Tomsk Reg.; - Negative sign before the labor elasticity ratio in the model of the following region: Chechen Rep.

*) The model for the Cobb-Douglas production function for the Chechen Rep. was calculated according to the data for 2008-2017

Figure 3: Characteristics of the parameters of the production function models constructed for 83 constituent entities of the federation

5. Discussion

Of the many tools for assessing the resource availability of the territorial-economic complex, including those considered in the present study, the production function is the most deliberative. When identifying the adequacy of the quantity and quality of the economic factors in a constituent entity of the Federation for building a model of an innovative economy, the necessity to analyze the time series of absolute and relative statistical measures is evident. In addition, with reference to the views outlined in scientific works, a system of indicators has been formed, which supported ranking of the regions according to the availability of labor, physical and real capital. The integral indicator developed, with the low-component composition as an advantage, has been proposed for use not as a counterweight, but as an addition.

5.1 Specifics of using the production function

When calculating the production function, atypical deviations in terms of economic interpretation were observed, which did not allow to assess the obtained results. Thus, for the Rep. of Bashkortostan, the production function as applied in general to its real sector of the economy (2000-2017) is as follows:

$$Y = 2.2685E - 19 * K^{1.18} * L^{5.29}, \quad (3)$$

where *Y* is GRP, mln rubles, *K* is average annual cost of fixed capital, mln rubles, and *L* is average annual number of the employed, thousand people. The *Y* and *K* values are presented in incomparable prices due to unavailability of information on the index of the physical volume of fixed capital in the context of the constituent entities of the Federation, which could have become a factor that led to a significant deviation of the sum of the capital and labor elasticity coefficients (6.47) from the standard value equal to one. Furthermore, during the mentioned period, a significant depreciation of the national currency was recorded, with a small volatility in the labor force, which explains the high labor elasticity coefficient: the return on investment in labor is greater than on investment in capital only due to the disproportionality of the change in the variables of this function.

The resulting model of the Cobb-Douglas production function evades adequate economic justification, and it can be obviously explained by incomparability of the measurement units of indicators. To summarize: all the parameters of the model should be expressed either in physical terms or in terms of value in order to ensure their comparability; therefore, it is appropriate to regard the "labor" in the context of the cost of payment. This is reasonable from the perspective of accounting for both the quality of labor and the actual work time consumed.

5.2 Substantiation of the "limits" of use of the production function

The development of a model of the Cobb – Douglas function at the meso-level is acceptable subject to a number of assumptions. First, the variables expressed in cost parameters should be expressed in comparable prices, however, in the official statistical editions, such data for individual indicators are unavailable for the variety of regions, which predetermined the application of the approach disclosed herein. Second, it is still worth mentioning that to assess the real costs of wages seems impossible, because some employers practice "off-the-books" payment schemes for earned income. At the same time, the GRP includes goods, services, and works acquired, among other things, at the expense of hidden incomes of individuals, since production output depends on effective demand, regardless of the source of funds, up to a certain amount. In view of this, the designated independent variable should be used taking into account "off-the-books" wages, which is difficult due to unavailability of such information. It is incorrect to speak about the advantage of the indicator "Average annual number of the employed", since an unknown number of individuals are employed without proper registration. Third, the industrial composition of gross value added should be considered, because in some areas of production, labor is in less demand than capital, while in some others a different situation has been formed, for example, in public services, it is still difficult to replace a human with a mechanism. Consequently, the gross value added produced in a specific industry of the regional economy should act as the resulting variable, while the factors of production consumed should act as the explanatory one.

In general, the presented comprehensive view on assessing availability of production factors in an economic complex of territories increases the objectivity of determining the level of preparedness of meso-formations for innovative transformations, since it combines different types of measurement tools.

6. Conclusions

Following the study, a number of conclusions can be drawn, which clarify the prospects for applying the approach developed by the authors to assess the resource availability in the regions from the position of adaptability to the innovative economy:

- high differentiation of the innovation potential of the regions has been quantitatively evidenced, which allowed for grouping the variety of constituent entities of the Federation according to availability of labor and capital;

- the integral indicator "Index of Stability of Resource Availability for Innovative Initiatives", which determines the variability of key economic factors, i.e. capital and labor, has been recommended for use as a tool for express analysis;
- the scope of application of the standard production function for defining the type of economic growth of the territory has been substantiated, on the basis of which type a judgment is made about the degree of intensification of the reproduction cycle.

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References

Golova, I. M., & Sukhovey, A. F. (2017). "Development of Innovative Component for the Region's Economic Security". Ekonomika regiona [Economy of Region], 13, 4, 1251-1263.

Karavay, A. V. (2017). "State and Dynamics of the Quality of the Russian Workers' Human Capital". Terra Economicus, 15, 3, 144-158.

Kirilyuk, I. L. (2013). "Models of Production Functions for the Russian Economy". Computer Research and Modeling, 5, 2, 293-312.

Nureev, R. M., & Simakovsky, S. A. (2017). "Comparative Analysis of Innovation Activity of Russian Regions". Terra Economicus, 15, 1, 130-147.

Rastvortseva, S. N. (2020). "Innovative Path of the Regional Economy's Departure from the Previous Path Dependent Development Trajectory". Ekonomika regiona [Economy of Region], 16, 1, 28-42.

Rodionov, D. G., & Rudskaya, I. A. (2017). "Regıonal Innovatıve Envıronment in Natıonal Economıc Development (The Case of Russıa)". International Journal of Ecology and Development, 32, 4, 20-28.

Rodionov, D., Rudskaia, I., Degtereva, V. (2017). "Regional Foresight as a Technology for Development of the Regional Innovation System". Proceedings of the 29th International Business Information Management Association Conference-Education Excellence and Innovation Management through Vision 2020: From Regional Development Sustainability to Global Economic Growth, 2699-2705.

Romanova, O. A. (2017). "The Innovation Paradigm of New Industrialization in the Conditions of the Integrated World Economic Way". Ekonomika regiona [Economy of Region], 13, 1, 276-289.

Rudskaya, I., & Rodionov, D. (2017). "Econometric Modeling as a Tool for Evaluating the Performance of Regional Innovation Systems (with Regions of the Russian Federation as the Example)". Academy of Strategic Management Journal, 16, S2.

Samoilova, L. (2020). "Quantitative and Qualitative Indicators of Safe (Pseudo-safe) State of Territory's Economy". First Conference on Sustainable Development: Industrial Future of Territories (IFT 2020): E3S Web of Conferences, 208, 03058.

Shevchenko, I. K., Razvadovskaya, Y. V., Kaplyuk, E. V., & Rudneva, K. S. (2020). "Developing Indicators for Assessing the Dynamic Capabilities of Industrial Enterprises". Terra Economicus, 18, 1, 121-139.

Sukharev, O. S. (2016). "Economic Growth of a Rapidly Developing Economy: Theoretical Formulation". Ekonomika regiona [Economy of Region], 12, 2, 359-370.

Sukhovey, A. F. (2014). "The Problems of Providing Innovative Security in Russia". Ekonomika Regiona [Economy of Region], 4, 141-152.

Suvorov, N. V., Akhunov, R. R., Gubarev, R. V., Dzyuba, E. I., & Fayzullin, F. S. (2020). "Applying the Cobb-Douglas Production Function for Analysing the Region's Industry". Ekonomika regiona [Economy of Region], 16, 1, 187-200.

Urasova, A. A. (2019). "Regional Industry in the Digital Era: Information and Communication Dimension". Ekonomika regiona [Economy of Region], 15, 3, 684-694.

Vaseyskaya, N. O., & Glukhov, V. V. (2019). "Activities of University in Cluster Structure Based on Cobb–Douglas". St. Petersburg State Polytechnical University Journal. Economics, 12, 3, 153–161.

Vorontsovskiy, A. V. (2020). "Digitalization of the Economy and its Impact on Economic Development and Social Welfare". St Petersburg University Journal of Economic Studies, 36, 2, 189–216.

Yusupov, K. N., Toktamysheva, Yu. S., Yangirov, A. V. & Akhunov, R. R. (2019). "Economic Growth Strategy Based on the Dynamics of Gross Domestic Product". Ekonomika regiona [Economy of Region], 15, 1, 151-163.

Zemtsov, S. P., & Baburin, V. L. (2016). "Assessing the Potential of Economic-Geographical Position for Russian Regions". Ekonomika regiona [Economy of Region], 12, 1, 117-138.

Zemtsov, S., Muradov, A., Wade, I., & Barinova, V. (2016). "Determinants of Regional Innovation in Russia: Are People or Capital More Important?". Forsayt, 2, 29–42.

Knowledge as a Competitive Entrepreneurial Asset: Concepts and Practices by Early-Stage Entrepreneurs in Creative Industries

Juha Saukkonen[1] and Matti Muhos[2]
[1]JAMK University of Applied Sciences, Jyväskylä, Finland
[2]University of Oulu, Finland
juha.saukkonen@jamk.fi
matti.muhos@oulu.fi
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Abstract: Industries linked to and built on creativity and design have been described as backbones of a modern economy by the likes of Florida (2002; 2005). This paper reviews the ways early-stage entrepreneurs of creative industries conceptualise knowledge and depict their development trajectory and practices in issues concerning knowledge. These entrepreneurs operate in the context of a knowledge economy that underlines the key role of knowledge as a source of advantage. As Moore (2000) claims, knowledge intensity creates entrepreneurial opportunities and results to offer an advantage. The current view of knowledge management (KM) stretches the realm of KM beyond the ability to create. Action on knowledge contains sub-processes of knowledge creation, maintenance, renewal, organisation, and transference, for example (Wiig, 1997). This multiple case study explores the way entrepreneurs express the nature of knowledge in the enterprise and in relation to their personal entfloridarepreneur role. Light is shed on the principles and practices of KM in entrepreneurial firms. The research is an exploratory and interpretative case study, revealing patterns of thoughts and behaviour in the companies studied. A sample of seven companies whose business activity is based on design and creativity were interviewed in-depth. The collected qualitative case data is thematically content-analysed to constitute a model of companies' development trajectory in relation to knowledge. The study contributes to academic knowledge both in the areas of entrepreneurial studies as well as in KM. The practical contributions serve creativity-connected industries and early-stage entrepreneurs who can use the results to plan and foresee their KM.

Keywords: entrepreneurship, creativity, knowledge, growth, competitiveness, entrepreneur

1. Introduction

The research at hand focuses on early-stage entrepreneurs creating, manufacturing and selling design-laden products. The quest for knowledge is focused on how they define and deploy the concept of knowledge. The implicit vs explicit nature of principles and processes aiming at maintenance of knowledge assets is also studied.

The undercurrent of the economic activity has been stated to be shifting from an information era to a knowledge one. In this paradigm, value is seen to reside in the intangible assets, rather than in the tangible resources and outcomes of the firm (e.g. Boisot et al., 2007).

Knowledge has many definitions. Briefly, it can be coined an organisation's ability to act efficiently in its environment. Knowledge management (KM), in turn, is the capability to purposefully manage activities for leveraging knowledge to maintain competitive positioning (CEN, 2004). In a volatile and rapidly-developing operating environment, a firm needs to manage its knowledge dynamically, i.e. the KM needs to evolve over time and in interaction with other stakeholders (Saukkonen, 2020).

Despite the key role of a unique knowledge base in micro-sized companies' and SMEs' reason for existence and growth, actions on knowledge in this cohort are often implicit and lack processes (Saukkonen and Kreus, 2018). Earlier research has stated that processes for managing knowledge mostly derive from and are applicable to large firms. The dilemma for early-stage micro- and SME-entrepreneurs is that they are simultaneously 1) highly dependent on specific knowledge they possess and 2) resource-constrained; they integrate KM into the rest of their entrepreneurial work.

This paper reviews the ways early-stage entrepreneurs conceptualise knowledge in their entrepreneurial realm and depict their development trajectory and practices in issues concerning knowledge. The research questions set were:

RQ1: How do early-stage entrepreneurs in creative industries conceptualise knowledge?
RQ2: How do early-stage entrepreneurs depict their development trajectory in issues related to knowledge?

RQ3: How do early-stage entrepreneurs foresee their future knowledge journey?

To address these questions, the paper mirrors the primary data collected to selected frameworks and seeks a step forward in modelling the phenomenon in the specific context selected.

2. Literature review

2.1 Defining knowledge

This study is based on the construct of *knowledge as an organisation´s ability to act successfully in its environment.* With that definition it is also easy to make a distinction between knowledge and information. Knowledge is information that has been processed further from items such as experiences of the past, contextual information on the current environment and resources and experts' insights (Gamble and Blackwell, 2001). Knowledge is thus dynamic over time and states of a firm's development trajectory. The dynamism of knowledge also means the reach over the boundaries of individuals and organisations, as it emerges from interactions amongst individuals and organisations (Nonaka, Toyama and Konno, 2000). Knowledge as an asset is also context-specific, relative and situational, as it depends on a particular time and space.

The difference between information and knowledge has been a major source of difficulty for research and practice. To address this, Zeleny (1987) introduced a taxonomy of knowledge called DIKW (Data-Information-Knowledge-Wisdom). The model was extended by Hey (2004) into DIKIW, with the additional layer being Intelligence. In the DIKW/DIKIW hierarchies, the achievements in the work done at the lower layer affect the results achievable at the upper layers. A solid base of data and information facilitates better knowledge and a better chance of situational awareness, and the correct action being taken in emerging situations (Yusof et al., 2018).

2.2 Definitions of knowledge and its management

One strong current stream in knowledge management research focuses on the intellectual capital (IC) of the firm. IC consists of:

- relationship capital (Nahapiet and Ghoshal, 1998)
- human capital – the knowledge, skills and experience of individuals and their willingness to share (Baron, 2011)
- structural capital in firms' structure and process (Kianto, 2008)
- renewal capital in terms of innovative solutions (Kianto, ibid.)
- trust capital embedded in a firm's relationships regarding sharing (e.g. Mayer, Davis and Schoorman, 1995)
- entrepreneurial capital in terms of capabilities and mindset (e.g. Erikson, 2002)

Likewise, KM has been established as an umbrella term that covers various activities relating to knowledge, through which the company seeks competitive positioning and advantage. The research community has proposed various taxonomies for KM, as summarised below (Table 1).

Table 1: Divisions of KM into sub-processes

Key sources	KM sub-processes
Wiig 1997	Creation, maintenance, renewal, organisation, transference
Alavi and Leidner (2001)	Creation, storage, retrieval, transference, application
Lin (2014)	Generation, access, facilitation, integration, embedding, application, transfer, protection

This study purposefully does not opt for any of these classifications but sets out to be informed by them and to identify in the empirical part of the study the processes deployed by the early-stage creative industry and reflect the findings back onto these frameworks.

Framework on facets of knowing

As knowledge is a wide and multifaceted concept, various scholars have worked on dividing knowledge into sub-segments, as well as making a distinction between knowledge and other concepts related to it and showing the

links to the overall construct of knowledge. Zack (1999) divided knowing into the areas of: a) knowing *what* (possession of knowledge artefacts: data, patents, etc.) b) knowing *how* (processual competence) c) knowing *why* (identifying goals and paths to reach them) d) knowing *who* (having in place the necessary relationships) e) knowing *where* (understanding the context and the potential sources of relevant added knowledge and areas of application for the knowledge possessed).

ASKO-framework

Kakouris (2018) has developed the novel ASKO framework on entrepreneurial factors and beliefs to be used to understand and design entrepreneurship education. A stands for Ability, i.e. possession of talent and skills for the tasks and perceptions of that skill and performance by entrepreneurs. Support (S) refers to external aids (finance, incubation, etc.) Knowledge (K) refers to generic as well as specific knowledge needed for the firm in its context (e.g. administration skills and knowledge of a specific technology). Opportunity (O) means the situation emerging that is perceived as promising by the entrepreneur (ibid.) The authors decided to test the relative presence (rather than mutually exclusive choice) of the elements in the trajectory and foreseen future of the firm studied, not in order to refute/confirm the framework but to assess its applicability to existing early-stage companies.

2.3 The models of growth

The early-stage companies studied were in the process of growth and had identified needs and opportunities to grow further. Growth in entrepreneurial firms and domination logic or modus operandi making it possible has been described in various ways.

The three main processes that lead to growth have been named as emergence, effectuation and causation (Saukkonen, 2020). Emergence puts weight on non-linearity (Lichtenstein, 2000). In practice, emergence can lead to entrepreneurial success by the firm bringing order to an unorganised value system or by challenging the existing and potentially rigid system of value creation. In effectuation, firms and entrepreneurs seek to control their future by developing partnerships and pre-commitments from various stakeholders for their business. Causation describes a process where the entrepreneur sets a goal and then selects the best available means to achieve the goal. The three process types are not mutually exclusive, and they manifest themselves differently across states of entrepreneurs' and firms' development.

Development of an entrepreneurial firm is often depicted as a sequential process with identifiable stages. These models are referred to despite claims that they cannot reveal the unique path of each SME (Levie and Lichtenstein, 2010; Muhos et al., 2010). They also lack predictive value since they do not carry path determinism (Muhos, 2015). The stage-gate approach consists of sequential stages where essential activities are performed. The authors of this paper decided not to fix the stages/states to any prior model but provided an opportunity for their findings to arise from the data, whilst still utilising the elements of earlier models by Scott and Bruce (1987) and Skok (1997).

2.4 Specificity of knowledge in an entrepreneurial SME setting (Finalised)

KM has been studied extensively within large, mature firms specialising in KM tasks, jobs and departments. A smaller volume of research focuses on how knowledge concepts and processes are made operational in SMEs that typically have challenges with successful KM (Strobel and Kratzer, 2017). A study by Shin et al. (2017) indicated that the prevalence of knowledge resources of a new firm increases the chances an early-stage firm has of survival and (studied) short-term success, so improvements in KM action pay off for new SMEs. Thus, additional understanding of the phenomenon is likely to have both scholarly and pragmatic contributions.

For entrepreneurial firms, specifically, the knowledge of an organisation cannot be separated from the knowledge possessed by its founder-managers. Frameworks of company inception and growth (Farrokh et al., 2017) propose that at early-stage firms the knowledge conceptualisations and processes, as well as entrepreneurs' personal and contextual attributes, impact the knowledge-oriented processes of an SME.

3. Research approach and implementation

This study is an exploratory and interpretative multiple-case study (Yin, 1989; George and Bennett 2005), revealing patterns in the thinking and behaviour of creative industries. According to Yin (1989, p.23), "a case study is an empirical inquiry that: investigates a contemporary phenomenon within its real-life context" and "when the boundaries between phenomenon and context are not clearly evident". Multiple-case studies are helpful in generating and testing explanations (Herriott and Firestone, 1983). Theory testing and extension through a qualitative explanatory study is a step before conducting pure theory testing of hypotheses, as is commonly undertaken through quantitative research (Van Echtelt et al., 2008). Multiple-case studies help to create theory via replication and extension among cases. Cases can be used for the independent corroboration of propositions, and this allows researchers to perceive new patterns. Furthermore, individual cases may add complementary aspects. Bringing together individual patterns helps complete the puzzle from a theoretical standpoint (Eisenhardt, 1991).

Seven entrepreneurs whose area of business activity relies on products and services based on design and creativity were interviewed in-depth using the critical incident technique (CIT; Chell, 2004; Fisher and Oulton, 1999) to clarify how early-stage entrepreneurs conceptualise knowledge as a part of their entrepreneurial realm, depict their knowledge development trajectory and foresee their future knowledge journey. A critical incident is a behaviour that is either outstandingly effective or outstandingly ineffective in relation to the general aims of an activity (Fisher and Oulton, 1999). CIT facilitates the investigation of significant occurrences (events, incidents or issues) identified by the interviewee, the way they are managed and the outcomes perceived (Chell et al., 1998).

The collected qualitative case data is thematically content-analysed. The ways the entrepreneurs interviewed had internalised the concept of knowledge and processes and practices relating to it are interpreted by the researchers via what was expressed (externalisation) in thematic interviews. More precisely, the study at hand represents inductive interpretivism. In an inductive method, the researcher identifies the area of enquiry and aims at developing theory, or a model, from the data. Inductive research moves from particulars to generalisations.

The above characteristics of the interpretivist paradigm were applied to this research as the researchers set out to explore the phenomena (knowledge and its management) in the specific context of early-stage creative industry SMEs as experienced by stakeholders (founder/owner-managers) involved in the issue area. The approach was in this sense exploratory. Exploration is typically applied when the objective is (1) to assess the magnitude of a particular phenomenon and (2) to generate ideas about that phenomenon, or (3) to test the feasibility of establishing more extensive studies regarding the phenomenon (Bhattacherjee, 2012).

The progression of the study from theoretical background to case studies and summative conclusions is depicted in Figure 1.

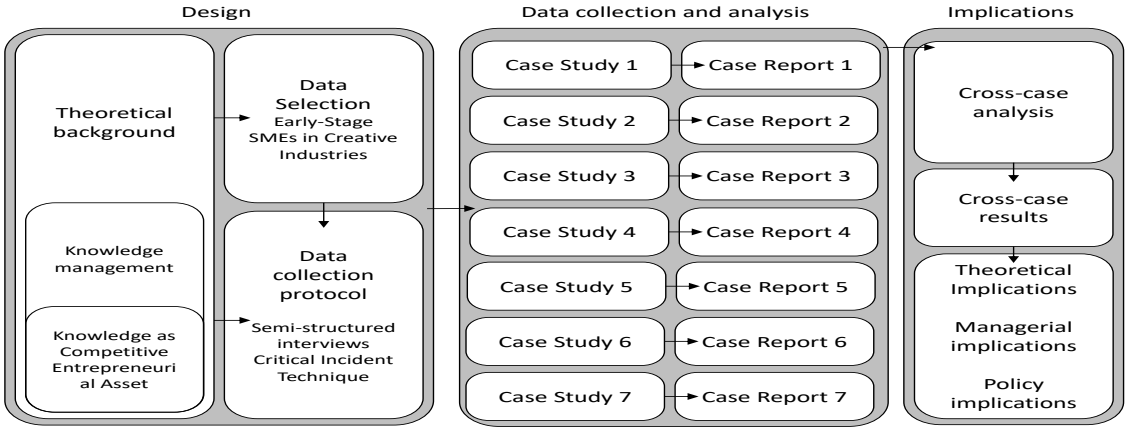

Figure 1: The research process

Altogether, seven SME companies participated in the semi-structured interviews – the content plan and main questions were decided on prior to the interviews, but themes brought up by the interviewees were added to the discussion and resulting analysis. The sales revenue of the companies varied between €40,000/year (2019)

and €1.2 million/year. The number of personnel at the companies studied ranged from one (in three cases) to ten people.

All interviews were recorded, edited verbatim and subjected to thematic content analysis, where researcher triangulation was applied; the two researchers analysed the content independently and drew their conclusions to be later merged into a joint view.

4. Results

4.1 Knowledge conceptualisation

The interviewees unanimously answered the open question asking them to define knowledge in a pragmatic and operational manner. The question itself was labelled as challenging, and most entrepreneurs answered it by giving examples of knowledge they possessed and then generalised their idea on a conceptual level. A typical definition is the following, from a founder-entrepreneur in fashion design and manufacturing:

> *"To me, knowledge is to understand situations and to be able to act in them."*

In terms of the content of knowledge and artefacts of knowledge, most early-stage firms had registered a trademark, but instead of dividing knowledge capital into fragments, they explained that:

> *"our firm as a whole story is the knowledge we capitalise on – the idea, the history, the values – you cannot and need not protect that, since it cannot be copied."*

In the same vein, the companies had very few and very loose contractual bases to control and protect their knowledge. Many entrepreneurs recognised the risk involved in such a trust-based view but added that:

> *"trust has worked so far, since our key relations are part of our story and we are parts of theirs."*

Entrepreneurs saw themselves as the key knowledge hubs 'of the whole' in their firms, yet recognised the need to spread the knowledge amongst various actors within the firm and also to allow space for other members' knowledge to have greater influence on the development of the firm.

4.2 Knowledge management development

Typical of cases in the sample was a negative incident involving exceeding one's limits of knowledge; entrepreneurs tried to find a solution to a novel situation by going beyond their experience and expertise.

> *"First I wanted to do it myself, then, luckily, I realised someone else does it way better."*

The failure of the solution caused them to turn this kind of 'affordable loss' into a knowledge acquisition process, where they found a partner/supplier to complement their own knowledge base, thus acquiring specialised knowledge on the issue at hand from external parties.

> *"It was good that we tried it ourselves; now we know what to talk about and ask for when dealing with partners and suppliers."*

Positive incidents were linked to opportunity recognition and agility in grasping the opportunity. Interviewees recalled incidents where they were able to 'mobilise' their knowledge swiftly to address to the requests of the market and/or value chain.

4.3 Knowledge and KM processes

As the prior-art literature suggested, processes relating to knowledge in the SMEs studied were largely implicit and not documented. The knowledge processes lacked milestones and responsibilities, yet at the same time a common remark was that:

> *"it (knowledge management) is happening all the time, and many people and parties are involved."*

In the discussion, many entrepreneurs expressed recognition of the need to systematise and 'processualise' KM. In one case this had even extended to recruiting for that purpose (among others) recently.

> *"We needed someone to look at the future and markets with a wider and organised view, so I can stick to creativity, where I can best drive the company further."*

4.4 The knowledge (management) trajectory across development states via established frameworks

One of the interview questions related to the by-then development trajectory and the role of different items and processes concerning knowledge in the entrepreneurial journey. The critical incidents were analysed using the theoretical taxonomies and frameworks introduced earlier (see Chapter 2). The findings of the analysis are summarised below in Table 2.

Table 2: Knowledge elements identified in development states reflected againsttheoretical frameworks

Presence of the elements of the theoretical frameworks					
State of development	**Intellectual Capital Model**	**Knowledge Management Processes**	**Areas of knowing (by Zack)**	**ASKO-framework by Kakouris**	**Process Types of Growth**
Ideation	human capital entrepreneurial capital	creation application	know what know how	Ability Opportunity	Emergence
Inception	trust capital relationship capital	acquisition exploitation transfer	know what know who	Ability Support	Effectuation Causation
Stabilisation	structural capital entrepreneurial capital	sharing protection	know where know how	Knowledge	Effectuation
Growth	relationship capital renewal capital	exploitation sharing renewal	know where know what known when	Opportunity Support	Emergence Causation
Current state (time of the interviews)					
Future Areas of Knowledge Action	structural capital entrepreneurial capital	creation exploitation dissemination	know where know how	Ability Opportunity	Causation

The findings confirm the earlier modelling by Levie and Lichtenstein (2010), which proposes instead of using a stage-based model, to instead see the trajectory of a new enterprise as an organism moving between *dynamic states* rather than sequential and well-definable stages. Seeing entrepreneurial firms through the lenses of knowledge and knowledge management, it became obvious that the knowledge capital sets, processes and valued ASKO-model elements both varied between the development states, i.e. they were dynamic and often moved backwards as well as forwards. The preferred role for entrepreneurs, however, was to be still involved in 'doing' rather than 'planning and managing': "If need be, I can still put the working overalls on and help others where needed".

This finding repeated the results of a study by Saukkonen and Vänttinen (2016), where external industry experts gave more weight to establishing processes and practices of management in company development than entrepreneurs did. Various studies (e.g. Kafaji, 2020) state that moves towards delegation and sharing of knowledge contribute positively to solid growth and are a natural process in the company timeline. However, the entrepreneurs interviewed were ready and keen to grow the business but also had an idea of a target size of the company that would be ideal for the company and their role in it, instead of ever-continuing growth. This finding resonates with the conclusions of Asante and Affum-Osei (2019), that individuals with an internal locus of control are likely to engage in entrepreneurship. Parker et al. state that entrepreneurial motivation arises from three states: 1) can do, 2) reason to do, and, 3) energised to do. The findings propose that these states are interlinked and the motivation of the entrepreneur may decrease when distanced from the 'core of doing': "An ideal size for some would be several million (euro) in sales and around 10+ people, then I would still feel like an entrepreneur".

4.5 Specificity of creative industry context to knowledge and KM

The research results did not reveal any specific knowledge sets/processes typical for the creative industries. Most entrepreneurs had experience in other industries and the advisors were not industry-specific either. Entrepreneurial knowledge was seen as generic knowledge that just had materialised in the creativity context for the respondents. A statement by one interviewee summarises well the view on what is to be an early-stage creative industry entrepreneur: "The interesting thing in this (business) is that history does not help you much;

we cannot know if customers will come back to us next time. But, well, who knows that in any business nowadays?"

5. Conclusions and discussion

5.1 Answers to the research questions.

The study provided answers to the research questions set as follows:

RQ1: How do early-stage entrepreneurs in creative industries conceptualise knowledge as a part of their entrepreneurial realm?

The early-stage entrepreneurial view on knowledge stresses the operational nature of the concept: knowledge is both born and gains its value in action. Exploitation and sharing overrule the concerns relating to knowledge protection. In early-stage enterprises the knowledge resides in individuals rather than in explicit and shared knowledge deposits.

RQ2: How do early-stage entrepreneurs depict their development trajectory and practices in issues related to knowledge?

The framework in Figure 2 depicts the way the early-stage entrepreneurial company progresses along its development trajectory via knowledge-related incidents.

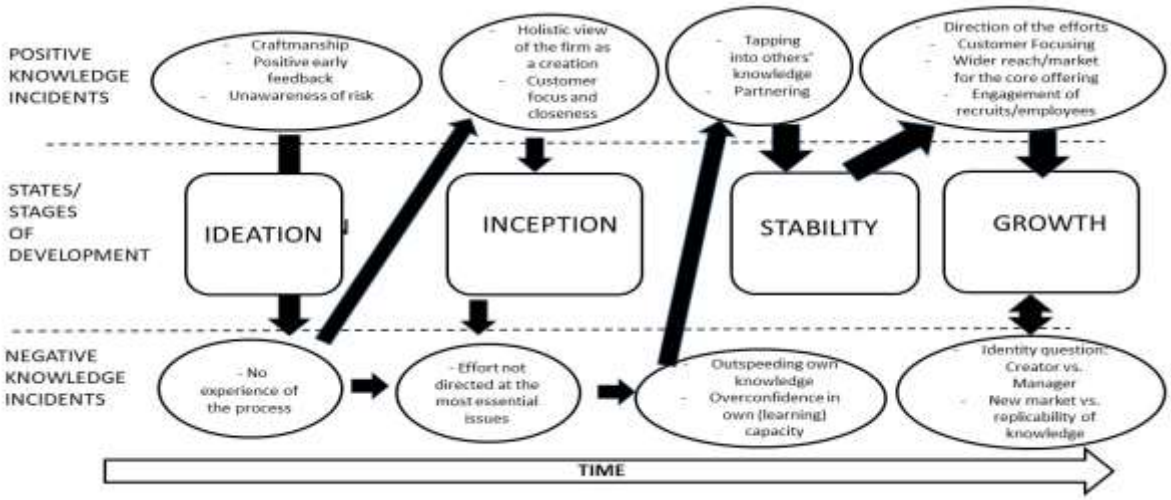

Figure 2: Knowledge-related incidents on the development trajectory

RQ3: How do early-stage entrepreneurs foresee their future knowledge journey?

The entrepreneurs interviewed face a dilemma. They recognise the needs for and benefits of structuring and sharing the knowledge depository and collaborate in pragmatic action on it. However, they wish to stay in touch with most practical aspects happening within the company. This may limit the growth of the firm, the entrepreneur themselves and the other stakeholders involved. The knowledge already possessed was still unused to its full potential, so the focus of the entrepreneurs was wider and more purposeful exploitation of the knowledge to conquer new markets and products

5.2 Limitations of the study and directions for further research

The case-study strategy using CIT proved effective for the analysis of the ways early-stage entrepreneurs conceptualise knowledge during early stages of growth, taking the sequential character of the process into account. The construct validity of the study is based on a sound research plan, multiple sources of evidence, synergy between types of data and an established chain of evidence. Analytic generalisation is possible in the case of building the context-specific frameworks applicable in creative industries. The findings of the study cannot be directly generalised to other business contexts, and they are intrinsically linked to the time of data

collection. Repeating the research in another contextual setting would shed light on whether the findings are specific to the context or have a wider generalisability. However, case-study protocol was followed and a database established, allowing for further testing of the findings.

This study resonates with an earlier finding by Cope and Watts (2000) that the concept of critical incidents is not as straight-forward as it seems. It was not easy to recall those incidents retrospectively and they were often more processes with longevity than occurrences specific in time. As Cope and Watts (ibid.) sum up: the critical incidents have potential to lead to fundamental, higher-level learning. To reach this, there is a need for knowledge and support designed to help entrepreneurs interpret critical incidents as learning experiences, in order to increase the power of the learning outcomes.

Additional research could focus on dynamics of KM, namely the dynamics over time within the company and entrepreneur trajectory and the dynamics between entrepreneurs and other knowledge actors internal and external to the company (Saukkonen, 2020).

References

Alavi, M. and Leidner, D. (2001), "Review: knowledge management and knowledge management systems: conceptual foundations and research issues", MIS Quarterly, Vol. 25 No. 1, pp. 107-136

Asante, E. A., & Affum-Osei, E. (2019). Entrepreneurship as a career choice: The impact of locus of control on aspiring entrepreneurs' opportunity recognition. *Journal of Business Research*, *98*, 227-235.

Baron, A. (2011). Measuring human capital. *Strategic HR Review*.

Bhattacherjee, A. (2012),*Social Science Research: Principles, Methods, and Practices* , 2nd ed., AnolBhattacherjee (open access textbook). Retrieved from https://scholarcommons.usf.edu/oa_textbooks/3/

Boisot, M. H., MacMillan, I. C. and Han, K. S. (2007). *Explorations in information space: Knowledge, agents, and organization*. Oxford: Oxford University Press on Demand.

CEN Comité Europeénne de Normalisation (2004a). European Guide to Good Practice in Knowledge Management-Part 5: KM Terminology. In CEN Workshop Agreement CWA 14924-5. Retrieved from: https://chupa.pbworks.com/f/CWA14924-05-2004-Mar.pdf

Chell, E. (2004) Critical incident technique, In Cassell, C and Symon, G. (Eds.), *Essential guide to qualitative methods in organisational research*, 1st ed. SAGE Publications, London, pp.45–60.

Cope, J., & Watts, G. (2000). Learning by doing–an exploration of experience, critical incidents and reflection in entrepreneurial learning. *International Journal of Entrepreneurial Behavior & Research*.

Eisenhardt, K. M. (1991) Better stories and better constructs: The case for rigor and comparative logic, *Academy of Management Review*, 16(3), pp.620–627.

Farrokh S., Kordnaeij A., Zali M.R. (2017). Factors affecting the growth of small and medium-sized enterprises. IJABAER. 2016 ;14(10):6199-6216 Available at: http://serialsjournals.com/serialjournalmanager/pdf/1479289988.pdf. (Accessed: 30 March, 2021)

Fisher, S and Oulton, T. (1999) The critical incident technique in library and information management research, *Education for Information*, 17(2), pp.113–125.

Florida, R. (2002): The Rise of the Creative Class. Basic Books, New York.

Gamble, P. R. and Blackwell, J. (2001). *Knowledge management: A state of the art guide*. London : Kogan Page Publishers

George, A. L., & Bennett, A. (2005). Case studies and theory development in the social sciences. MIT Press: London.

Herriott, R. E and Firestone, W. A. (1983). Multisite qualitative policy research: Optimizing description and generalizability, *Educational Researcher*, *12*(2), pp.14–19.

Hey, J. (2004). The data, information, knowledge, wisdom chain: the metaphorical link. *Intergovernmental Oceanographic Commission*, *26*, pp. 1-18.

Kafaji, M. (2020). Delegation and Collaboration Practices to Embrace Innovative Ideas for Business Growth in Small to Medium Enterprises. *International Journal of Entrepreneurship*, *24*(1), 1-8.

Kakouris, A. (2019). The ASKO dialectical framework for entrepreneurial courses construction: theoretical foundation. *Entrepreneurship Education*, *2*(1), 51-69.

Kianto, A. (2008), Development and validation of a survey instrument for measuring organizational renewal capability, *International Journal of Technology Management*, 42(1), pp. 69-88.

Levie, J., & Lichtenstein, B. B. (2010). A terminal assessment of stages theory: Introducing a dynamic states approach to entrepreneurship. *Entrepreneurship Theory and practice*, *34*(2), 317-350.

Lin, H. (2014), "A multi-stage analysis of antecedents and consequences of knowledge management evolution", Journal of Knowledge Management, Vol. 18 No. 1, pp. 52-74

Mayer, R.C., Davis, J.H. and Schoorman, F.D. (1995), An integrative model of organizational trust. *Academy of Management Review*, 20(3), pp. 709-734.

Moore, G. A. (2000.) *Living on the Fault Line: Managing for Shareholder Value in the Age of the Internet*. New York : Harper-Collins.

Muhos, M. (2015). Review of business growth models: methodology and the assumption of determinism. *International Journal of Management and Enterprise Development,* 14(4), pp. 288-306.

Muhos, M., Kess, P., Phvat, K., and Sanpanich, S. (2010). Business growth models: review of past 60 years. *International Journal of Management and Enterprise Development,* 8(3), pp. 296-315.

Nahapiet, J. and Ghoshal, S. (1998), Social capital, intellectual capital and the organizational advantage, *The Academy of Management Review,* 23 (2), pp. 242-266

Nonaka, I., Toyama, R. and Konno, N. (2000). SECI, Ba and leadership: a unified model of dynamic knowledge creation. *Long range planning*, 33(1), pp. 5-34.

Parker, S. K., Bindl, U. K., & Strauss, K. (2010). Making things happen: A model of proactive motivation. Journal of Management, 36(4), 827–856.

Peirce, C. S. (n.a.). Collected Papers. Edited by: Hartshorne, C., Weiss, P. and A. Burks. Cambridge, MA.: Harvard University Press.

Reed K., Lubatkin M. and Srinivasan, N. (2006) Proposing and testing and intellectual capital-based view of the firm. *Journal of Management Studies*, 43, (4), pp. 867-893

Saukkonen, J. (2020). Towards dynamic knowledge management in technology-based SMEs. *JYU dissertations*. University of Jyväskylä. https://jyx.jyu.fi/handle/123456789/71621

Saukkonen, J., & Kreus, P. (2018). Extending the Concept of Knowledge Management into Innovation and New Business Creation. In *Proceedings of the International Conference on Creativity and Innovation 2018.* Japan Creativity Society and Kindai University, pp. 11-26

Saukkonen J. & Vänttinen K. (2016) Development trajectory of an innovation-based environmental technology start-up. In *Proceedings of The 11th European Conference on Innovation and Entrepreneurship*, 15-16 September 2016. Reading : Academic Conferences and Publishing International, pp. 706-716.

Scott, M. and Bruce, R. (1987). Five stages of growth in small business. *Long range planning,* 20(3), pp. 45-52.

Shin, K., Park, G., Choi, J. Y. and Choy, M. (2017). Factors affecting the survival of SMEs: A study of biotechnology firms in South Korea. *Sustainability*, *9*(1), 108.

Skok M. (2017). *Startup Secrets – Roadmap to Success*. Available at: : https://www.slideshare.net/mjskok/startup-secrets-roadmap-to-success

Strobel, N. and Kratzer, J. (2017). Obstacles to innovation for SMEs: Evidence from Germany. *International Journal of Innovation Management*, 21(03), 1750030.

Van Echtelt, F. E., Wynstra, F., Van Weele, A. J and Duysters, G. (2008) Managing supplier involvement in new product development: A multiple-case study, *Journal of Product Innovation Management*, 25(2), pp.180–201.

Wiig, K. (1997), Knowledge management: where did it come from and where will it go?, *Expert Systems with Applications*, 13(1), pp. 1-14.

Yin, R.K. (1989) Case Study Research: Design and Methods, Sage Publications, Beverly Hills.

Yusof, W., Zakaria, O., Zainol, Z. and Ananthan, S. (2018). DIKW Application on Knowledge Based Framework with Situational Awareness. *International Journal of Academic Research in Business and Social Sciences*, *8*(6), pp. 1110-1120.

Zack, M. H. (1999). Managing codified knowledge. *Sloan management review*, 40(4), pp. 45-58.

Zeleny, M. (1987). Management support systems: towards integrated knowledge management. *Human Systems Management*. (7), pp. 59-70.

Disruptive Innovation: A Trigger of Radical Change?

Emelie Schwill[1] and Kevin Reuther[1,2]
[1]University of Applied Sciences, Zwickau, Germany
[2]University of Leipzig, Germany
Emelie.Schwill.gfb@fh-zwickau.de
Kevin.reuther@uni-leipzig.de
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Abstract: Disruptive innovations are a phenomenon that can be observed more or less frequently depending on the industry one is looking at. While they have the potential to create new markets and opportunities, they also force established companies out of traditional markets. For that reason, previous literature is mainly concerned with the question of how companies should react to disruptive innovations. However, the question of how they influence the occurrence of technological or societal change remains largely unresolved. Therefore, this paper aims to synthesize the role of disruptive innovations as drivers of radical change by means of a systematic literature review. Based on analysing 163 articles from the Scopus database, a variety of radical change processes triggered by disruptive innovations are synthesized. It is shown that for a sustainable establishment of disruptive innovations on the market, certain preconditions must be fulfilled, which affect the type and strength of the occurring changes. On the one hand, examples of destructive radical changes triggered by disruptive innovation include an emerging competition among the environment of established companies with the environment of the new ventures, that established companies are forced out of the market and that established companies often fail in adapting to disruptive innovations. On the other hand, identified constructive radical changes triggered by disruptive innovation include, for instance, an increase in the overall productivity both within organizations and markets, a positive impact towards new product development or the development of additional service offerings.

Keywords: innovation management, change management, disruptive technologies, technological change, disruption, discontinuous innovation

1. Introduction

Disruptive innovation has been discussed by academics and practitioners for many years. They are described to typically start in niches of the market, to then spread rapidly and often push established companies or technologies out of the market (Christensen, 1997). Thus, everyone has probably already used a disruptive innovation without consciously noticing it. Streaming services like Spotify (Remneland Wikhamn, B. and Knights D., 2016) and Netflix (Michael, H., Reitmeier, S. and Czichon, M., 2020) are replacing CDs and DVDs. The delivery giant Amazon has not only had a lasting impact on the book trade (Suyambu, G. T., Anand, M. and Janakirani, M. (2020) but heralded the shift from books to eBooks. Nevertheless, disruptive innovations are often ridiculed before their breakthrough. When they succeed and prevail on the market, however, their consequences are often drastic for entire industries (Kumar, V., Sundarraj, R. P., 2018).

One could therefore argue that radical change processes can be triggered by disruptive innovations under certain conditions. However, this connection between innovation and change processes has only been marginally addressed in the academic debate so far, but it could provide new explanatory models for a better understanding of disruptive innovations. Therefore, this paper aims 1) to identify influences of disruptive innovations on the occurrence of radical changes, 2) to clarify which changes are triggered by the innovations and 3) to derive potential prerequisites that are required for disruptive innovations to lead to radical changes. To answer these questions, a systematic review of the literature discussing the interrelationships between radical change and disruptive innovation is carried out. We find that previous research mainly dealt with the question of how companies should react to disruptive innovations in order not to suffer any damage. At the same time, only few studies elaborate on the question of what influence disruptive innovations have as drivers of radical change.

The remainder of this paper is structured in four parts. The first introduces a brief overview of the key terminology defining both disruptive innovation and radical change. The following section explains the review approach. We then synthesize the selected literature to derive the conditions for disruptive innovation to lead to radical changes. On this basis, the identified kinds of changes that can be triggered by the innovations are set out in detail. Finally, we provide a conclusion and an outlook on possible future research avenues on the subject.

2. Theoretical background

2.1 Disruptive innovation

According to Christensen (1997), disruptive innovations are technologies that provide a different source of value creation from mainstream technologies and are initially inferior to mainstream products in terms of the services that are particularly important to the customer. In earlier stages of the product's development, they could only serve niche segments because they did not yet meet the needs of customers in the mainstream market. In the later stages, the products are improved in terms of key features to meet the requirements of other customers as well. If a new product, despite its inferior characteristics, manages to displace a product that is already established on the market, then a disruption of the market occurs. Thus, disruptive innovations become possible whenever a product offers more than the customer needs to be satisfied (Christensen et al., 2018).

Improvements in productivity mostly arise from technological changes. According to Christensen (1997), these changes can be either disruptive or sustaining. Disruptive innovations are usually associated with a change in the technological paradigm and the business model. New products are created that are likely to drive established products out of the market. Sustained innovations do not lead to new products , but to existing products being further developed. Disruptive innovations usually do not happen as suddenly as their name suggests. Rather, they are a process and the implementation of the innovations in the market can take several decades (Christensen, Raynor and McDonald, 2015).

Disruptive innovations often look at the material or social aspects of the disruptive outcomes. Innovations are always considered disruptive if they are new to the company or industry as a whole. In addition, they require significant and expensive changes in the company's processes and their results. Innovations in general can be classified in terms of two dimensions. One is the novelty of the technology and the other is the extent to which it satisfies the needs of customers. Disruptive innovations are particularly distinctive in terms of both dimensions (Remneland Wikhamn and Knights D., 2016).

Christensen and Raynor (2003) developed Christensen's (1997) theory further. The term disruptive technology was changed here to disruptive innovations and thus includes not only innovations from the technological field but also services in the phenomenon. Christensen (2006) made clear, however, that disruptive technology and disruptive innovations cannot be equated. Disruptive innovations cannot only be understood as technologies that surpass the performance of dominant technologies. Rather, disruptive innovations can also result from a change in the business model or the underlying processes of the company (Christensen, Raynor and McDonald, 2015).

According to Markides (2006), disruptive innovations can be divided into three areas. These include innovations in the technological, business model and product areas. Markides (2012) further developed two criteria to distinguish disruptive innovations from other innovations. The first is that disruptive innovations are inferior in terms of the services a customer expects in the mainstream market, but they are also cheaper. The second criterion is that disruptive innovations evolve quickly in terms of the features that are important to customers and are nevertheless priced below what incumbents offer. If an innovation disrupts the existing conditions in the market, then it is called disruptive, even if it would otherwise be considered much more imitative (Huang, Chou and Lee, 2010).

2.2 Radical change

As a working definition for this article, the IGI Global definition of radical change is adopted. They define radical change as "change that occurs rapidly and alters the nature of social structures or organisational practices. In particular, this type of change affects the resources, norms and interpretive schemes of groups and individuals" (IGI Global, 2008).

Further, radical change can be defined as "a discontinuous change across a range of organisational characteristics and parameters" (McAdam, 2003, p. 227). Radical changes can only be identified retrospectively after a period of time (Whelan and Gond, 2017). They involve change in both the structure and the system of an organisation (Greenwood and Hinings, 1993). Permission from an authority is helpful for radical change.

However, it is not sufficient on its own. Those affected by the change must see it as meaningful for it to finally take hold (Hyndman and Liguori, 2018).

Radical change is different from routine change in organisations. These routine changes come about through revisions or improvements in work processes or efficiency and happen over time. Radical change, in contrast, seeks to redistribute structures, functions, values, culture, strategy, power distribution or control in the organisation (Scalzo, 2006).

3. Literature review approach

We follow a systematic literature review approach as suggested by Tranfield et al. (2003). This chapter therefore summarizes the key decisions made in the course of the review process related to the choice of databases, keywords as well as inclusion and exclusion criteria. In order to get an overview of the relationship between disruptive innovations and radical change, we used Google Scholar and Scopus to identify articles that address the influence of disruptive innovations on radical change. Based on initial readings, we derived and refined keywords for a comprehensive database search. The Scopus database was chosen due to its comprehensiveness offering access to over 23,500 peer-reviewed journals (Elsevier, 2019). The search was carried out on the 1st of March 2021 using the keywords "disruptive innovation" in connection with "change", "transformation" or "turn around management". This initially let to 163 sources with the search terms in the title, abstract or keywords. The results were then refined using the inclusion criteria of the document type needing to be an article and the language needing to be English. This led to the exclusion of 53 articles and left 110 papers for further analysis.

To prepare for a focused synthesis, we followed the advice of Elsbach and Knippenberg (2020) on integrative reviews, who suggest that when studying a broader research field (such as disruptive innovation), the synthesis should typically focus on a particular, narrow aspect. In our case, this aspect is the specific discussion of when and how disruptive innovation processes can trigger radical change. We thus checked the remaining papers by reading their titles and abstracts to see whether they could contribute to answering our research questions, finding that only 25 deal with this particular issue and thus form the core literature for this paper. The ten most cited sources have been presented below in a table for better comprehensibility.

Table 1: Most cited sources

Authors	Year of publication	Paper Title	Summary Details	Cited by
Christensen	1997	The Innovator's Dilemma: When New Technologies Cause Great Firms to Fail	Extends the concept developed by Christensen in 1995 to disruptive innovations	5955
Rochet, Tirole	2003	Platform Competition in Two-Sided Markets	Considers disruptive innovation markets with network externalities and builds a model of platform competition with two-sided markets	1628
Olivia, Kallenberg	2003	Managing the transition from products to services	Describes to what extent the integration of services makes sense for manufacturers	1330
Bower, Christensen	1995	Disruptive Technologies: Catching the Wave	Explores why leading companies fail as soon as markets or technologies change	1300
Adner, Kapoor	2010	Value creation in innovation ecosystems: how the structure of technological interdependence affects firm performance in new technology generations	Presents the connection between innovations companies and the efforts of companies in their environment	1011
Parker, van Alstyne, Choudary	2016	Platform revolution. How networked markets are transforming the economy and how to make them work for you	Describes how platform companies manage to disrupt traditional businesses	690
Gawer, Cusumano	2014	Industry Platforms and Ecosystem Innovation	Shows the impact of industry platforms on innovation inside and outside the company	666
Marcides	2006	Disruptive Innovation: In Need of Better Theory	Discusses the three specific types of disruptive innovations	567

Authors	Year of publication	Paper Title	Summary Details	Cited by
Gawer	2014	Bridging differing perspectives on technological platforms: Toward an integrative framework	Presents a framework for management research on technological platforms	540
Christensen, Raynor	2003	What is disruptive innovation	Tries to correct the misinterpretation of the concept of disruptive innovation	498

4. Synthesis – disruptive innovations as triggers of radical change

4.1 Preconditions of disruptive innovations to trigger radical change

According to Christensen (1997), there are two requirements for market disruption. The first is a performance excess of the product's characteristics in the mainstream market. The second requirement is asymmetric incentives between the existing incumbent business model and the potentially disruptive new competitor. The impact of technological change can be measured by the frequency with which changes occur (Assini, 2006).

A technology in itself is not sustainable or disruptive as it always depends on the interaction of a network in the context of other social and material elements. The power of an innovation does not come from the inner core itself, but from how it behaves together with the culture and norms of society. Thus, disruptive innovations rely on elements that lie outside their technological core (Remneland Wikhamn and Knights D., 2016).

All attempts to describe disruptive innovations go back to how they differ from existing knowledge and methods. Furthermore, the argument in favour of change in the context of disruptive innovations is that major technological changes can have a creative but also destructive impact on the already existing industry. On the one hand, the innovations can disrupt the market through the new knowledge they come with. On the other hand, they can also expand existing knowledge (Remneland Wikhamn and Knights D., 2016).

Furthermore, there are three prerequisites that make disruptive innovations possible. These include resource allocation, organisational structure, and organisational culture. Established companies are often not committed to disruptive innovations due to their dependence on resources. This is due to the attempt to maintain their current business models or to satisfy their existing customers (Christensen, 2006). Moreover, companies are more likely to invest in other incumbents because they are more predictable and have a perceived advantage (Yu Dan and Hang Chang Chieh, 2008).

Disruptive innovations can both strengthen or weaken companies. This depends entirely on how the different actors interact or overlap. The answer lies not only in the core technology itself, what impact the technology will have in the market. It is much more in the network of stakeholders how stable or unstable it is through complex relationships, technological artefacts, and socio-political associations. The success of a disruptive innovation depends on how successfully it can associate itself with culture, politics, and social norms (Remneland Wikhamn and Knights D., 2016).

4.2 Two ecosystems in competition

Disruptive innovations trigger a phase of competition that usually ends with the incumbent disappearing from the market (Dedehayir, Ortt and Seppänen, 2017). The appearance of the disruptive innovation leads to two ecosystems of innovation that compete with each other. The disruptive innovation prevails against the incumbent and thus leads to the restructuring of the stakeholders and their connections with each other. Especially the ecosystem of the established company in the market is reconfigured. This reconfiguration can take place in five different ways. First, the stakeholders and the tasks assigned to them can be rearranged. Furthermore, tasks can be subdivided and taken over by different sectors of the market from now on. A third possibility is that different tasks are now handled by one provider alone. In addition, a new market player can take over tasks that have not been done so far, but which benefit the ecosystem. The last possibility is that existing companies and their tasks disappear from the ecosystem (Adner, 2012).

The value of structures in an ecosystem is inherently different between companies with disruptive innovations and those already established in the market. From the beginning of a disruption, all participants in the market

have to re-sort themselves and their connections to other companies. Some of the resulting changes are harmful, while others can strengthen the position of market participants (Adner, 2017).

We live in a time in which there are permanent disruptions to the existing market order. There are always fundamental changes that result in disrupting or reorganising the way existing businesses and their associated ecosystem work. The existing relationships of members in the ecosystem are radically reconfigured by innovation (Kumaraswamy, Garud and Ansari, 2018). In doing so, innovation impacts interactions across the ecosystem (Adner and Kapoor, 2010, Jacobides, Cennamo and Gawer, 2018). For incumbents, innovation can disrupt pre-existing relationships (Kumaraswamy, Garud and Ansari, 2018). Especially in systematic industries with multi-sided platforms, it is difficult to build a new viable ecosystem for the companies with disruptive innovations (Gawer and Cusumano, 2014, Hagiu, 2015, Nambisan, Siegel and Kenney, 2018, Parker, van Alstyne and Choudary, 2016, Rochet and Tirole, 2003).

When different members of an ecosystem coalesce around a platform, their intentions and motivations diverge, even if they produce value together. Thus, some relationships are cooperative, and some are competitive. In this process, new innovations may occur that disrupt the disruptive innovations. It can also happen that established companies manage to use the disruptive innovations for themselves or cooperate with them. Thus, disruptive innovations must also continue to evolve (Kumaraswamy, Garud and Ansari, 2018).

4.3 Forcing established incumbents out of the market

A key characteristic of disruptive innovations is that they displace companies already established in the market. Over time, products improve very quickly in terms of the features that are important to customers. In this way, new companies succeed in capturing larger and larger areas of the market, where they can offer good products for lower prices. Established companies only have the option of shifting to higher-priced segments until they are finally forced out of the market. Disruptive innovations thus ensure that the distribution of power in the market changes (Remneland Wikhamn and Knights D., 2016).

Over time, the innovations improve and manage to serve larger segments in the market, thus starting a power struggle between the incumbents and those new to the market. As the incumbents are not aware of the potential threat of the disruptive innovations, they react too late or not at all. This forces them to leave the market (Sandberg and Hansén, 2004). Furthermore, disruptive innovations pose different challenges to established companies and have a different meaning for management (Remneland Wikhamn and Knights D., 2016).

Established companies do not learn from the disruptive innovations of the past. They continue to serve only the mainstream market, because this is where the highest profits can be generated, and do not invest in new technologies that the customer does not need at the moment, but which could be important later. When it comes to decision-making, management continues to focus on established customers because this promises secure profits (Bower and Christensen, 1995).

Often, disruptive innovations are underestimated before they take over the market. Other, established companies do not recognise the threat they pose and do not take countermeasures or do so too late. The term disruptive is also not exactly tangible because it has a different meaning for each company. For some companies, innovations are more disruptive than for others, because some companies already have the prerequisites necessary to make the innovations work for them. For these companies, the innovation is then less disruptive. However, companies that are structured differently than the disruptive innovations require are usually not able to use the disruptive innovations for themselves and suffer disadvantages from the emergence of the innovation (Christensen et al., 2018).

When disruptive innovations take place in new markets, they do not necessarily undercut incumbents in price. Most of the time, it is more likely that customers get a better product because both the incumbent company and the one with the innovation are struggling to attract customers. When disruptive innovations enter the market, the incumbent firm may no longer receive sufficient supply from other firms or market participants. But it may also happen that the value of the incumbent changes because tasks that were previously done by one company are now done by several companies and the new entrants (Dedehayir, Ortt and Seppänen, 2017).

Disruptive innovations manage to drive established companies out of the market because they can offer customers better value or benefits. This does not always have to be a low price. It can also be additional benefits, such as better availability or flexibility (Dedehayir, Ortt and Seppänen, 2017). For example, disruptive innovations also create platforms where the user can both provide the services and be a customer (Gawer, 2014).

Innovation will primarily lead to competitive advantages. Especially if it is based on a novel management principle that challenges long-standing orthodoxy and is part of an ongoing programme of rapid discovery of innovation where progress increases over time (Hamel and Breen, 2007). Disruptive impact is also achieved because radical and continuous change come together. In industries where disruptive innovation is particularly prevalent, the firms that lead the market change frequently (Bower and Christensen, 1995).

4.4 Overall productivity of the market increases

The entry of more effective firms like the ones with disruptive innovations affects the overall productivity of the market. At the macro level, an additional and consolidated feature of disruptive innovations is the change in the technological paradigm (Walsh and Linton, 2000, Kostoff, Boylan and Simons, 2004, Ho and Lee, 2015, Kaal, 2016). For sustaining innovations, the impact on productivity is almost always positive. For disruptive innovations, it can be negative.

The impact of disruptive innovations can be different, at different points in time and in different countries. However, the impact of displacing incumbent firms is always greater than the effect of replacing them. The existence of less productive firms in the market goes in favour of more productive firms, which have an impact on the overall productivity of the market at the macro level. The reallocation of factors towards new and more productive firms influences overall productivity. The value of disruptive innovations is the value added by the new firm that emerges in the market and the value lost by displacing an incumbent firm from the market. The same disruptive innovation can have positive effects in some areas and negative effects in others (Feder, 2018).

4.5 Product development

Disruptive innovations can have a substantial impact on product development performance. The first important reason is that these innovations disrupt existing markets in order to identify new ones. The second is that incumbents do not have enough knowledge regarding disruptive innovations and try to increase their knowledge in this regard. Disruptive innovations lead to an increase in profit and sales of the company. In addition, the presence of an innovation team and increased effectiveness in product development can help the company position itself in the competitive environment. Knowledge management and innovation gaps are important factors and their relationship to variable efficiency of new product development is noticeable (Salavati, Abdi and TeymoorPayandeh, 2015).

4.6 Additional services

A lack of innovation in companies is often compensated with services that are part of the product. Disruptive innovations have the effect to change such services. They often make service offerings redundant because the products are already on such a high level that they do not require additional services (Oliva and Kallenberg, 2003).

On the other hand, services that are part of the product can be critical for radical innovation because their novelty is difficult for users to understand and companies need to help customers learn about new product features and perform them appropriately. Furthermore, these services can also be interesting for companies to prevent imitation of the innovations (Levin et al., 1987).

Disruptive innovations help companies to offer services to the product. They are the primary determinant of these services (Avadikyan, Lhuillery and Negassi, 2016). It is also possible that innovations increase the value of existing products and services. On the other hand, they can also render existing business models useless. They disrupt the value chain and make companies rethink what is valuable to them (Kumaraswamy, Garud and Ansari, 2018).

5. Conclusion

Based on the threefold aim of this paper to 1) identify influences of disruptive innovations on the occurrence of radical changes, 2) clarify which changes are triggered by the innovations and 3) derive potential prerequisites that are required for disruptive innovations to lead to radical changes, we developed a consolidating framework based on the academic literature published on the subject that summarises key prerequisites and potential consequences of disruptive innovation causing radical change. This is illustrated in Figure 1.

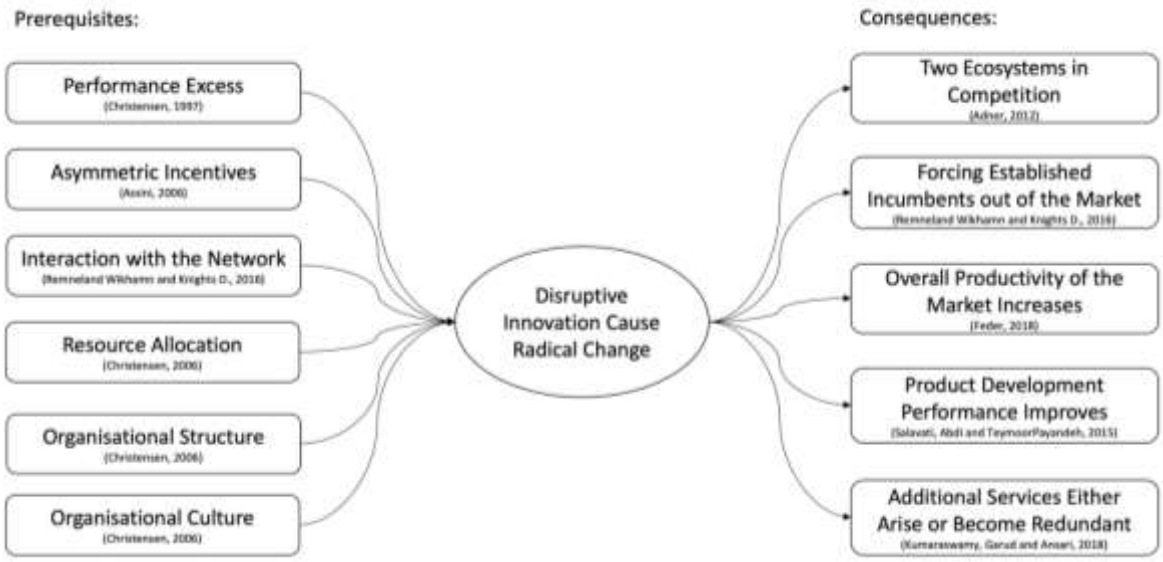

Figure 1: Prerequisites and consequences of disruptive innovations

Disruptive innovations never stand alone. Their existence depends on external factors. These determine the extent to which they are able to disrupt the market. One of the possible destructive changes that can occur is the competition between two ecosystems. The disruptive innovations have to build their own new ecosystem of suppliers and cooperating companies and are in competition with the already existing ecosystem of the established companies. Furthermore, disruptive innovations displace companies already established on the market. The disruptive innovations compete with them and, by offering added value to customers, manage to displace the incumbents into other segments of the market and eventually completely. Nevertheless, many established companies have not learned from the past and react too late or not at all to the appearance of disruptive innovations on the market. Thus, it is still possible for the disruptive innovations to displace incumbents and take the lead in the market themselves.

Disruptive innovations can also lead to constructive changes like an increase in the overall productivity of the market. They usually establish a new technology or a new way of working that is more efficient than the one currently prevailing in the market. Product development is also influenced by disruptive innovations. Existing markets are destroyed, or established companies are displaced. To counteract this, established companies must become active and make a counteroffer to the customers. Since disruptive innovations usually offer new functions in a product that the customer did not know before, these innovations are often offered together with services when they are introduced to the market in order to support the customer in using them. On the other hand, it is also possible that a disruptive innovation improves a product in a way that makes service no longer necessary, and the product can be offered at a lower price than before.

In conclusion, disruptive innovations have a great impact on radical change. From their definition, it can be concluded that it is always an innovation that displaces established companies. Thus, it can be said that an innovation that is described as disruptive always leads to radical changes at the same time. The radicality of the occurring changes depends on the conditions in the environment in which the disruptive innovation wants to establish itself.

Further considerations could examine potential negative effects of disruptive innovations as drivers of radical change. Another interesting question would be in which cases the changes that are triggered turn out to be less radical and why.

References

Adner, Ron (2012). The wide lens. A new strategy for innovation. London, Portfolio Penguin.

Adner, Ron (2017). Ecosystem as Structure: An Actionable Construct for Strategy. Journal of Management 43 (1), 39–58. https://doi.org/10.1177/0149206316678451.

Adner, Ron and Kapoor, Rahul (2010). Value creation in innovation ecosystems: how the structure of technological interdependence affects firm performance in new technology generations. Strategic Management Journal 31 (3), 306–333. https://doi.org/10.1002/smj.821.

Avadikyan, A., Lhuillery, S. and Negassi, S. (2016). Technological innovation, organizational change, and product-related services. Management 19 (4), 277–304.

Bower, J. L. and Christensen, Clayton M. (1995). Disruptive Technologies_ Catching the Wave. Harvard business review, 43–53.

Christensen, C. M. (2013). The innovator's dilemma: when new technologies cause great firms to fail. Harvard Business Review Press.

Christensen, Clayton M. (1997). The Innovator's Dilemma: When New Technologies Cause Great Firms to Fail.

Christensen, Clayton M. (2006). The Ongoing Process of Building a Theory of Disruption. Journal of Product Innovation Management 23 (1), 39–55. https://doi.org/10.1111/j.1540-5885.2005.00180.x.

Christensen, Clayton M., McDonald, Rory, Altman, Elizabeth J. and Palmer, Jonathan E. (2018). Disruptive Innovation: An Intellectual History and Directions for Future Research. Journal of Management Studies 55 (7), 1043–1078. https://doi.org/10.1111/joms.12349.

Christensen, Clayton M. and Raynor, M. E. (2003). The innovators solution: Creating and sustaining successful growth, Harvard Business School.

Christensen, Clayton M., Raynor, M. E. and McDonald, Rory (2015). What is disruptive innovation. Harvard business review, 44–53.

Dedehayir, Ozgur, Ortt, J. Roland and Seppänen, Marko (2017). Disruptive change and the reconfiguration of innovation ecosystems. Journal of technology management & innovation 12 (3), 9–21. https://doi.org/10.4067/S0718-27242017000300002.

Elsbach, K. D. and Knippenberg, D. (2020). Creating High-Impact Literature Reviews: An Argument for 'Integrative Reviews'. Journal of Management Studies, 57(6), 1277-1289. doi:10.1111/joms.12581

Elsevier (2019). Scopus - Data | Curated. Connected. Complete. Elsevier B.V. Retrieved 28.04.2021 from https://www.elsevier.com/solutions/scopus

Feder, Christophe (2018). The effects of disruptive innovations on productivity. Technological Forecasting and Social Change 126, 186–193. https://doi.org/10.1016/j.techfore.2017.05.009.

Gawer, Annabelle (2014). Bridging differing perspectives on technological platforms: Toward an integrative framework. Research Policy 43 (7), 1239–1249. https://doi.org/10.1016/j.respol.2014.03.006.

Gawer, Annabelle and Cusumano, Michael A. (2014). Industry Platforms and Ecosystem Innovation. Journal of Product Innovation Management 31 (3), 417–433. https://doi.org/10.1111/jpim.12105.

Greenwood, Royston and Hinings, C. R. (1993). Understanding Strategic Change: the Contribution of Archetypes. Academy of Management Journal 36 (5), 1052–1081. https://doi.org/10.5465/256645.

Hagiu, A. (2015). Strategic decisions for multisided platforms. Top, 10, 4-13.

Hamel, G. and Breen, B. (2007). The future of management. Language, 14(272p), 24cm.

Huang, Ju-Yu, Chou, Tzu-Chuan and Lee, Gwo-Guang (2010). Imitative innovation strategies. Management Decision 48 (6), 952–975. https://doi.org/10.1108/00251741011053488.

Hyndman, Noel and Liguori, Mariannunziata (2018). Achieving radical change. Accounting, Auditing & Accountability Journal 31 (2), 428–455. https://doi.org/10.1108/AAAJ-04-2016-2527.

IGI Global (2008). Available online at https://www.igi-global.com/dictionary/how-do-you-know-if-it-is-any-good/24444.

Jacobides, Michael G., Cennamo, Carmelo and Gawer, Annabelle (2018). Towards a theory of ecosystems. Strategic Management Journal 39 (8), 2255–2276. https://doi.org/10.1002/smj.2904.

Kumar, V. and Sundarraj, R. P. (2018). The Value of Disruptive Innovations. In Global Innovation and Economic Value (pp. 189-256). Springer, New Delhi.

Kumaraswamy, Arun, Garud, Raghu and Ansari, Shahzad (2018). Perspectives on Disruptive Innovations. Journal of Management Studies 55 (7), 1025–1042. https://doi.org/10.1111/joms.12399.

Levin, Richard C., Klevorick, Alvin K., Nelson, Richard R., Winter, Sidney G., Gilbert, Richard and Griliches, Zvi (1987). Appropriating the Returns from Industrial Research and Development. Brookings Papers on Economic Activity 1987 (3), 783. https://doi.org/10.2307/2534454.

McAdam, Rodney (2003). Radical change: a conceptual model for research agendas. Leadership & Organization Development Journal 24 (4), 226–235. https://doi.org/10.1108/01437730310478093.

Markides, Constantinos (2006). Disruptive Innovation: In Need of Better Theory*. Journal of Product Innovation Management 23 (1), 19–25. https://doi.org/10.1111/j.1540-5885.2005.00177.x.

Markides, C. C. (2012). How disruptive will innovations from emerging markets be?. MIT Sloan Management Review, 54(1), 23.

Michael, H., Reitmeier, S. and Czichon, M. (2020). Netflix and kill? Disruptive Innovation im Zeitalter der Digitalisierung. M&K Medien & Kommunikationswissenschaft, 68(4), 386-405.

Nambisan, Satish, Siegel, Donald and Kenney, Martin (2018). On open innovation, platforms, and entrepreneurship. Strategic Entrepreneurship Journal 12 (3), 354–368. https://doi.org/10.1002/sej.1300.

Oliva, Rogelio and Kallenberg, Robert (2003). Managing the transition from products to services. International Journal of Service Industry Management 14 (2), 160–172. https://doi.org/10.1108/09564230310474138.

Parker, Geoffrey, van Alstyne, Marshall and Choudary, Sangeet Paul (2016). Platform revolution. How networked markets are transforming the economy and how to make them work for you. New York, W. W. Norton & Company.

Remneland Wikhamn, B. and Knights D. (2016). Associations for disruptiveness: The Pirate Bay vs Spotify. Journal of technology management & innovation 11 (3), 40–49.

Rochet, Jean-Charles and Tirole, Jean (2003). Platform Competition in Two-Sided Markets. Journal of the European Economic Association 1 (4), 990–1029. https://doi.org/10.1162/154247603322493212.

Salavati, Mehran, Abdi, Farshid and Teymoor Payandeh, Amir (2015). A structural equation modelling to investigate and analyze the relationships among new product development, disruptive innovation, fuzzy-front end, knowledge management, and team vision. Uncertain Supply Chain Management 3 (2), 129–140. https://doi.org/10.5267/j.uscm.2014.12.008.

Sandberg, Birgitta and Hansén, Sten-Olof (2004). Creating an international market for disruptive innovations. European Journal of Innovation Management 7 (1), 23–32. https://doi.org/10.1108/14601060410515619.

Scalzo, Nicholas J. (2006). Memory loss? Corporate knowledge and radical change. Journal of Business Strategy 27 (4), 60–69. https://doi.org/10.1108/02756660610677137.

Suyambu, G. T., Anand, M. and Janakirani, M. (2020). Blockchain–A Most Disruptive Technology On The Spotlight Of World Engineering Education Paradigm. Procedia Computer Science, 172, 152-158.

Tranfield, D., Denyer, D. and Smart, P. (2003). Towards a Methodology for Developing Evidence-Informed Management Knowledge by Means of Systematic Review. British Journal of Management, 14(3), 207-222. doi:10.1111/1467-8551.00375

Wan, Feng, Williamson, Peter J. and Yin, Eden (2015). Antecedents and implications of disruptive innovation: Evidence from China. Technovation 39-40, 94–104. https://doi.org/10.1016/j.technovation.2014.05.012.

Whelan, Glen and Gond, Jean-Pascal (2017). Meat Your Enemy. Journal of Management Inquiry 26 (2), 123–138. https://doi.org/10.1177/1056492616671828.

Yu Dan and Hang Chang Chieh (2008). A reflective review of disruptive innovation theory. In: Dundar F. Kocaoglu/Timothy R. Anderson/Tugrul Unsal Daim et al. (Eds.). 2008 Portland International Conference on Management of Engineering & Technology. Cape Town, South Africa, 27-31 July 2008. [Piscataway, N.J.], IEEE.

Start-up Lab: A Springboard for University Entrepreneurship and Students' Start-ups

Alessandra Scroccaro and Alessandro Rossi
University of Trento, Italy
alessandra.scroccaro@unitn.it
alessandro.rossi@unitn.it
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Abstract: Entrepreneurship education initiatives can play an important role in promoting entrepreneurial skills and a proactive mindset in learners, as well as in launching new business ventures from students graduating from higher education institutions. Since 2013 the course Start-up Lab is striving to promote entrepreneurship, creativity, and innovation skills for graduate students, Ph.D. candidates, and lifelong learners of the University of Trento. Start-up Lab is an extracurricular 3-month program carried out by CLab Trento, an interdepartmental initiative of the University of Trento that aims to enable students with different backgrounds to work on the creation and incubation of their ideas through entrepreneurial learning activities. As a hands-on laboratory, Start-up Lab follows five steps: idea generation, validation, business modelling, financial planning and pitching. The program core is based on the principles of business design, a methodology for designing innovative products and services that meet the needs of the customers, through an iterative and incremental method aimed at testing the main assumptions underlying an innovative business model well before the launch of the real product on the market. The course has adopted a comprehensive learning assessment toolkit, as means to infuse into students a self-reflective mindset and a self-directed learning approach. This laboratory trains students to develop an enterprising mindset to support new venture creation and, more generally, the upskilling of human capital, also in terms of employability in the job market.

Keywords: entrepreneurship education, students' entrepreneurship, business modelling, lean startup, innovation, enterprising competency, learning assessment tools

1. Introduction: The innovation and education background in the Trentino region

Entrepreneurship education is increasing in popularity in business and technical schools, universities, and higher education institutions worldwide (Katz, 2008). It is strategically recognized as a way to make an impact by responding to societal challenges and learning needs and capitalising on new trends and research opportunities responding to educational and social challenges (Jones et al., 2021). Educating in entrepreneurship is also a strategic challenge in European policies envisioned to sustain youth's employability (Entrepreneurship 2020 Action Plan) and can play an important role in promoting entrepreneurial skills and a proactive mindset in learners, as well as in launching new business ventures from students graduating from higher education institutions (Cassia et al., 2014; Del Palacio et al, 2008; Maas and Jones, 2017; Nelles and Vorley, 2011; Secundo et al., 2016). Such efforts, if supported by a local innovation ecosystem, have much more opportunities to become real start-ups (Wright et al., 2017).

In this paper, we describe the case of Start-up Lab, an entrepreneurship education program developed over the past years at the University of Trento. The institution is a key innovation catalyst in its region (the Autonomous Province of Trento, located in the Northern part of Italy), due to the research excellence of its departments as well as the other structures devoted to entrepreneurial education, such as CLab Trento, an interdepartmental initiative, located within the School of Innovation, which aims at promoting entrepreneurship, creativity, and innovation skills. Without claiming to be a model, the program might be considered as a springboard for university students' start-ups.

The rest of the paper is organized as follows: after a brief description of the entrepreneurship education context at the University of Trento and in CLab Trento (Section 2), we will present the Start-up Lab program, focusing on the five main steps followed by students to develop a business idea into a business project ready for launch into the market (Section 3). Then, we will describe the assessment toolkit which was recently introduced in the latest edition of the program (Section 4). Finally, we will discuss some learned lessons on the program, and we particularly address how to improve the impact of our program with respect to the formation of human capital and enterprising skills within the participants (Section 5).

2. CLab Trento and the Start-up Lab program

Contamination Lab Trento (CLab Trento) is an initiative funded by the Italian Ministry of University and Research (MIUR) in 2017 that aims to enable university students with different backgrounds to work on the development of their business ideas through entrepreneurial learning activities (Secundo et al., 2020). Cross-fertilization is a principle inspiring the organization of all interactions for the participants and takes place at different levels. Firstly, among students coming from different courses and departments, who have the unique opportunity to interact and work together, typically developing their entrepreneurial project in a semester-long stint engaging with peers having complementary backgrounds and interests. Secondly, among students and instructors from different departments and disciplines, where both parties need to figure out a common language and how to effectively understand each other. Thirdly, with local and international stakeholders (companies, start-ups, investors, experts, etc.) who are directly involved in the educational activities and interact with the students in various ways.

CLab Trento consists of a large co-working facility located within the School of Innovation (a cross-departmental centre for innovation targeting mostly graduate students, but also open to bachelors, faculties, and alumni). The facility is managed in collaboration with Hub Innovazione Trentino (a foundation set up by the University with other local actors, namely two research centres - Fondazione Edmund Mach and Fondazione Bruno Kessler - and Trentino Sviluppo, the local development agency) that aims at promoting the results of research and innovation in the Trentino region and supporting the development of the local economy. In line with the belief that the learning environment is a fundamental driver for students' participation and engagement, as well as for the innovation and creativity of business ideas (Apostolopoulos et al., 2018), all the details of the facility (such as the ensemble of the infrastructure, the layout of the classrooms, meeting rooms and other common areas, and the opportunities for interactions in the various spaces between learners, instructors, mentors) have been carefully designed so that the location is perceived as a stimulating environment designed to encourage entrepreneurial approaches and to inspire the principles of proactive problem-solving, sustainability, innovation, and learning by doing.

CLab Trento is not only connected within the regional ecosystem but is also involved in various EU-funded networks of collaboration and exchange with other Higher Education Institutions. Among them, a prominent one is represented by ECIU University, a European Consortium of Innovative Universities which brings together fourteen universities united by their marked international openness, quality, and innovation in teaching and research and the connection with the business world. The consortium aims to create a revolutionary and innovative educational model on a European scale, in which students, researchers, companies, public organizations, and citizens work together the challenges-based learning methodology (Nichols and Cator, 2008; Observatory Tecnológico of Educational de Monterrey, 2015) to find innovative solutions that have a positive and solid impact on society. In 2019 CLab Trento was awarded the Special Highly Recommended Award for Innovation in Teaching and Learning by the ECIU Consortium.

Within this context, CLab Trento offers every year an extracurricular 3-month program, namely, Start-up Lab, focused on generating business ideas, aimed at developing entrepreneurial skills and facilitating new venture creation. The program, since 2013 promotes entrepreneurship, creativity, and innovation skills for Master, Ph.D. and post-doc students willing to apprentice entrepreneurial and intrapreneurial skills and to put the basis for a startup. Every year almost 200 participants apply to the program and around half of them are selected, according to a series of criteria, such as the personal motivation to get involved in an entrepreneurship education experience; previous experience or involvement in innovation, entrepreneurship, and technology experiences; personal expectations on the program and learning goals. Individual applicants with an already well-developed business idea are given closer scrutiny during the selection process, but the program also accommodates the application of students without a well-developed idea.

Start-up Lab provides students with the opportunity to engage with a wide network of instructors, staff, external experts, and senior and junior mentors. Senior mentors are typically professionals working in startups, companies, or in the Trentino innovation ecosystem, with sizeable experience in business development and a passion for "giving back" by coaching students. After the completion of the program, senior mentors can help and support students and teams by offering internship and networking opportunities. Junior mentors are alumni of the program, usually, former participants who provide support activities to the ones current engaged in the

program. The establishment of such a peer mentoring program further the learning opportunities both for attending students and past ones, while also securing inter-generational ties between alumni of the program.

3. The Start-up Lab: A five steps program to launch student start-ups

Start-up Lab is meant to complement students' curricula by employing teaching methods based on laboratory learning, problem-based learning, and challenge-based learning.

The course introduces learners to the topic of business design, a methodology for designing truly innovative products and services desired by customers and economically sustainable, through an iterative and incremental methodology that allows students to test the main assumptions underlying the business model before launching on the market the product. Students are introduced to various techniques drawn from lean start-up (Ries, 2011), business modelling (Osterwalder and Pigneur, 2009), design thinking (Brown, 2019), and user-centric design practice (Lowdermilk and Rich, 2017), and they familiarize, through a hands-on approach, with techniques of business design which have been recently subject of scrutiny of and validation by various academics (Camuffo et al., 2020).

The course combines traditional elements of market analysis and business strategy with contents and methods taken from the disciplines of design thinking and human-centred design, to help the rapid prototyping of value propositions for the customer, revenue modelling and capture of value, and modes of delivering value to the end customer. Whether learners are interested to learn how to work on new projects within an existing business or organization, or they are keener on becoming an entrepreneur ready to start a start-up, this course helps them reduce the risks of launching the product on the market, by helping them develop entrepreneurial ideas that represent a truly innovative solution to a real, pressing, and urgent problem felt from a specific market segment of early adopters.

This course corresponds to 8 ECTS (European Credit Transfer System) and to around 200 workload hours divided into 48 class hours and 152 teamwork hours. Classes are scheduled twice per week (2 hours sessions). The class embraces a hands-on approach to teaching innovation and entrepreneurship by using flipped classroom techniques (short videos are assigned for review before class) and active class participation: during the learning sessions, participants discuss in teams and with mentors the specific topics of the session and they immediately apply those concepts on their project by working in teams and by jointly discussing their advancements with instructors, mentors, and also in group sessions with other teams.

Around 50% of class time is devoted to group activities such as preparation of a group project work, discussion with mentors, delivery of pitches, and intermediate presentations of the project work. In addition to that in-class activities, participants work in teams independently in-between classes to complete group and individual assignments.

By the end of the course, students learn how to work in a multidisciplinary team, how to develop an entrepreneurial approach to problems, acquire the necessary vocabulary, knowledge, and skills to develop a solution, to effectively use design thinking, lean validation methodologies, business modelling techniques, financial modelling, cash flow analysis, project management and finally they learn how to communicate productively within the team and with different stakeholders. As a hands-on laboratory, Start-up Lab follows typically a 5-step process (Figure 1).

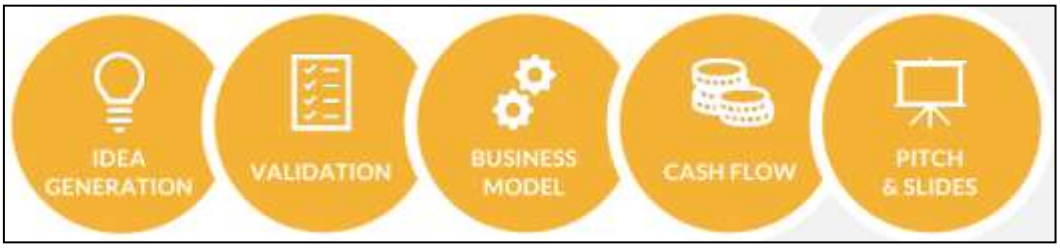

Figure 1: The five step's program of Start-up Lab – University of Trento

3.1 Step 1: Idea generation

The first step of the program takes three weeks and is related to facilitating the generation of business ideas: in this phase students form their teams through role-playing and ice-breaking activities and by participating in facilitation sessions aimed at identifying the problem they want to solve using a customer-centric approach.

In most cases, individual students apply without an established business idea, but they are rather driven by the curiosity of discovering the start-up creation's process, or because they want to achieve a proactive mindset and to become more competitive in the job market. In such cases, individual students accepted in the program are fostered to come up with a business idea to pitch in front of their peers to convince the audience and recruit teammates.

Teams are autonomously created by students but they need to consider some constraints set up by the instructors. Teams need to be composed of at least four and a maximum of six participants and they must be as diverse as possible, accounting for different nationalities, disciplinary backgrounds, and gender balance in member recruitment.

In the first week, ice-breaking and games build a smooth and informal atmosphere between students, professors, and mentors. These games facilitate communication: students are incentivized to speak up, give feedback, ask questions, get involved without fear, and be sure that they are not judged for what they say. Those messages are the key to develop a psychological safety net in the class and let the dialogue be more fluid. Everyone can make mistakes and failure is part of the journey and the learning process.

This tuning helps students being divergent in this first phase: they must identify the problem they want to solve, not the solution (they need to generate ideas and not jump to conclusions). To focus on the problem, they are introduced to the Value Proposition Canvas (Osterwalder et al., 2014) and they are fostered to start their analysis by identifying their customer profile through the analysis of pains and gains. Once completed this phase, they match the customer profile with products and services that could resolve the customer's pains.

3.2 Step 2: Validated learning

The second step of the program is represented by the validation phase, which takes four weeks: teams use various techniques belonging to the Lean Startup approach (Ries, 2011) to validate both the problem part and the solution part of their business idea. They use the Javelin board, which is a practical tool that allows teams to validate their business idea by experimenting and evaluating the problem with customers' by gathering evidence supporting or disproving the most critical assumptions underlying their business idea. By means of several iterations, they ideally improve their understanding of the fit between the problem and their target customer. In this step they are encouraged to engage directly with their potential customers to get first-hand feedback, using different techniques such as online or in-presence interviews and surveys, for the validation of the problem they want to solve, and by crafting Minimum Viable Products to collect feedback on their solution.

This is a crucial phase in the program because most of the time teams realize that they fell into some biases and that they identified the wrong problem or the wrong customer or that they went straight forward to a solution that is not the right one. In that case, teams are persuaded to pivot and change their customer or their problem to improve the fit between both and then re-work the exact nature and details of their solution.

3.3 Step 3: Business modelling

The third step of the program is represented by the business modelling phase, and it takes two weeks. Teams learn Business Modelling as a methodology designed to fully define the outline and to optimize their innovative business idea. This step is focused on refining the value proposition developed in the previous step by understanding properly how to create, deliver and capture value. Teams build the Business Model Canvas (Osterwalder and Pigneur, 2009) of their projects and are asked to reflect, with the same iterative approach used during the validation phase, on the value proposition, target customer segments, distribution channels, customer relationships, key partners, activities, and resources, and finally, the cost structure, and revenue streams.

3.4 Step 4: Financial planning

The fourth step of the program is about developing a sound financial plan based on cash flow analysis: students learn the essentials of what an entrepreneur must know about the economics and financials of a company. In one week, teams focus on the design of the cash inflows and outflows related to the development and the go-to-market of the business idea and how and where to fundraise to solve liquidity issues connected with the launch or to speeding up the growth phase.

3.5 Step 5: Pitching

The fifth and final step of the program consists of preparing a final pitch of the business idea to a panel of judges: for two weeks students are introduced to public speaking and familiarize with the construction of an effective pitch deck, while also improving their verbal and non-verbal language skills, the use of voice, and images to effectively communicate their ideas to various stakeholders and to tune their speech to different audiences (e.g., sales vs. investor pitch). Teams train their speech skills and slide deck contents through a series of so called "Pitch Clinics" where they are given various opportunities to test their pitch in sessions with different pitch experts. The pitch must last around 4 minutes. This represents a precious learning experience since they can iterate and finalize visuals, contents, storytelling, while also perfecting the speech delivery by incorporating different feedback into the final presentation.

4. The Start-up Lab assessment: A reflective approach

Evaluating participants in a hands-on laboratory has many implications. As we presented in Section 3, Start-up Lab has multiple learning goals. But, how to assess all these variables? Who should assess them and in what way?

The Start-up Lab program is research-driven, since it is rooted in a systems perspective of training assessment (Baldwin and Ford, 1988) and aims at mapping the transformative impact of the participation of the students in terms of changes in their entrepreneurial skills and motivation (Bacigalupo et al., 2016; Oosterbeek et al., 2010). Students participating in the program usually report high levels of satisfaction and in surveys, they explicitly described their experience as transformative for their entrepreneurial mindset, intent, awareness and more generally in terms of their soft skills (as attested by a survey run during the 2019 edition, which is summarized in Table 1).

Start-up Lab uses to assess students integrating the summative evaluation (the assessment of the learning goals' achievement at the end of the experience) with the formative one which permits monitoring the learning process during the experience.

For Start-up Lab 2021 Edition, we decided to include a self-directed learning approach (Hammond and Collins, 1991) which is one of the 21st Century skills and one of the most recommended capacities required by the job market (World Economic Forum). That is why in the Start-up Lab, we proposed some tools to enable students to elaborate some reflections on their progress and their team's work.

Since everyone is a unique person with specific learning needs and different ways of learning (Gardner, 1999), we tried to overcome the standardized approach to teaching and evaluating, to personalize the learning process. Because students feel responsible for their learning, they can choose partly the agenda, co-designing their entrepreneurial experience, and instructors leave their traditional roles to become guides and coaches (Hammond and Collins, 1991; Ní Bheoláin et al., 2020).

Table 2 shows the assessment tools we used for the 2021 Start-up Lab Edition, explaining which are formative or summative ones, to whom they are addressed, who are the evaluators, the goal of each tool, the period in which the tool was proposed to participants and the outcome.

Team reports and Reflection reports, semi-final pitches, and class participation contributed to the final grade. To get the final credits students also needed to deliver all other ungraded items (learning contract, learning diaries, self-assessment).

Table 1: Various measures of enterprising competency measured in terms of self-confidence, entrepreneurial intent, entrepreneurial awareness, and envisioned work situation for the 2019 edition of Start-Up Lab (compared with Cooper & Lucas, 2006 and Lucas & Cooper, 2004)

	CL2006	CL2006	SUL2019	SUL2019	SUL2019			
	Pre-program N=217	Post-program N=217	Pre-program N=102	Post-program N=102				
A. Self-confidence (self-efficacy) in skills: Evaluate your current skill levels compared to your peers (e.g., your classmates)	Percent ranking their skill "Good" to "Excellent"				Response changes from pre- to post event survey and sign test			
					N	N increase	Total change	p-value
Design something novel and innovative	61.0%	81.7%	56,9%	79,4%	102	52	65	0,0000
Solve an unstructured problem	75.2%	88.6%	83,3%	93,1%	102	47	65	0,0001
Clearly describe a problem orally	67.9%	82.6%	70,6%	79,4%	102	42	65	0,0063
Clearly describe a problem in writing	67.7%	78.9%	69,6%	86,3%	102	43	62	0,0006
Ask probing questions that clarify facts	70.2%	87.2%	72,5%	88,2%	102	41	68	0,0341
Motivate others to work together	71.4%	84.4%	78,4%	82,4%	102	36	66	0,1945
Recognise a good business opportunity	72.0%	86.8%	65,7%	81,4%	102	52	72	0,0000
Understand what it takes to start your own business	41.0%	87.7%	53,9%	81,4%	102	58	74	0,0000
Start a successful business if you want	41.0%	82.2%	43,1%	66,7%	102	55	72	0,0000
Evaluate arguments and evidence so competing alternatives can be judged	73,1%*	92,3%*	79,4%	87,3%	102	43	69	0,0147
Apply an abstract idea or concept to a real problem or situation	48,1%*	81.5%*	78,4%	84,3%	102	45	66	0,0009
Develop several methods that might be used to solve an unstructured problem	53,8%*	69,2%*	66,7%	86,3%	102	56	73	0,0000
Work on collaborative projects as a member of a team	85,2%*	85,2%*	87,3%	87,3%	102	39	61	0,0102
Lead a group whose members disagree	37%*	63%*	69,6%	76,5%	102	42	71	0,0480
Put a detailed plan into action	59,3%*	74,1%*	77,5%	87,3%	102	44	69	0,0077
Deliver on a job you have agreed to do	89,9%*	92,6%*	88,2%	94,1%	102	33	61	0,2213
B. Envisioned work situations by Time Periods (Immediately, Within 5 years, 5 to 10 years, more than 10, or Never)	Percent seeing themselves in situation within 5 years				Response changes from pre- to post event survey and sign test			
					N	N increase†	Total change	p-value
In new venture (owned by others)	70.8% **	64.6%**	85,3%	81,4%	102	17	45	0,1352
As business owner (employing others)	27.6% **	27.6% **	26,5%	27,5%	102	25	59	0,7024
Self-employed (working for self)	29.2% **	41.7% **	36,3%	36,3%	102	28	58	0,5522
C. Entrepreneurial Intent. Evaluation of agreement with the following statements:	Percent answers "Agree Slightly" to "Agree Strongly"				Response changes from pre- to post event survey and sign test			
					N	N increase	Total change	p-value
If I see an opportunity to join a start-up company in the next few years, I'll take it	39.7%	56.2%	68,6%	65,7%	102	33	58	0,1185
The idea of high risk/high pay- off ventures appeals to me	37.0%	45.2%	47,1%	60,8%	102	41	70	0,0598
I often think about ideas and ways to start a business	54.4%	62.1%	57,8%	59,8%	102	27	58	0,6530
At least once I will have to take a chance and start my own company	59.8%	78.1%	65,7%	66,7%	102	26	52	0,4449
D. Entrepreneurial Awareness. Looking back at the last month, how often did these scenarios happen to you:	Percent answers "Often" or "Very Often"				Response changes from pre- to post event survey and sign test			
					N	N increase	Total change	p-value
You talked about an idea for starting a Company	28,6%*	39.3%*	39,2%	60,8%	102	54	69	0,0000
You pursued an idea for starting a company talking about it more than once	14.3%*	28.6%*	22,5%	51,0%	102	60	69	0,0000
You took steps (e.g., looked into markets or technology) to follow up on an idea	7.1%*	25.0%*	25,5%	53,9%	102	60	78	0,0000

* = CL (2004); N=28; post: after 6 months; Response rate at post-test, 50.9% ** = CL (2004); N=55;
† = Earlier for new venture, later for business owner or self-employed

Table 2: Assessment tools for 2021 Start-up Lab Edition

Tool	Type	Recipient	Evaluator	Goal	Period	Outcome
Learning Agreement	Formative	Student	Instructors	Co-design the learning process with students. Students can identify their learning goals and their strategies to achieve them	At the beginning of the Start-up Lab	Completed and signed agreement
Self-assessment	Formative	Student	Student	Students can assess their initial and final entrepreneurial skills	At the beginning and after the Start-up Lab	Online surveys
Learning diaries	Formative	Team	Instructors	Teams evaluate their teamwork	In the middle of the Start-up Lab	One-pager
Peer Evaluation	Formative	Student	Student	Individual students evaluate their teammates and discuss in team	In the middle of the Start-up Lab	Online surveys + Team discussions
Team Reports	Summative	Team	Instructors	Teams show their outcomes	In the middle of the Start-up Lab	One-pager
Final Project	Summative	Team	Jury	Teams present their final business idea	At the end of the Start-up Lab	Final pitch

4.1 The learning contract

The learning contract is an individual agreement negotiated between the supervisors and the students to ensure that certain activities are undertaken to achieve an identified learning goal (Knowles, 1986). It is completed and signed by students and instructors at the beginning of the Start-up Lab program. Through the learning contract, students explore their readiness to learn and their self-directed learning skills. Students discover their learning objectives, how they are going to be evaluated, and identify their learning goal too, choosing how they are going to assess their achievements.

4.2 The self-assessment

The self-assessment is a survey of students' beliefs and views towards various topics on innovation and entrepreneurship, such as entrepreneurial self-efficacy, awareness, intent, and work situation. In the 2021 Start-up Lab Edition, we also included the GET2 test which defines an enterprising tendency as the tendency to start up and manage projects - highly enterprising people do this more often and are more innovative in their approach. This self-assessment test aims to give students an idea of their enterprising potential and entrepreneurial skills such as the high need for achievement, high need for autonomy, creative tendency, calculated risk-taking, and an internal locus of control. The self-assessment was completed by students at the beginning and the end of the program.

4.3 Learning diaries

Learning diaries are complementary documents to Teams Reports (Subsection 4.6) which were introduced to evaluate the team reflection ability to the undergoing process. It is a one-pager for each Team outcome: the Javelin Board, the Business Model Canvas, and the Cash Flow. In Learning diaries teams evaluate how they are working in answering these four questions: a) What went well (strength points of their teamwork)? b) What did they learn? c) What to improve (weak points of their teamwork)? d) What will they take into practice (strategies to improve actions for the next steps)?

4.4 Peer evaluation

Peer Evaluation is proposed to teams in two rounds. This is a way through which students can give feedback to their teammates and the other way around, experiencing important turning points of their experience. Feedback regard a) the regular attendance of group meetings, b) the level of meaningful contribution to group discussions,

c) the completion of group assignments on time, d) the quality of work, e) the cooperative and supportive attitude, and 6) the contribution to the success of the project. Peer evaluation results are sent to teams, in an anonymized and aggregated way and they can be the object of discussions in teams. Mentors can facilitate these exchanges.

4.5 The reflection report

The reflection report (Gibbs, 1988) guides students through a 6-stage process aimed at learning from the experience that they have just left behind them and at giving the opportunity to put some order, by identifying what went well and what did not go well, and by planning their next actions. This individual report matches the student's learning contract and is completed by students at the end of the course.

4.6 Team reports

Team reports evaluate the team's quality of work for each macro step of the process: the Value Proposition Canvas, the Javelin Board, the Business Model Canvas, and the Cash Flow. For each of these outcomes, teams are asked to explain the process through which they created them by delivering a one-pager summarizing the overall process and learning.

4.7 Final project

Teams present their business idea in two phases. In the first one, called "Semifinals", all teams deliver their final 4-minute pitch in front of the instructors and receive an evaluation on the overall proposed solution, the innovation level, the business model plan execution, and the presentation quality and Q&A session. Teams that can prove the worthiness of their idea pass to the second selection phase. Selected teams can show and convince a jury composed of experts, and potential investors during the Demo Day, which is the very last day of the program, and they are evaluated on the same criteria mentioned above.

Teams are ranked by the demo jury according to the same criteria employed in the semifinals, the worthiest projects are awarded prizes such as mobility funds to visit incubators, accelerators programs, research institutes, or to participate in workshops, events, and meetings in Italy, in Europe, and worldwide.

All participants who attended 80% of the class, receive grades, credits, and a completion certificate. Individual participants receive grades in the function of the projects (50%), the Reflection Report (15%), the quality of Team Reports (20%), and individual class participation (15%).

5. Conclusions

Start-up Lab is a program fostering in participants the acquisition of career-changing enterprising skills, which seem to be particularly appreciated by students, even when, after completing the program, students do not continue developing their project, as it happens in many cases. Since its inception, the program has involved over 1000 students, 60 mentors, and 50 companies, developing 170 startup projects and supporting the creation of 15 startups and it can be considered as the first step for pre-incubation university students' start-ups. The program benefits from being embedded in a dynamic local ecosystem focused on innovation, where public research institutions are connected and cooperate in the entrepreneurship education system. As a matter of fact, Trentino has earned the status of the "Italian Silicon Valley": with almost 200 innovative startups registered (2021 data from Infocamere and Registro delle Imprese), this is the region with the highest density of innovative startups in Italy.

In the close future, we plan to improve the linkages for participants with the local ecosystem by increasing both networking and job market matchmaking and by supporting the most promising and innovative ideas so to enhance the probability of continuation of the projects, also considering the local opportunities offered by various acceleration and incubation facilities in the local area.

References

Apostolopoulos, N., Kakouris, A., Liargovas, P., Dermatis, Z., Komninos, D. (2018), "Evaluating the learning environment of a cross-institutional postgraduate programme in entrepreneurship", *Entrepreneurship Education*, 1(1), 105-123.

Bacigalupo, M., Kampylis, P., Punie, Y. and Van den Brande, G. (2016), *EntreComp: The entrepreneurship competence framework*. Publication Office of the European Union: Luxembourg.

Baldwin, T. T., & Ford, J. K. (1988), Transfer of training: A review and directions for future research. *Personnel Psychology*, 41(1), 63-105.

Brown, T. (2019), *Change by Design, Revised and Updated: How Design Thinking Transforms Organizations and Inspires Innovation*, Harper Business: New York.

Camuffo, A., Cordova, A., Gambardella, A., & Spina, C. (2020). A scientific approach to entrepreneurial decision making: Evidence from a randomized control trial. Management Science, 66(2), 564-586.

Cassia, L., De Massis, A., Meoli, M. and Minola, T. (2014), "Entrepreneurship research centers around the world: research orientation, knowledge transfer and performance", *Journal of Technology Transfer*, Vol. 39 No. 3, pp. 376-392.

Cooper, S.Y. and Lucas, W.A. (2006), Developing self-efficacy for innovation and entrepreneurship: An educational approach*. International Review of Entrepreneurship*, 4, pp.141-161.

Del Palacio, I., Sole, F. and Batista-Foguet, J.M. (2008), "University entrepreneurship centres as service businesses", *The Service Industries Journal*, Vol. 28 No. 7, pp. 939-951.

Gardner, H. (1999), *Intelligence Reframed: Multiple Intelligences for the 21st Century*, New York: Basic Books.

Gibbs, G. (1988), *Learning by Doing: A guide to teaching and learning methods*. Further Education Unit. Oxford Polytechnic: Oxford.

Hammond, M. & Collins, R. (1991). Self-directed learning: Critical practice. London: Kogan Page Limited.

Jones, P., Apostolopoulos, N., Kakouris, A., Moon, C., Ratten, V. and Walmsley, A. (2021), "Universities and Entrepreneurship: Meeting the Educational and Social Challenges", Jones, P., Apostolopoulos, N., Kakouris, A., Moon, C., Ratten, V. and Walmsley, A. (Ed.) *Universities and Entrepreneurship: Meeting the Educational and Social Challenges* (*Contemporary Issues in Entrepreneurship Research, Vol. 11*), Emerald Publishing Limited, Bingley, pp. 1-9. https://doi.org/10.1108/S2040-724620210000011001.

Katz, J. A. (2008), "Fully mature but not fully legitimate: A different perspective on the state of entrepreneurship education". *Journal of Small Business Management*, 46(4), 550-566.

Knowles, M. (1986), *Using learning contracts: Practical approaches to individualizing and structuring learning*, London: Jossey-Bass Publications.

Lowdermilk, T. and Rich, J. (2017), *The Customer-Driven Playbook: Converting Customer Feedback into Successful Products*, O'Reilly: Boston.

Lucas, W.A. and Cooper, S.Y. (2004), "Enhancing Self-Efficacy to Enable Entrepreneurship: The Case of Cmi's Connections". MIT Sloan Working Paper 4489-04, May 2004.

Maas, G. and Jones, P. (2017), "Entrepreneurship Centres: Global Perspectives on Their Contributions to Higher Education Institutions", *Palgrave Macmillan*, London, pp. 11-16.

Nelles, J. and Vorley, T. (2011), "Entrepreneurial architecture: a blueprint for entrepreneurial universities", *Canadian Journal of Administrative Sciences*, Vol. 28 No. 3, pp. 341-353.

Ní Bheoláin, R., Lowney, R. & O'Riordan, F. (2020). Students as Partners in Assessment: A Literature Scoping Review. Dublin: Dublin City University. https://doi.org/10.5281/zenodo.4270579

Nichols, M. and Cator, K., (2008), *Challenge Based Learning White Paper*. Apple, Inc.: Cupertino.

Observatory Tecnológico of Educational de Monterrey (2015), Edu Trends: Challenge Based Learning, Oct. 2015, Tecnológico de Monterrey.

Oosterbeek, H., Van Praag, M. and Ijsselstein, A. (2010), "The impact of entrepreneurship education on entrepreneurship skills and motivation", *European Economic Review*, 54 (3), 442–54.

Osterwalder, A. and Pigneur, Y. (2009), *Business Model Generation,* John Wiley and Sons: New Jersey.

Osterwalder, A., Pigneur, Y. Smith, A., Bernarda, G. Papadakos, P., (2014), *Value Proposition Design,* John Wiley and Sons, New Jersey.

Ries, E., (2011), *The Lean Startup: How Today's Entrepreneurs Use Continuous Innovation to Create Radically Successful Businesses*, Crown Business, New York.

Secundo, G., Ndou, V. and Del Vecchio, P. (2016), "Challenges for instilling entrepreneurial mindset in scientists and engineers: what works in European universities?", *International Journal of Innovation and Technology Management*, Vol. 13 No. 05, p. 1640012.

Secundo, G., Rippa, P. and Meoli, M. (2020), "Digital transformation in entrepreneurship education centres: preliminary evidence from the Italian Contamination Labs network", *International Journal of Entrepreneurial Behavior & Research*, Vol. 26 No. 7, pp. 1589-1605. https://doi.org/10.1108/IJEBR-11-2019-0618

Wright, M., Siegel, D. S., & Mustar, P. (2017). "An emerging ecosystem for student start-ups". *The Journal of Technology Transfer*, 42(4), 909-922.

Shaping the Pathways to Entrepreneurship. Entrepreneurial Education in Romanian Technical Universities

Anca Șerban[1], Lidia Alexa[2], Veronica Maier[31] and Răzvan Crăciunescu[4]
[1]Lucian Blaga University of Sibiu, Romania
[2]Gheorghe Asachi Technical University of Iasi, Romania
[3]Technical University of Cluj-Napoca, Romania
[4]University Politehnica of Bucharest, Romania
anca.serban@ulbsibiu.ro
veronica.maier@enm.utcluj.ro
lidia.alexa@tuiasi.ro
razvan.craciunescu@upb.ro
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Abstract: Over the last twenty years, universities have been facing a period of profound changes and unprecedented challenges with an increased pressure from different stakeholders requiring universities to play an active role in innovation and entrepreneurial education, both in terms of mindset and practical instruments. At the same time, education seems to be an important tool for stimulating entrepreneurship (Backes-Gellner & Werner, 2007; Harris & Gibson, 2008; Kuratko, 2005; Raposo & Do Paço, 2011) as extensive research provides evidence that there is a positive and robust link between entrepreneurial education and entrepreneurship performance (The Small Business Economy, 2007). The main goal of the research was to explore the way Romanian technical universities are adapting to the new market and educational challenges and are embedding entrepreneurship in their curricular and extracurricular activities to enhance entrepreneurial competences in engineering students. The research questions that guided the study were: 1. How are Romanian technical universities infusing an entrepreneurial mindset in engineering students? 2. Which are the engineering programs that implement most entrepreneurial education courses? 3. What are the most frequent entrepreneurship related extracurricular activities implemented in universities? The research was conducted on 5 major Romanian technical universities. The analysis was conducted using a two-step approach: first, a critical analysis of the literature discussing the concepts of entrepreneurship, entrepreneurial education and entrepreneurial university and the role of technical Higher Education Institutions (HEIs) in shaping entrepreneurial competencies in engineering students and secondly, an exploratory empirical content analysis of the 5 Romanian technical universities' websites and curricula in order to identify the courses covering topics related to entrepreneurship and the extracurricular activities implemented throughout the university during the 2020-2021 academic year.

Keywords: entrepreneurial university, entrepreneurship, engineering education, higher education institutions, Romania

1. Introduction

Universities have attracted growing attention from researchers exploring the changing dynamic and impact of HEIs over the local and regional ecosystems. According to authors such as Etzkowitz (2003, 2004), Etzkowitz et al. (2000), Gibb (2005, 2012), Gibb and Hannon (2006), Gibb et. al (2012) or Hannon (2013), HEIs are currently undergoing a 'second revolution' incorporating economic and social development as part of their mission. If during the first academic revolution, research was added as an academic function in addition to teaching, the second revolution refers to the emerging of the entrepreneurial university which integrates economic development as an additional function (Etzkowitz, 1993; Ropke, 1998; Laukkanen, 2000; Kweick, 2012).

Education is one of the most important tools for advocating and stimulating entrepreneurship (Backes-Gellner & Werner, 2007; Harris & Gibson, 2008; Lewrick et. al, 2010; Raposo & Do Paço, 2011; O'Connor, 2013; Maritz & Brown, 2013) and extensive research provides evidence that there is a consistent positive link between entrepreneurial education and entrepreneurship intention and overall performance (Dickson et. al 2008; Walter & Dohse, 2012; 2008; Block et. al, 2013; Bae et. al, 2014; Mikic et. al, 2018). Scholars investigating the impact of university entrepreneurial education programs (Barringer et. al, 2005; Fayolle et. al, 2006; Mueller, 2011; Barba-Sánchez & Atienza-Sahuquillo, 2018) have found that these types of courses generate a positive impact for participants in terms of skills, competences, and overall entrepreneurial attitude.

[1] Corresponding author

At the same time, the catalyzing role of the universities was reflected by other changes in the entrepreneurial ecosystem and other stakeholders begun to take on a more active role by providing increased governmental support through policies and funding or by getting more involved in the programs developed by universities.

2. Universities role in economic development

Universities have evolved from being "accumulators" of knowledge to becoming "knowledge hubs" by fostering interactions between stakeholders and taking an active role in instigating economic and social development (Rothaermel et al. 2007; Youtie and Shapira 2008, Morazau et al, 2016). This change led to the emerge of the *entrepreneurial university* concept that is largely discussed in the literature. According to Röpke (1998), "an entrepreneurial university can mean three things: the university itself, as an organization, becomes entrepreneurial; the members of the university - faculty, students, employees - are turning themselves somehow into Entrepreneurs; and the interaction of the university with the environment, the "structural coupling" between university and region, follows entrepreneurial pattern". Kirbi (2002) considers that "at the heart of any entrepreneurial culture, Entrepreneurial Universities have the ability to innovate, recognize and create opportunities, work in teams, take risks and respond to challenges".

Guerrero and Urbano (2010) are describing the entrepreneurial university as a university which can meet the current requirements of the society by developing its organizational potentials, innovation, creating and identifying opportunities, facilitating teamwork, and taking calculated risks.

This change is not easy for academic institutions and Hannon (2013) argues that the most challenging change is the realignment of organizational values and culture and changing the mindsets of individuals, journey that has begun in many European universities.

3. Entrepreneurial education in Romanian technical universities

Universities should be "at the heart of their local community and so they may be considered to have a duty to contribute to that community by supporting business activity" (Wells, 2012). This support can come in many shapes and forms as creativity and innovation play a central role in economic growth and development as universities are innovation hubs.

Pugh et al. (2018) argues that the role of the universities, particularly technical universities, stretches beyond generating technology transfer (i.e., patents, spin-offs) and encompasses wider roles as contributing and providing leadership, creating entrepreneurial thinking, actions, institutions, and entrepreneurial capital.

The 2015 study by the Executive Unit for the Financing of Higher Education, Research, Development and Innovation, Romania (UEFISCDI, 2015) revealed that entrepreneurial education was underdeveloped and depended upon the efforts of individuals rather than a collective, strategic effort on the part of the HEI or national government. In the past years, Romanian's state universities participated in various initiatives meant to enhance the entrepreneurial ecosystem, including programs dedicated to HEIs top management. As a response, the Romanian Ministry of Education (ME) passed a law in 2017 requiring each state university to create a Student Entrepreneurial Society (SES), a new university department to "support, develop and encourage the entrepreneurial spirit among students and recent graduates". SES has an executive board consisting of the members of the academia, local business representatives and students, subordinated to the University Senate and Rector.

A SES must: create materials for informing and guiding students in the development of business plans and/or financing projects, organize business mentoring activities for students, encourage mentor-student collaboration to consolidate and develop entrepreneurial skills, organize pitch sessions, organize competitions to attract funding for the best projects and coordinate the activities of all business incubators, simulated enterprises, and other entrepreneurial entities within the university.

4. Research methodology

Considering all the above, the goal of the research was to explore the way Romanian technical universities are adapting to the new market challenges by embedding entrepreneurship and entrepreneurial education in their curricular and extracurricular activities.

The research questions that guided the study were:

- 1. How are Romanian technical universities infusing an entrepreneurial mindset in engineering students?
- 2. Which are the engineering programs that implement most entrepreneurial education courses?
- 3. What are the most frequent extracurricular activities entrepreneurship related implemented in universities?

The research was conducted on 5 major Romanian technical universities (for this study, we considered technical universities, the HEIs that had over 50% of their programs in engineering) according to the Romanian ME List of Public HEIs, namely:

- 1. Polytechnic University of Bucharest (UPB)
- 2. Technical University of Civil Engineering of Bucharest (UTCB)
- 3. Technical University of Cluj Napoca (TUCN)
- 4. Technical University "Gheorghe Asachi" Iasi (TUIASI)
- 5. Polytechnic University of Timisoara (UPT)

The analysis was conducted using a two-step approach: first, a critical analysis of the literature discussing the concepts of entrepreneurship, entrepreneurial education and entrepreneurial university and the role of technical HEIs in shaping entrepreneurial competencies in engineering students and secondly, an exploratory empirical content analysis of the 5 Romanian technical universities' websites and curricula in order to identify the courses covering topics related to entrepreneurship and the extracurricular activities implemented throughout the university during the 2020-2021 academic year.

There are three reasons we focused our research on Romanian technical universities: firstly, there is an important connection between a country's engineering capacity and its economic development (Maloney & Caicedo, 2016), secondly, the importance of Entrepreneurial education for engineers has been highlighted in the literature in the past years (Da Silva et al., 2015; Barba-Sánchez & Atienza-Sahuquillo, 2018), and thirdly, the average number of engineering students enrolled in bachelor programs between 2014 and 2018 was 86463, representing 21% of Romania's entire student population (Romanian Ministry of Education – 2018).

Within the 5 technical universities included in the study, we further narrowed the analysis by selecting only the faculties that offered engineering programs. Therefore, we included in the analysis 48 faculties (Table 1).

Table 1: Number of faculties and study programs included and excluded from the analysis

	UPB	**UTCN**	**TUIASI**	**UPT**	**UCB**
	Included/ Excluded	Included/ Excluded	Included/ Excluded	Included/ Excluded	Included/ Excluded
No. of faculties	15/0	10/2	11/0	7/3	5/2
No. of bachelor programs	80/2	62/0	55/3	34/0	20/0
No. of master programs	164/0	77/0	72/9	46/0	26/0

We analyzed only the *teaching and learning* dimension of the entrepreneurial universities, as defined by NIRAS et. al, 2008, by examining the programs, courses, curricula, and extra-curricular activities designed to enhance entrepreneurial competences.

Considering there are divergent views, in the literature, discussing entrepreneurial education, we decided to adopt and follow Linan's (2004) approach regarding the objectives of entrepreneurship education which are based on an entrepreneurial intention model. Hence, there are four main objectives of entrepreneurship education in HEIs, awareness education, education for start-ups, education for entrepreneurial dynamism continuing education, of which we have focused our research on the first two:

- *Awareness education*, targets to increase the number of students with knowledge of entrepreneurship so they might consider pursuing an entrepreneurial career. This category includes optional and mandatory courses such as: entrepreneurship theory and practice, introduction to entrepreneurship, entrepreneurship for engineers, personal and professional development.
- *Education for start-ups*, which aims at preparing students in owning a business. Courses related to the start-up phase, such as business planning, business, strategy, management, marketing, finance, legal aspects,

taxation, innovation management, new product development, creative thinking, corporate finance, business ethics, e-business etc. are included in this category.

The research team analyzed each university's website to identify the programs and the curricula listed for bachelor and master students and extracurricular activities related to entrepreneurship implemented through SES. The elements that were included in the content analysis were words or terms, themes, characters, paragraphs, items, concepts, and semantics (Berg, 2009).

Similar research methodologies based on content analysis of university websites were used by Maritz et. al. (2015) in a study aimed at identifying the entrepreneurship education offering of Australian Universities, by Bischoff et. al. (2017) in a research analyzing the key external stakeholder groups of entrepreneurship education at HEIs or by O'Byrne et al. (2015) who conducted a study to evaluate the curricula of programs granting degrees in sustainability.

The analysis was conducted between January 2020 and July 2020 and considered the publicly available curricula. Hence, we focused on identifying courses that were on entrepreneurship and on entrepreneurship related subjects and, in most cases, the title was suggestive and included easily identifiable terms.

The curricula's content analysis distinguished between the compulsory/mandatory courses and the optional/elective courses for both bachelor and master programs.

For the extracurricular activities, the analysis was conducted by assessing the public information that SES make available on their official websites and their social media accounts. All 5 universities have established SES and have had activities in the analyzed period.

Based on the roles that SES need to play, we focused our analysis on identifying what we consider to be five types of activities that these associations should offer their students:

- 1. Creation of entrepreneurship materials and information dissemination
- 2. Mentorship activities (facilitating the connection between students and the business environment)
- 3. Pitch and business plan competitions
- 4. Trainings on entrepreneurship and other soft skills (workshops)
- 5. Creating business incubation opportunities

5. Findings and discussions

To address our research questions, we have examined in depth the information gathered from the technical universities' public sources. The analysis included 5 universities (48 faculties), as stated in the research methodology (Table 1).

Table 2: Mandatory and optional entrepreneurship education related courses offered at the analyzed universities

	UPB		**UTCB**		**TUCN**		**TUIASI**		**UPT**	
Total Courses Bachelor (TB)	***7043***		***1168***		***5778***		***4092***		***1608***	
	M*	***O****	***M***	***O***	***M***	***O***	***M***	***O***	***M***	***O***
	4397	2646	889	279	3443	2335	2398	1694	1170	438
Entrepreneurship Awareness Education Courses Bachelor (EAB)	24	12	0	0	23	61	1	38	0	2
Education for start-ups Courses Bachelor (ESB)	323	214	22	9	237	210	87	130	112	18
% EAB of TB	0.55	0.45	0	0	0.67	2.61	0.04	0.30	0	0.46
% ESB of TB	7.35	8.09	2.47	3.23	6.88	8.99	3.63	4.90	9.57	4.11
% EAB & ESB of TB	***8.14***		***2.65***		***9.19***		***6.26***		***8.21***	
Total Courses Master (TM)	***3231***		***356***		***1894***		***1159***		***621***	
	M	***O***	***M***	***O***	***M***	***O***	***M***	***O***	***M***	***O***
	2247	984	214	142	956	938	778	381	457	164

	UPB		UTCB		TUCN		TUIASI		UPT	
Entrepreneurship Awareness Education Courses Master (EAM)	36	19	0	0	31	14	8	3	1	1
Education for start-ups Courses Master (ESM)	222	52	9	16	117	71	40	43	13	14
% EAM of TM	1.60	1.93	0	0	3.24	1.49	1.03	0.79	0.22	0.61
% ESM of TM	9.88	5.28	4.21	11.27	12.24	7.57	5.14	11.29	2.84	8.54
% EAM & ESM of TM	**10.18**		**7.02**		**12.3**		**8.11**		**4.67**	
% Entrepreneurship courses out of total bachelor and master courses	***8.78***		***3.67***		***9.96***		***6.67***		***7.22***	
***Mandatory**					***** Optional**					

- **UPB** –We have observed that from the total number of course offerings, UPB offers 0.89% of courses dedicated to entrepreneurship awareness education and 7.89% of courses to education for start-ups. Taken together the courses related to entrepreneurship awareness education and education for start-ups at both bachelor and master level sum up a percentage of 8.78 of total course offerings. Most of these courses are offered at the Faculty of Entrepreneurship, Business Engineering and Management, namely 43.8%, followed by the Faculty of Engineering in Foreign Languages, with a percentage of 16.21%. The Faculty of Entrepreneurship, Business Engineering and Management is unique to UPB as purely technical universities in Romania do not have a separate faculty dedicated to entrepreneurial studies. Most courses taught here are focused on Entrepreneurship, Management, Marketing, Finance, Accounting and Law.

Further analyzing the university's website and its social media pages, we noted that UPB has a Google Hub and a Technical and Business Incubator called ITA- CETTI, that supports small businesses, interested in commercializing academic research related to electronics.

The Student Entrepreneurial Society, UPBIZZ, has a vast variety of activities on all five analyzed areas. Between 2019 and March 2021, the social media account of the SES has had more than 300 posts that reached approximately 2000 followers. UPBIZZ disseminates constantly information relevant for the entrepreneurship enthusiasts, promoting useful materials and advertising national entrepreneurship competition and programs such as Social Impact Award Romania, HEI Innovate by Junior Achievement, and Innovation Labs.

UPBIZZ organizes an early business plan competition, Be an entrepreneur, and organizes various workshops such as Financial Fitness (a financial education program), StorySelling (using storytelling to help increase sales), Idea Generation, and Design Thinking. After mid-2020 and until March 2021 we observed a slight increase in the number of activities and a switch regarding the format in which the activities have been delivered, more online focused because of the pandemic. UPBIZZ has adapted and all the projects were transformed to the online version. It is observed also that increased attention has been given to the mentorship activities by organizing various online meetings with local and national entrepreneurs as well as with alumni community (#MeettheMentors, Meet the Alumni entrepreneurs) and even introducing some new training such as How to keep motivated and How to have a successful mindset, events organized in partnerships with the Student Counselling department. UPBIZZ does not coordinate its own incubation program, but it does facilitate participation to pre-accelerators such as Innovation Labs and StepFWD and the ITA- CETTI incubator.

- **UTCB** –We can observe that UTCB does not offer any courses dedicated to entrepreneurship awareness education neither at bachelor nor master level and only 3.67% of courses dedicated to education for start-ups. The Faculty of Civil, Industrial and Agricultural Constructions is the faculty that offers most courses related to entrepreneurship education, namely 8.91%, followed by the Faculty of Railways Roads and Bridges with 3.75%. This result is explained by the fact that the Faculty of Civil, Industrial and Agricultural Constructions offers a program called "Economic Engineering in Constructions" where we find most of the courses related to entrepreneurship education focused on Management, Project Management, Marketing, Financial Management and Law.

In what regards other entrepreneurship related initiatives UTCB is a partner of Construct Hub, a private initiative that is hosted on the university's premises, which encourages "a new way of practical learning through direct collaboration: students – businesses – professors and efficiently training students in order to fit the current employment standards".

The Student Entrepreneurial Society - SAS UTCB, focuses its activities on a few major yearly projects that include formal entrepreneurship training and pitch and business plan competitions. SAS UTCB is less focused on

disseminating information on social media platforms, focusing instead on the page on the university's site. There is no indication that any projects have been cancelled due to the pandemic.

- **TUCN** –Table 2 summarizes the courses related to entrepreneurship education at both bachelor and master level. We notice that almost 10% of course offerings are related to entrepreneurship - 1.68% are entrepreneurship awareness courses and 8.28% are courses dedicated to education for start-ups. Most of the entrepreneurship related courses are offered at the Faculty of Science Baia Mare with approx. 23%, since at both bachelor and master level there is a specialization entirely dedicated to "Management", "Business Economics" and "Business Management". The Faculty of Machine Building also offers a wide range of entrepreneurship related courses, namely 16.19%. This is explained since at bachelor level a specialization called "Industrial Economic Engineering" and at master level a specialization called "Entrepreneurship" are being offered.

Apart from including entrepreneurship related courses in the curricula, TUCN is also housing two makerspaces, namely "Industrial Design" Makerspace, that allows students to do 3D models and product prototyping and "iHub" Makerspace providing learning materials and mentoring sessions for students. TUCN is also one of the founding members of the Spherik Accelerator, the first accelerator launched in Romania having the mission of connecting startups with strategic resources and thus supporting the development of the local ecosystem.

The Student Entrepreneurial Society, SAS-UTCN, seems to be another important part of the entrepreneurship ecosystem. SAS-UTCN has an active presence for the students both on its website and social media page, reaching more than 1300 students. Observing the activities, we can concur that they cover the five areas of interest. The association makes a good job disseminating entrepreneurship related information and organizes activities almost on a weekly basis. In the pandemic period the projects have been adapted to the online version and we could also observe an increased focus on keeping the students motivated by offering more regular mentor and volunteer meetings. During the end of 2020 and beginning in 2021, SAS-UTCN has organized or been a partner in organizing three hackathons REplasticHack, e-Mental Health Hackathon and Innovation Labs, as well as other competitions such as Tech start-up boot camp and Prototype challenge.

- **TUIASI** – Analyzing the curricula, we observed that from the total number of course offerings 0.95% of courses are dedicated to entrepreneurship awareness education and 5.71% of courses to education for start-ups. Most courses related to entrepreneurial education are offered at the Faculty of Industrial Design and Business Management, 16.99% of total course offering, followed by 9.70% at the Faculty of Industrial Design and Business Management. The fact that the Faculty of Industrial Design and Business Management offers a higher number of entrepreneurship related courses is because at bachelor level it offers the specialization "Business Engineering and Management" and at master level the specialization "Innovation and Entrepreneurship" and "Management and Business Administration". Another relevant aspect in terms of entrepreneurial education is the fact that the TUIASI implemented a university wide project called AntreprenorIng, having the aim at improving entrepreneurial education among engineering students by including in the curricula of 3rd and 4th year students, optional courses on entrepreneurial education.

TUIASI is engaged as a partner in developing the Fab Lab coworking hub, with the mission of stimulating innovation, supporting digital fabrication, and enhancing the local entrepreneurial ecosystem and is also partnering with Rubik Hub, having a program dedicated to students who consider entrepreneurship as a career opportunity.

The Student Entrepreneurial Society , SAS TUIASI, had a complex activity until the end of the year 2020, both on the website and on the social media page. The activities included mentoring opportunities, formal training for entrepreneurship, business plan competitions and facilitating the access to different pre-accelerator programs. Unfortunately, there is no information regarding SAS TUIASI activities past the end of the year 2020.

- **UPT** –According to the information displayed in Table 2, we notice that 0.18% of total course offerings are related to entrepreneurship awareness education and 7.04% are courses related to education for start-ups. The Faculty of Mechanical Engineering offers most courses related to entrepreneurial education with a percentage of 12.87, followed by the Faculty of Industrial Chemistry and Environmental Engineering with a percentage of 8.33 course offerings and the Faculty of Civil Engineering with a percentage of 8.12. Most of the entrepreneurial education identified courses are based on basic economics and management, such as Microeconomics, Management, Marketing, and Communication.

Just like UPB, UPT is hosting a Google Hub. This hub is meant to provide a working space for students and to enable them the access in participating at the Google's Digital Workshop to develop their online marketing and digital skills.

The Student Entrepreneurial Society, InoHub, is providing students with a large range of activities, just as the SES rules require. In the last period, a slight increase in entrepreneurial activities can be observed, especially around mentorship meetings, provided by the fact that all activities take place in a virtual medium.

After analyzing the situation related to the entrepreneurship courses offered at the five investigated universities we can conclude the following:

- In terms of awareness education courses, we discovered that, even though there are not a lot of courses included in the universities' curricula focused on presenting the students with the option of self-employment, the interest manifested by the universities in this direction is increasing.
- In terms of education for start-ups courses, we noted that the universities offer a significant variety of courses in this direction, although the majority of these are being offered at the faculties which have an economic and management focus.
- All the analyzed universities have the ability to guide young entrepreneurs as well as the capability to apply and coordinate European projects in order to facilitate grants for them.

6. Conclusions

In this paper we analyzed the behavior of 5 Romanian technical universities regarding entrepreneurship activities between January and July 2020 with the goal of identifying the way Romanian technical universities are adapting to the new market and educational challenges and are embedding entrepreneurship in their curricular and extracurricular activities to enhance entrepreneurial competences in engineering students..

The analysis was done by answering 3 research questions, for each university.

Hence, we observed that:

- Technical universities are infusing entrepreneurial mindset in engineering students by implementing courses and extracurricular activities through the Student Entrepreneurial Society and other initiatives that have the purpose to develop soft-skills and a startup mindset.
- Except UPB that has a faculty focused on entrepreneurship in the other universities the entrepreneurship courses are developed in faculties where students are more likely to become entrepreneurs or freelancers after graduation.
- The extracurricular activities are implemented mainly by the SES and by other NGO programs associated or partners with the mentioned universities. The activities are trainings for soft-skills, business plan creation, prototyping, financial education or pitching contests, business plan contests or business mentoring for students.
- The Covid19 pandemic challenged the entrepreneurial organizers, and all the programs were shifted to an online environment, thus, having the possibility to extend some of the programs to other universities, making the know-how sharing open between universities. All the observed activities continued during the pandemic.

The conducted research presents some limitations, both methodological and contextual. Firstly, the study does not provide any indication of the prevalence of the conditions described in other universities in Romania and the research was limited to assessing the public information available about the analyzed universities' entrepreneurial ecosystem. Secondly, the context was as such that during the Covid19 pandemic the research could not be conducted on site in the case of the five universities. Both types of limitations can be removed as part of a further research conducted in normal circumstances.

Despite the above-mentioned limitations, the paper demonstrated that entrepreneurial activities are beginning to gain traction in top engineering faculties from Romania and that these universities are moving forward to become entrepreneurial universities.

References

Backes-Gellner, U., Werner, A. (2007) "Entrepreneurial Signaling via Education: A Success Factor in Innovative Start-Ups". *Small Business Economics* 29**,** 173–190.

Bae, T.J.; Qian, S.; Miao, C.; Fiet, J.O. (2014). "The relationship between entrepreneurship education and entrepreneurial intentions: A meta-Analytic review". *Entrepreneurship Theory and Practice* 38, 217–254.

Barba-Sánchez, V., & Atienza-Sahuquillo, C. (2018). "Entrepreneurial intention among engineering students: The role of entrepreneurship education". *European Research on Management and Business Economics*, 24(1), 53–61.

Barringer, B., Jones, F., & Neubaum, D. (2005). "A quantitative content analysis of the characteristics of rapid-growth firms and their founders". *Journal of Business Venturing*, 20, 663–687.

Berg, B.L. (2009), *Qualitative Research Methods for the Social Sciences*, 7th ed., Allyn & Bacon, Boston, MA.

Bischoff, K., Volkmann, C. K., & Audretsch, D. B. (2017). "Stakeholder collaboration in entrepreneurship education: an analysis of the entrepreneurial ecosystems of European higher educational institutions", *The Journal of Technology Transfer, 43(1), 20–46.*

Block, J., Hoogerheide, L., & Thurik, R. (2013). "Education and entrepreneurial choice: An instrumental variables analysis", *International Small Business Journal*, 31(1), 23–33.

Da Silva, G. B., Costa, H. G., & De Barros, M. D.(2015). "Entrepreneurship in engineering education: A literature review". *International Journal of Engineering Education*, 31(6), 1701–1710.

Dickson, P.H., Solomon, G.T. and Weaver, K.M. (2008), "Entrepreneurial selection and success: does education matter?", *Journal of Small Business and Enterprise Development*, Vol. 15 No. 2, pp. 239-258.

Etzkowitz, H. (1993). "Enterprises from Science: The origins of Science-based Regional Economic Development". *Minerva*, 31(3): 326-360.

Etzkowitz, H. (2003). "Research groups as 'quasi firms': the invention of the entrepreneurial university". *Research Policy*, 32: 109-21.

Etzkowitz, H. (2004). "The evolution of the Entrepreneurial University". *International Journal of Technology and Globalization*, 1: 64-77.

Etzkowitz, H., Webster, A., Gebhardt, C., and Cantisano, B. R. (2000). "The future of the University and the University of the future: evolution of ivory tower into entrepreneurial university." Research Policy, 29: 313-30.

Fayolle, A., Gailly, B., & Lassas-Clerc, N. (2006). "Assessing the impact of entrepreneurship education programmes: A new methodology", Journal of European Industrial Training, 30(9), 701–720.

Gibb, A. A. & Hannon, P. D. (2006) "Towards the Entrepreneurial University". *International Journal of Entrepreneurship Education*, Vol. 4, 73-110.

Gibb, A. A. (2005) *Towards the Entrepreneurial University: Entrepreneurship Education as a Lever for Change*. National Council for Graduate Entrepreneurship, UK.

Gibb, A. A. (2012) "Exploring the Synergistic Potential in Entrepreneurial University Development: Towards the Building of a Strategic Framework". *Annals of Innovation & Entrepreneurship*, 3, 1-21.

Gibb, A. A., Haskins, G., Hannon, P. D. & Robertson, I. (2012) *Leading the Entrepreneurial University,* National Centre for Entrepreneurship in Education, UK.

Guerrero, M.; Urbano, D., (2010), "The development of an entrepreneurial university", *The Journal of Technology Transfer*, Vol .37, 1

Hannon P. D. (2013). "Why is the Entrepreneurial University Important?", *Journal of Innovation Management,* 1, 2, 10-17.

Harris, M.L. and Gibson, S.G. (2008), "Examining the entrepreneurial attitudes of US business students", *Education + Training*, Vol. 50 No. 7, pp. 568-581.

Kirby, D.A. (2002). Creating Entrepreneurial Universities: A Consideration. School of Management. Working Paper, University of Surrey.

Kuratko, D. F. (2005). The emergence of entrepreneurship education: Development, trends and challenges. *Entrepreneurship Theory and Practice*, 29(5), 577–597.

Kweick, M. (2012). *Knowledge Production in European Universities*. Higher Education Research and Policy – 3, Peter Lang Edition.

Linan, F. (2004). "Intention-based models of entrepreneurial education", paper presented at IntEnt 2004, Internationalizing Entrepreneurship Education and Training, University of Napoli Federico II, Napoli, 4-7 July.

Laukkanen, M. (2000). "Exploring Alternative Approaches in High-level Entrepreneurship Education: Creating Micro-mechanisms for Endogenous Regional Growth", *Entrepreneurship and Regional Development*, 12: 25-47.

Lewrick, Michael & Omar, Maktoba & Raeside, Robert & Sailer, Klaus. (2011). Education for entrepreneurship and innovation: "Management capabilities for sustainable growth and success". World Journal of Entrepreneurship, Management and Sustainable Development. 6. 1-18. 10.1108/20425961201000001.

Maloney, W.F., Caicedo, F.V. (2016). "Engineering Growth: Innovative Capacity and Development in the Americas", *World Bank Research publication*, Available at: http://pubdocs.worldbank.org /en/422491458852358129/Engineers-County7A.pdf .

Maritz, A., Jones, C., & Shwetzer, C. (2015). "The status of entrepreneurship education in Australian universities", *Education + Training,* 57(8/9), 1020–1035.

Mikic, M., Sopta, M., & Horvatinovic, T. (2018). "The role of entrepreneurial education in the development of entrepreneurship". *Casopis Za Ekonomiju I Trzisne Komunikacije*, 8(2), 385-395.

Marozau, R., Guerrero, M. & Urbano, D. (2016). „Impacts of Universities in Different Stages of Economic Development". *Journal of the Knowledge Economy,* **12,** 1–21 (2021).

Mueller, S. (2011). "Increasing entrepreneurial intention: Effective entrepreneurship course characteristics", *International Journal of Entrepreneurship and Small Business*, 13(1), 55–74.

NIRAS Consultants, FOR A, ECON Poyry, 2008, Survey of Entrepreneurship in Higher Education in Europe, Main Report. Available at: https://ec.europa.eu/docsroom/documents/8973/attachments/1/translations/en/renditions/native.

O'Byrne, D.; Dripps, W.; Nicholas, K.A. (2015). "Teaching and learning sustainability: An assessment of the curriculum content and structure of sustainability degree programs in higher education", *Sustainability Science*, 10, pp. 43–59.

O'Connor, A. (2013), "A conceptual framework for entrepreneurship education policy: meeting government and economic purpose", *Journal of Business Venturing*, Issue 4, 28, 546-563.

Pugh, R., Lamine, W. Jack, S. & Eleanor Hamilton (2018). "The entrepreneurial university and the region: what role for entrepreneurship departments?", *European Planning Studies*, 26:9, 1835-1855.

Raposo, M., & do Paço, A. (2011). "Entrepreneurship education: Relationship between education and entrepreneurial activity". *Psicothema, 23*(3), 453–457.

Romanian Ministry of Education. Report regarding the Higher Education Status in Romania 2017 – 2018. Available at: https://www.edu.ro/sites/default/files/Raport%20privind%20starea%20%C3%AEnv%C4%83%C8%9B%C4%83m%C3%A2ntului%20superior%20din%20Rom%C3%A2nia_%202017%20-2018.pdf

Röpke, J. (1998). "The Entrepreneurial University, Innovation, academic knowledge creation and regional development in a globalized economy". Working Paper Department of Economics, Philipps- Universität Marburg, Germany : 15.

Rothaermel, F. T., Augung, S. D., & Jiang, L. (2007). „University entrepreneurship: a taxonomy of the literature", *Industrial and Corporate Change*, 16(4), 691–791.

The Small Business Economy. (2007). A report to the President, for data year 2006. Washington, DC: United States Government Printing Office.

UEFISCDI (2015), *The Romanian Entrepreneurship Ecosystem. An Exploratory Study,* available at: http://ree.uefiscdi.ro/.

Walter, S. G., & Dohse, D. (2012). Why mode and regional context matter for entrepreneurship education. *Entrepreneurship & Regional Development: An International Journal*, 24(9–10), 807–835.

Youtie, J., & Shapira, P. (2008). „Building an innovation hub: a case study of the transformation of university roles in regional technological and economic development", *Research Policy*, 37(8), 1188–1204.

Blockchain Technology Innovation: An Investigation of the Accounting and Auditing Use-Cases

Tebogo Sethibe[1] and Sibusiso Malinga[2]
[1]Agriculture Research Council, Pretoria, South Africa
[2]University of the Witwatersrand, Business School, Johannesburg, South Africa
tsethibe@gmail.com
Malinga.Sibusiso@imperiallogistics.com
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Abstract: Since the inception of the cryptocurrency bitcoin, blockchain technology has gained much attention amongst scholars from various industries, including accounting and auditing. Blockchain technology is a secure distributed ledger promising to change the principle of double entry-based accounting and to provide economic advantage. More significantly, blockchain technology can improve operational efficiency in the supply chain management process by augmenting transactional visibility and traceability and enhancing trust between different stakeholders. Despite the potential impact of blockchain technology innovation in many industries, there are limited studies aimed at investigating its prospective adoption. This paper endeavours to empirically examine possible blockchain technology adoption amongst accounting and auditing professionals. The study was descriptive, following a quantitative and qualitative method. Using data from 21 accounting and auditing professionals, the results show a lack of awareness about blockchain technology. Traceability, trustworthiness, transparency, fraud detection, operational efficiency and real-time reporting are mentioned as the key benefits of blockchain technology. Despite the benefits mentioned earlier, accounting and auditing professionals are sceptical about blockchain technology readiness. This study provides insights for researchers and practitioners about the perceptions of blockchain technology innovation and the possible adoption within the accounting and auditing profession.

Keywords: accounting, auditing, blockchain, innovation, South Africa

1. Introduction

Despite the enforcement of auditing controls and the widespread literature dedicated to accounting best practices and the prevalent adoption of various accounting standards, regrettably, commercial fraud still occurs and a significantly high number of organisations still fail to fulfil the requirements of a clean audit outcome (Faccia, 2019; Warren, Reeve and Duchac, 2018; Williams, 2018). According to the Auditor General of South Africa (2011), the organisation is issued with a clean audit outcome when there is evidence that their financial statements are free from material misstatement and there are no material findings on the reporting of performance objectives or non-compliance with legislation. One of the key underlying challenges found in the literature is the lack of traceability and provenance of transactions to ensure the accuracy of the financial statements (Songyue and Shangyang, 2019). Many reputable technology and accounting scholars and practitioners propose blockchain technology as a possible solution to this challenge (Brystrom, 2019; Smith, 2018; Dai and Vasarhelyi, 2017; MaCalling et al., 2017).

A synthesis of the literature reveals that traceability, transparency, trust, increased efficiency, auditability, security, reduction of risk related to human error, low risk of fraud and automation are some of the key underlying benefits of blockchain technology (Manski, 2017; Faccia, 2019). Blockchain technology enables traceability to the item level, not just batch level, so that participants can trace each item or transaction in the supply chain process (Wuest, 2015). A key feature of blockchain technology include, verified shared ledger transactions, consensus protocol, private or public peer-to-peer network (Faye, 2017), to mention a few. In a private blockchain, only participants with specific authentication and permission can be part of the network (Sylvester, 2019). Using blockchain technology, organisations can generate new information systems that record validated transactions in a secured shared ledger (Dai and Vasarhelyi, 2017).

2. Problem statement and motivation

In a corporate governance context, agency theory predicts that the misalignment of the interests between shareholders and managers can lead to agency problems (Chen, Lu and Souginnis, 2011). According to Jenson and Meckling (1976), an agency problem occurs when managers engage in activities for their own benefit rather than for the benefit of the firm's shareholders. From the accounting and auditing perspective, an agency problem can arise when the auditors act in the interest of the managers that hire them to audit their accounting books (Watt and Zimmerman, 1983). In other words, agency problem theory argues that auditors can collude

with management in producing financial statements that do not reflect management's private information (McCalling et al., 2017).

Prior studies have predominantly attempted to explain measures implemented by regulatory bodies to enhance the independence of auditors, such as the establishment of audit committees, the restrictions of non-audit work and auditor rotations, with very little attention to data quality (Church et al., 2015). Furthermore, recent studies have explored how blockchain technology can be applied in accounting and auditing profession (Jayasyriya, 2019; Lu, Yeh and Huang, 2019; English, 2019). Apart from the novelty of blockchain technology innovation, the vast majority of the studies are theoretical in nature, developed with the challenges of western countries in mind (Dapp, Slomka and Hoffmann, 2014). Using the data collected from South Africa (i.e. Developing Country), this study is designed to empirically investigate the potential impact and adoption of blockchain technology innovation on the accounting and auditing profession.

3. Literature review

This section begins with a brief definition of blockchain technology and its characteristics, followed by a review of prior studies of blockchain technology and the accounting profession. The research objectives are then stated.

3.1 Blockchain technology

Adopted from bitcoin technology, blockchain is defined as a shared ledger that utilises a fault-tolerant and decentralised architecture (Latif, Iqbal and Rizwan, 2019). It makes the transaction process resistant to any failure or attack by using a public key infrastructure that allows the contents to be encrypted in a manner that is expensive to decode (Liang, 2017). Scott, Loonam, and Kumar (2017) define blockchain more systematically as a distributed digital transaction ledger with identical copies maintained on multiple computer systems controlled by different entities. Put simply, blockchain is a chain of blocks which are linked using cryptography whereby each block contains a cryptographic hash of the previous block that is timestamped and encrypted and involves a record of continuously growing transaction data (Khandelwal, 2019). Building mutual confidence and trust based on a consensus mechanism that ensures integrity in the chain without central authority amongst participants is at the core of blockchain technology (Rao and Pandurangiah, 2018). Put it differently, blockchain is a decentralised database that enables real-time verification and communication of information (Appelbaum, 2018). The primary aim of blockchain technology is to provide trust and transparency in the value chain process (Lin et al, 2017).

3.2 Characteristics of blockchain technology

The key characteristics of blockchain technology include decentralisation, persistence, immutability, anonymity and auditability (Wang, Zheng , Xie, Dai and Chen, 2018). In a conventional transactional system, each transaction needs to be validated by the central trusted authority or agency, such as banks and universities. With blockchain technology, a transaction with a blockchain network can be performed between two users without authentication by the single central authority or agency (Olsen et al., 2019). Blockchain is a decentralised and distributed ledger that keeps records of digital transactions in such a way that makes them accessible and visible to multiple participants in the network while keeping them secure (Kumar, Iyengar, 2018). Concerning persistency, each transaction that is broadcast throughout the network needs to be confirmed and recorded in the block, which implies that each node needs to be authenticated in the block, making tampering with the data nearly impossible. Addresses used by users to interact with the blockchain network are entirely removed from the physical address to ensure anonymity. In other words, blockchain users can effortlessly create a multitude of accounts, avoiding any form of identification exposure. All transactions are validated and recorded with a timestamp to provide assurance for auditability, which makes it possible to check the integrity of previous records and verify the existing ones. These characteristics of the blockchain technology improve traceability and the transparency of the data stored.

3.3 Benefits of blockchain technology

A study by Chinaka (2016), identified the benefits of blockchain as increased transparency, the low cost of scalability and easier scalability. According to Mori (2016), other benefits of blockchain include near real-time settlement, low cost, traceability, encryption, accuracy, distributed ledger and reliability. Increased transparency refers to the decentralised register of ownership that ensures that all transactions are recorded in the system and visible to all parties in a particular transaction. The low cost of transactions is achieved because the

transaction costs are reduced, since there are no third parties or intermediaries involved in the transactions. Scalability is about simplicity, as it is easier and cheaper to scale services to reach a wider audience. The benefit of near real-time settlement is that the distributed ledgers are updated in near real time, which saves time compared to other remittance systems. For traceability, all transactions are recorded on multiple nodes and leave a clear audit trail. Transactions are encrypted, ensuring that multiple parties can transact directly with each other without the need for a trusted central authority. Accuracy is mentioned as a benefit because all the participants must agree to the transaction before it is recorded: this prevents fraud. A distributed ledger is beneficial as the peer-to-peer distributed network records a public history of transactions; this makes it computationally almost impossible for an attacker to change the transaction.

3.4 Theoretical review of blockchain technology and accounting

Blockchain technology has the potential to significantly influence the accounting and auditing fields (Wang and Kogan, 2018). According to Baron (2017), the potential use-cases for blockchain in accounting and auditing are traceable audit trails, automated audit processes, authentication of transactions, tracking ownership of assets, development of smart contracts and registry and inventory systems for any asset, ranging from raw materials to internet protocol. Blockchain accounting applications are sometimes called "triple-entry bookkeeping" (Brandon, 2016). According to Faccia and Mosteanu (2019), blockchain's triple-entry accounting systems can be programmed to follow accounting standards and regulations automatically by using smart contracts; they could also be used to automate tax filing.

3.5 Prior studies on blockchain technology in the accounting and auditing profession

Recent studies have attempted to demonstrate potential use-cases for blockchain technology in the accounting profession. In this context, Jayasuriya (2019) explored the effects of blockchain technology applications in corporate governance and accounting and found that the use of blockchain technology in accounting has excellent potential. However, the latter found that there are several problematic areas, such as voluntary blockchain reporting mechanisms, the possibility of hacking and the initial investment costs of the technology. Furthermore, Faccia (2019), using data from partners, showed that blockchain technology allows for timely examination of potential errors or fraud within accounting entries as well as automation of transaction verification. Similarly, Dai and Vasarhelyi (2017) explored how blockchain could enable the accounting profession and concluded that blockchain-based accounting is the assurance methodology that would provide real-time, verifiable information disclosure and progressively automate assurance.

From the empirical perspective, using data collected from 111 bitcoin users, Silinskyte (2014) investigated the acceptance of bitcoin using the unified theory of acceptance and use of technology and found that performance expectancy and effort expectancy are the key factors that significantly influence the behavioural intention to use bitcoin. The results further showed actual usage of bitcoin is affected by facilitating conditions and behavioural intention.

From the blockchain and accounting point of view, Lagaras (2018) examined the factors that influence professional accountants to accept the use of blockchain technology using data collected from 30 professional accountants. The study found that there is no significant relationship between the levels of awareness of the blockchain technology and the level of likelihood that it will impact the accounting profession. Furthermore, the study showed that the behavioural intention of professional accountants to use blockchain technology is significantly influenced by its perceived usefulness, perceived ease of use and technology task fit. The study concluded by recommending the inclusion of blockchain technology in the accountancy programme curriculum to address future needs.

3.6 Blockchain technology and technology acceptance model

Adapted from the Theory of Reasoned Action (TRA), the Technology Acceptance Model (TAM) is one of the research models used to predict the likelihood of accepting information technology (Davis, 1989). The TAM model focuses on a psychological analysis of the customer's experiences with the implemented technology (Ngangi, 2019; Davis, 1996). The TAM model has several constructs that can be adjusted to suit scientific study (Lee, Kim and Choi, 2019). These constructs include, amongst others, perceived usefulness, perceived ease of use, technology fit and behavioural intention. According to Lagaras (2018), the acceptability of the information system, as advocated by the TAM model, is determined by the perceived usefulness and perceived ease of use.

Perceived usefulness is defined as the user's subjective likelihood that the use of a certain technology will improve their action, and perceived ease of use refers to the degree to which the potential user expects the target technology to be effortless (Davis, 1989). Similarly, technology fit is defined as the degree to which a technology assists individuals in performing their tasks (Goodhue, 1997). Likewise, the behavioural intention is an individual's perception of their intent to use the technology, and they will use it if it is available (Lagaras, 2018).

4. Research objectives

Following the study conducted by Lagaras (2018), this study aims to address the following primary research objectives (ROs):

- RO1: To determine the potential benefits of blockchain technology in the accounting and auditing profession;
- RO2: To determine factors that could influence accountants and auditors to accept the use of blockchain technology;
- RO3: To identify accounting and auditing tasks that are currently manual and can be automated with blockchain technology;
- RO4: To investigate how the automation of accounting tasks can impact the accounting and auditing profession.

5. Method

The study employed a mixed research design strategy (i.e. quantitative and qualitative) to investigate blockchain technology innovation in the accounting profession. The mixed-method approach provides the opportunity to examine the respondent's level of awareness of blockchain technology and solicits their views regarding the impact of blockchain technology on the accounting profession. This section starts by describing the sampling and the method used to collect data, followed by a brief description of the instruments used to collect data. The section concludes by providing a short description of how the data was analysed.

5.1 Sample and data collection

A cross-sectional research design was adopted using questionnaires (i.e. quantitative) and semi-structured interview questions (i.e. qualitative) from 21 respondents representing two South African companies. The majority (66.7%) of the respondents were female, with 42.9% of the respondents certified as chartered accountants (Cas). All the respondents had a Bachelor's degree, with 42.9% having an honour's degree as their highest qualification and 19% having a master's degree as their highest qualification. The majority of respondents (42.9%) were White; followed by Indians (33.3%). Blacks and Coloureds represented 14.3% and 9.5% respectively. More than a third (38.1%) of the respondents specialised in corporate reporting, followed by 33.3% specialising in financial management and 19% specialising in tax. There were only two (9.5%) respondents who specialise in audit and assurance profession.

5.2 Instruments and measures

To assess the potential adoption of blockchain technology (i.e. RO's 1 and 2), questionnaires developed by Lagaras (2018) using TAM, were adapted and customised. Ultimately, the questionnaire consisted of 20 items in total, classified into four categories. These categories are blockchain-based accounting (10 items) and the Cronbach's Alpha Coefficient was 0.66, behavioural intention (three items) and the Cronbach's Alpha Coefficient was 0.70, perceived usefulness and ease of task (four items) and the Cronbach's Alpha Coefficient was 0.52, technology fit task (three items) and the Cronbach's Alpha Coefficient was 0.75.

Blockchain-based accounting, behavioural intention and technology fit task showed a generally acceptable level of internal consistency (i.e. Cronbach's Alpha Coefficient > 0.6), and perceived usefulness and ease of task showed a low level of internal consistency (i.e. Cronbach's Alpha Coefficient < 0.6). This can be attributed to number of items allocated for each dimension (i.e. two items for usefulness and two items for ease of task). Despite the drawback associated with the inclusion of "perceived usefulness and ease of task" in the analysis, Hilton, Brownlow, McMurray and Cozens (2004) in the book titled "SPSS Explained", maintained that a Cronbach's Alpha Coefficient of 0.5 to 0.6 shows a moderate reliability. It is with the aforementioned in mind

that the "perceived usefulness and ease of task" were included in the analysis. Five semi-structured interview questions were developed to answer research objectives 3 and 4.

6. Data analysis and discussion

The statistics software, IBM SPSS 24.0, was used to perform descriptive statistics and correlations of quantitative data, whereas ATLAS-TI was used to analyse qualitative data. Correlation and descriptive analysis were used to examine blockchain technology innovation in the accounting profession. The results of the analysis are presented in the next section.

6.1 Awareness of blockchain technology

The inquiry form began by assessing blockchain technology awareness amongst the participants. The findings revealed that a staggering 38% of the respondents had no knowledge of blockchain technology at all, 14% were slightly aware, and the remainder (48%) were fully aware of blockchain technology.

6.2 Descriptive statistics and correlation analysis

A descriptive and correlation analysis was employed to determine the benefits of blockchain technology and factors that can influence professional accountants to accept the use of blockchain technology. Table 1 represents the means and standard deviations of questionnaires for blockchain-based accounting constructs.

Table 1: Means and standard deviations of blockchain-based accounting

Blockchain-Based Accounting	Mean	SD
Blockchain-based accounting will reduce auditing costs and time.	4.10	1.044
Simplification of the procedures in the accounting data verification by using blockchain-based accounting technology.	4.00	0.548
Blockchain plays a pivotal role for development to become the "system of systems or journal of journals".	3.90	0.539
Blockchain will be programmed so that unusually patterned transactions can be checked immediately.	4.38	0.590
Blockchain will be capable of providing a real-time alerting schema to detect fraud.	3.95	0.865
Blockchain can increase the operational efficiency of the business.	4.29	0.561
A digital currency index will be the key to transparency in cryptocurrency transactions.	3.67	0.658
The high level of trustworthiness of accounting information in a blockchain technology regime will alter the role of accountants.	4.14	0.793
Many leading organisations consider digital transformation as a part of their strategic goals.	4.38	0.865
Technology disruption is evolving due to employee and customer expectations, values and behaviour.	4.48	0.512

In total, ten questionnaires were included in the blockchain-based accounting construct. The results presented in Table 1 show that there is an overwhelming agreement amongst participants that blockchain is influenced by changing employee and customer expectations, values and behaviours (mean = 4.48, std. dev = 0.512) and, as such, digital transformation is unavoidable (mean = 4.38, std. dev = 0,865). Table 1 further shows that most participants believe that blockchain has the potential to detect an unusual transaction (mean = 4.38, std. dev = 0.590) in real time and by inference, it will increase the operational efficiency of the business (mean = 4.29, std. dev = 0.561).

Table 2 presents the means, standard deviations, Cronbach's Alpha and correlation of all constructs included in the study; namely, blockchain-based accounting, behavioural intention, perceived usefulness and ease of use and technology fit. The constructs are listed by name in the first horizontal column and by abbreviation in the first vertical row. Overall, the results shown in Table 2 reveal that all participants are of the view that blockchain technology will impact positively on the accounting profession (mean = 4.1286; 0355).

Table 2. Means, standard deviations, Cronbach's Alphas and correlations

	Mean	SD	BBA	BI	PUEU	TTF
Blockchain-Based Accounting (BBA)	4.1286	0.35517	(0.66)	-		
Behavioural Intention (BI)	4.0794	0.48195	0.093	(0.70)		
Perceived Usefulness and Ease of Use (PUEU)	4.1587	0.42972	0.744**	0.258	(0.52)	
Technology Task Fit (TTF)	4.1746	0.62910	0.685**	0.410	0.632**	(0.75)

**p < 0.01; *p<0.05; Numbers in brackets represent Cronbach's Alphas.

The results presented in Table 2 show that blockchain-based accounting is significantly and strongly positively related to both perceived usefulness and ease of use and technology task fit, with a greater impact on perceived usefulness and ease of use. In contrast, the results reveal no relationship between perceived usefulness and ease of use and technology task fit on behavioural intention.

6.3 Benefits of blockchain technology in accounting and auditing

Eighteen (86%) respondents believe that blockchain technology will reduce auditing costs, save time and simplify accounting procedures and data verification. The results do not come as a surprise. According to Appelbaum et al. (2018), blockchain technology enables real-time verification of communication of information. Reduced costs are as a result of no third parties or intermediaries involved in the transactions (Chinaka, 2016). Seventeen (81%) respondents indicated that blockchain technology could play a pivotal role in tracking the journals and twenty (93%) respondents have confidence that blockchain technology will assist in detecting unusual transactions and ultimately reducing fraud.

The results support the notion put forward by Dai and Vasarhelyi (2017) that blockchain technology has the potential to generate new information systems that can record validated transactions in a secured shared data, making it easier for auditors to detect unusual patterns. In general, there is consensus amongst the respondents that the benefits of blockchain technology presented in the literature will impact positively in the accounting and auditing profession. The benefits supported by data include trustworthiness of accounting and auditing (86%), digital transformation (85%) and operational efficiency (95%).

6.4 Factors that influence accountants and auditors to adopt blockchain technology

The study examined the behavioural intention of the respondents to apply blockchain technology. It was found that there was no significant relationship (p value > 0.05), which is in contrast to the study conducted by Lagaras (2018), which found that professional accountants will probably use blockchain if implemented. However, the results revealed a significant and positive relationship between the potential adoption of blockchain technology and perceived usefulness and ease of use (Mean = 4.1487; Std.Dev = 0.4972). Furthermore, the relationship between blockchain-based accounting solutions and technology task fit was found to be positive and significant (Mean = 4.1476; Std.Dev = 0.62910).

Contrary to the study by Lagaras (2018), the results found no relationship between perceived usefulness and ease of use and behavioural intention. By the same token, no relationship was found between technology task fit and behavioural intention. Based on the proposition by Goodhue (1997), these results show that professional accountants believe that blockchain can be useful in helping them to perform their task, and, if adopted, it will be easy to use. However, at this stage, they are unlikely to advocate for it. This may be influenced by the limited awareness of blockchain technology (52% of the respondents). For instance, 38% of the respondents had no knowledge of blockchain technology at all, whereas 14% indicated that they were slightly aware. By inference, they might have heard about the term “blockchain” but had no idea what blockchain entails.

6.5 Manual accounting tasks that can be automated by blockchain technology

The third objective of this research was to identify accounting and auditing tasks that are currently manual but could be automated using a blockchain technology. The top-down approach was used to drive the analysis, which was driven by the research objective. The analysis followed the five phase’s process of the thematic analysis developed by Braun and Clarke (2006).

- Step 1: Be familiar with data: The participant’s widely held a view that processing of the accounting journals and reconciliation are the most time consuming tasks that needs to be automated. There is sense that the entire process leading to journal processing, including, calculations, data capturing, data cleaning, extracting bank statements, can be automated; however, manual intervention, such as manually reviewing the journal will still be required. There appears to be a belief that compliance and tax returns cannot be automated.
- Step 2: Generate initial codes: The use of open-coding was adopted, which means that pre-set codes were not used. Initially, 16 codes focusing on manual tasks were generated. Journal processing, trial balance, bank and credit reconciliation, extracting bank statement, data capturing and cleaning, data uploading, reviewing tax returns, shared-based equity, scheduling, financial disclosure, reporting, inter-company confirmation and resolutions were among the codes generated.

- Step 3: Search for themes: At this stage, the codes were examined and it was clear that some codes fitted together to form into a theme. All the manual codes that result into journal processing were grouped together. For example, bank statements and trial balances were grouped together into a journal processing theme. Bank and credit reconciliation formed one theme titled "reconciliation". Data capturing and cleaning were grouped together into a theme titled "data verification".
- Step 4: Review themes: During this phase, themes were reviewed and modified. The data associated with each theme was colour-coded. Themes had to be coherent and distinct from one another. Shared-based equity, scheduling, financial disclosure, inter-company confirmation, resolutions were grouped under the theme titled "corporate reporting". There were further subcategories such as time spent and frequency. The time spent ranged between 1 and 6 hours and the frequency could be a daily, weekly or monthly activity.
- Step 5: Final write-up: When respondents were asked about the existing manual tasks that could be automated by blockchain technology, the majority of participants (57%) mentioned journals as the most prominent activity that can be automated by blockchain technology, followed by reconciliation (23%). Other manual tasks that participants felt that should be automated included the capturing of data, the loading of data, including data verification and integrity. To assess the implications of current manual tasks, participants were asked how long they spend on the manual tasks; the findings showed that 54% of the participants spend at least one hour on manual tasks, and 23% of participants indicated at least two hours. Of the 21 participants, 5% indicated that they spend between four to six hours on manual tasks in one day. When participants were asked about the frequency of these tasks, the majority (57%) mentioned monthly, and 29% indicated daily, followed by 14% who indicated weekly. Overall, the findings showed that journal processing is one of the key areas that accountants believe can be solved by automation.

6.6 The potential impact of blockchain technology in the accounting profession

To establish the impact of blockchain technology on the accounting and the auditing profession, participants were asked how automating the accounting manual tasks would impact their work schedule and the profession. As expected, 52% believe that automation will save them a great deal of time, 33% mentioned accuracy and speed and 10% mentioned the improved and efficient audit process. Participants use words like "it will dramatically improve the accuracy and speed", "reduce time", "make it easier", "increased efficiency of tax returns", "reduce the reconciliation period", "fewer errors due to reduced human intervention", "free up time to focus on the role of accounting", "allow more time to review the accuracy of the data", "audit controls will be easier to verify". Despite the overwhelming acknowledgement that automation is necessary to free up accountants and auditors to focus on key activities, 5% expressed some hesitation when they were asked about the impact of blockchain technology in the accounting and auditing profession. Participants used words like "I don't think there will much impact unless the journal is automated", "I can't see how the journal can be automated" to express their reservations.

7. Conclusion and implications

The study reveals limited awareness of blockchain technology amongst the accountants and auditors. The study further showed that processing accounting journals and reconciliations are the main manual tasks of accountants, and they believe that the processing of accounting journals can be automated with blockchain technology. Every month, accountants spend a great deal of time working on manual accounting tasks, and most of the respondents believe that automation will save them an enormous amount of time. Over and above time-saving, the results also indicate that blockchain technology will simplify the accounting tasks and the inefficiencies that are currently being experienced in the profession can be reduced, if not eliminated, by the introduction of the blockchain technology.

In short, the results provide overwhelming evidence that blockchain technology presents a potential and valuable benefits to the accounting and auditing industry, but the majority are still sceptical about the technology. This may explain why the majority of studies on blockchain technology are mainly theoretical in nature, with very few empirical studies found in the literature. Despite some drawbacks, this study provides valuable information to blockchain researchers and industry professionals about the potential impact of blockchain technology in the accounting and auditing industry.

8. Limitations, recommendations and future research

This study is limited in several ways. First, the sample is 21, which is very good for the qualitative section of the study but presents a considerable limitation for the quantitative analysis. Second, the study was conducted using only two companies, with a very small number representing the auditing profession. Third, the research did not include technology professionals. As such, it is not known if the results would have revealed a different picture if the technology professionals had formed part of the study. Nevertheless, this study provides a high level of understanding of how professional accountants and auditors view the potential impact of blockchain technology in the industry.

Further research is required using a larger sample and representing more organisations. Future studies should also consider including technology professionals in the study. Perhaps the next research goal should focus on the awareness of blockchain technology and its adoption. This study contributes to the academic literature and the industry discussion on how new technologies, such as blockchain technology, can enhance the presentational trustworthiness of the financial results and how this new technology will impact the future of the accounting profession. It is essential that accounting and auditing academics and the industry at large are informed by these discussions considering the longstanding conflict that arose from the agency theory, the problem with traceability of transactions and the enormous amount of corporate fraud taking place worldwide.

References

Appelbaum, D and Smith, S. S. 2018. 'Blockchain basics and hands-on guidance: Taking the next step towrds implemantation and adoption', The CPA Journal, 88(6): 28-37.

Baron, J. 2017. Blockchain, accounting and audit: What you need to know. Available at:. https://www.accountingtoday.com/opinion/blockchain-accounting-and-audit-what-accountants-need-to-know.

Brandon, D. 2016. The blockchain: The future of business information systems?, International Journal of the Academic Business World, 10 (2), 33-40.

Braun, V., & Clarke, V. 2006. Using thematic analysis in psychology. Qualitative research in psychology, 3(2), 77-101.

Bystrom, H. 2019. Blockchains, real-time accounting, and the future of credit risk modeling. Ledger, 4: 39-47.

Chen, C.X, Lu, H and Souginnis, T. 2012. The agency problem, corporate governance, and the asymmetrical behavior of selling, general, and administrative costs. Contemporary Accounting Research, 29(1): 252-282. doi:10.1111/j.1911-3846.2011.01094.x

Chinaka, M. 2016. Blockchain technology-applications in improving financial inclusion in developing economies. Case study for small scale agriculture in Africa. Master of Science in Managament, MIT, USA.

Church, B.K., Jenkins, J.,McCracken, S., Roush, P and Stanley, J., 2015. Auditor independence in fact: research, regulatory, and practice implications drawn fromexperimental and archival research. Accounting Horizons. 29 (1): 217-238. https://doi.org/10.2308/acch-50966.

Dai, J and Vasarhelyi, M.A. 2017. Towards blockchain-based accounting and assurance. Journal of Information Systems, 31(3): 5-21.

Dapp, T.F., Slomka, L and Hoffmann, R. 2014. Fintech: The digital revolution in the financial sector. Available at:. https://www.deutschebank.nl/nl/docs/Fintech-The_digital_revolution_in_the_financial_sector.pdf.

Davis, F. D. 1986. A technology acceptance model for empirically testing new end-user information systems: Theory and results. Cambridge, MA: Massachusetts Institute of Technology.

Davis, F. D. 1989. Perceived usefulness, perceived ease of use, and user acceptance of information technology. MIS Quarterly, 13, 319–340.

English, D. B. M. 2019. Rise of the accounting machines: Blockchain and AI, the changing face of the profession. CaLICPA Education Foundation, California, USA.

Faccia, A and Mosteanu, N. R. 2019. Accounting and blockchain technology: from double-entry to triple-entry. The Business and Management Review, 10(2): 108-116.

Faye, P.S. 2017. Use of Blockchain technology in agribusiness: transparency and monitoring in agricultural trade. International Conference on Management Science and Management Innovation (MSMI2017). Atlantis Press, Paris, June 23-25.

Goodhue, D. 1997. The model underlying the measurement of the impacts of the IIC on the end-users. Journal of the American Society for Information Science, 48(5): 449-453.

Hilton, R, Brownlow, C, McMurray, I and Cozens, B. 2004. SPSS Explained, 1st Edition. Routledge, London.

Jayasuriya, D., and Sims, A. 2019. Genisys or skynet? An empirical and theoretical view of blockchain enabled corporate governance and accounting. International Symposium on Entrepreneurship: Blockchain and Crypto-Finance, Ariana, Tunisia.

Jensen, M.C and Meckling, W.H. 1976. Theory of the firm: Managerial behavior, agency costs and ownership structure. Journal of Finance Economics, 3(4): 305-360.

Khandelwal, S. 2019. Blockchain Technology: Heart of digital financial infrastructure for managing trust and governance system. International Conference on Digital Strategies for Organisational Success, Gwalior, India.

Kumar, M., Iyengar, N.C.S.N. 2017. A framework for blockchain technology in rice supply chain management. Advanced Science and Technology Letters. 146, 125–130.

Lagaras, M. C. 2018. Changing the landscape of accounting using blockchain technology. International Journal of Engineering and Management Research, 8(5): 190-195.

Latif, A., Shah, S., Iqbal, S., Farhan, M., Rizwan, O and Ijaz, F. 2019. Blockchain transforms the retail level by using a supply chain rules and regulation. International Conference on Communication, Computing and Digital systems (C-CODE), Islamabad, Pakistan, March 6-7, 2019.

Lee, J., Kim, J and Choi, J.Y. 2019. The adoption of virtual reality devices: The technology acceptance model integrating enjoyment, social interaction, and strength of the social ties. Telemat and Informatics, 39: 37–48.

Liang, X., Zhao, J., Shetty, S., Danyi L. 2017. Towards data assurance and resilience in IoT using blockchain. IEEE Military Communications Conference (MILCOM), Baltimore, USA.

Lin, Y.P., Petway, J., Anthony, J., Mukhtar, H., Liao, S.W., Chou, C.F and Ho, Y.F. 2017. Blockchain: The Evolutionary Next Step for ICT E-Agriculture. Environments, 4(3): 1-13.

Liu, S and He, S. 2019. Application of block chaining technology in finance and accounting field. International Conference on Intelligent Transportation, Big Data and Smart City (ICITBS), Changsha, China.

Lu, P.J., Yeh, L.Y., Huang, J.L. 2018. An privacy-preserving cross-organizational authentication, authorization, accounting System using Blockchain Technology, IEEE International Conference on Communications (ICC), Kansas City, USA.

McCallig, J., Robb, A., and Rohde, F. 2019. Establishing the representational faithfulness of financial accounting information using multiparty security, network analysis and a blockchain. International Journal of Accounting Information Systems, 33(1): 47-58.

Manski, S. 2017. Building the blockchain world: Technological commonwealth or just more of the same?. Strategic Change, 26(5): 511-522.

Mori, T. 2016. Financial technology: Blockchain and securities settlement. Journal of Securities Operations and Custody, 8(3): 208-217.

Ngangi, S.C.W and Santoso. A.J. 2019. Customer acceptance analysis of customer relationship management (CRM) systems in automotive company using technology acceptance model (TAM) 2. Indonesian Journal of Information Systems. 1(2) 133 -146.

Olsen, P., Borit, M. and Syed, S., 2019. Applications, limitations, costs, and benefits related to the use of blockchain technology in the food industry. Available at:. https://nofima.brage.unit.no/nofimaxmlui/handle/11250/2586121.

Rao, L and Pandurangiah, S. 2018. BlockchainTechnology: Will it disrupt or discipline accountants. The Management Accountant Journal, 53(6): 42-46.

Scott, B., Loonam, J and Kumar, V. 2017. Exploring the rise of blockchain technology: Towards distributed collaborative organizations. Strategic Change, 26(5), 423-428.

Silinskyte, J. 2014. Understanding bitcoin adoption: Unified theory of acceptance and use of technology (UTAUT) application. Master ICT in Business. Leiden University, Netherlands.

Smith, S. S. 2018. Implications of next step blockchain applications for accounting and legal practitioners: A case study. Australasian Accounting, Business and Finance Journal, 12(4): 77-90.

Sylvester, G. 2019. E-agriculture in Action: Blockchain for Agriculture, Opportunities and Challenges, International Telecommunication Union (ITU), Bangkok.

Wang, H, Zheng, Z, Xie, S., Dai, H.N and Chen, X. 2018. Blockchain challenges and opportunities: A survey. International Journal of Web and Grid Services, 14(4). 352 - 375. 10.1504/IJWGS.2018.10016848.

Wang, Y and Kogan, A. 2018. Designing confidentiality-preserving Blockchain-based transaction processing systems. International Journal of Accounting Information Systems, 30 (1), 1-18.

Warren, C., Reeve, J.M and Duchac, J. 2018. Financial Accounting. McGraw-Hill Higher Education.

Watts, R and Zimmerman, J. 1983. Agency problems, auditing and the theory of the firm: some evidence. Journal of Law and Economics, 26(3): 613–634.

Williams, J. 2018. Financial Accounting. McGraw-Hill Higher Education

Wuest, T. 2015. Identifying product and process state drivers in manufacturing systems using supervised machine learning. WTI-Frankfurt. Available at: www.wti-frankfurt.de/images/top-themen/Identifying-Product-and-Process-State-Drivers-in-Manufacturing-Systems-Using-Supervised-Machine-Learning.pdf.

Zhang, C. A , Dai, J and Vasarhelyi, M. A. (2018). The impact of disruptive technologies on accounting and auditing education. CPA Journal, 5: 20-26.

Twitter Analysis: How the Covid-19 Change the Understanding of Virtual Teams

Tereza Šímová, Kristýna Zychová and Richard Hartman
Department of Management, Faculty of Economics and Management, Czech University of Life Sciences Prague, Czech Republic
simovat@lib.czu.cz
zychovak@rektorat.czu.cz
hartman@af.czu.cz
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Abstract: In the light of the recent pandemic, the workplace has been changed. People from around the world have moved to the virtual world and virtual teams have become a critical part of innovation in most companies. The virtual team has been with us for many years thanks to the development of information and communication technologies, but the Covid-19 pandemic changed the working environment of millions of people from day to day. Virtual teams can be beneficial for employees as well as for companies, but also can bring many problems for the functionality of the team. Transformation to the virtual world is challenging innovation and it is not easy to go from a workplace environment to a virtual. For that reason, it is essential to investigate how companies and employees understand this change from office work to the virtual environment. The presented paper identified the main communities and factors that Twitter users used to describe their experience with virtual teams through hashtags during the Covid-19 pandemic. We investigated tweets with #virtualteam or #virtualteams to described and understand the virtual team communities. Data from the social network Twitter were analysed and compared for the years 2019 and 2020. For the social network analysis, we used SMAHR framework. SMAHR is a framework that is focused on social media analysis based on hashtag research. We detected two communities on the social network Twitter in 2019 – "Management of virtual teams" and understanding virtual teams as a "Different way of business". In 2020 we spotted five communities on Twitter – "Effect of Covid-19 on the workplace", "Virtual meetings", "Digital transformation", and two micro-communities. Future research should focus on a wider scope of searching hashtags; linguistic and etymologic research to define terms connected to virtual teams; a deeper understanding of communities and factors described by presented paper; study of communities on Twitter after the current pandemic; examination of communities on other social media networks (e.g., on Facebook, Instagram, TikTok or ResearchGate). Our research also opened the question about possible bias in social networking analysis.

Keywords: pandemic, social media analysis, virtual workplace, virtual environment, workplace

1. Introduction

Electronic communication has improved through time, allowing people to communicate more effectively over distances (Pearlson and Saunders, 2001). For members to discuss ideas, teams no longer need to be collocated, this kind of collaboration is known as working virtually (Guinea, Webster and Staples, 2005). During the pandemic, workplace and organizational collaboration have become a central issue for many companies (Davison, 2020; Richter, 2020). To avoid close contact and the spread of the virus, many companies have chosen to limit risks by forcing employees to work virtually (Abarca, Palos-Sanchez and Rus-Arias, 2020). Therefore, Covid-19 played a crucial role in work transformation from face-to-face to virtual form (Meluso, Johnson and Bagrow, 2020) and employees had to adapt to new ways of cooperation (Bailey and Breslin, 2020). As a result, all of this has caused that virtual teams became a necessity for the operation of organizations (Pearlson and Saunders, 2001; Guinea, Webster and Staples, 2005) and the use of virtual teams has considerably increased (Frost and Duan, 2020; Newman and Ford, 2020). Virtual teams represent groups that are geographically, organizationally, and sometimes across time zones dispersed (Aldag and Kuzuhara, 2015). Townsend, DeMarie and Hendrickson (1998, p. 18) described virtual teams as "*groups of geographically and/or organizationally dispersed coworkers that are assembled using a combination of telecommunications and information technologies to accomplish an organizational task*". To accomplish the organizational task, they rarely meet face-to-face and rely heavily on technological tools such as information and communication technologies (Partridge, 2007). Without technology assistance, virtual teams would be unable to complete their tasks and efficiently coordinate their activities (Gibson and Cohen, 2003). Virtual teams consist of members from all over the world who are spread across time zones (Partridge, 2007) and different cultures (Pearlson and Saunders, 2001). Members are located in different buildings, cities, and even continents (Ahuja and Galvin, 2003) and may belong to the same or multiple organizations (Gibson and Cohen, 2003).

1.1 Social network analysis

Every day people create trillions of connections through social media (Hansen *et al.*, 2020). Connections (“links,” “ties,” or “edges”) are formed between social actors (“nodes” or “vertices”), such as persons and organizations, to form a social network structure (Serrat, 2017). In 1954, John Barnes came up with the term "social network" (Berelson, 1952) and since then the theory of social networks has greatly expanded (Hansen et al., 2020). Crossroads of several fields are social network research. It has for a long time been associated with sociology, psychology, math, anthropology, and network science (Perez and Germon, 2016)

1.2 Twitter

Twitter is a popular social network platform that falls under the category of microblogging, which involves sending very short status updates (limited to 280 characters, four or fewer photos, and short-form videos), forcing users to be brief and creative. It's also possible to incorporate links to other websites or journal papers. Persons on Twitter can be followed by others; as a result, a single user's message may be seen to their followers in their feed, or in a list of updates from users they follow (Antonakaki, Fragopoulou and Ioannidis, 2021). Other users can retweet (repost) tweets as well. Twitter provides an easy data access API and a basic data model. This makes it excellent for social network research, seeking to understand online behavior patterns, social graph structure, sentiment toward various entities, and the nature of malicious attacks in a vibrant network with hundreds of millions of people (Pilař *et al.*, 2021). Indeed, Twitter has become a major research venue, with over ten thousand research articles citing it in the last ten years (Antonakaki, Fragopoulou and Ioannidis, 2021). Twitter data may help shed light on many topics, e.g., to describe particular domain (Pilař *et al.*, 2019), in healthcare (Pershad *et al.*, 2018), in political science (Bovet and Makse, 2019), in marketing (Taecharungroj, 2017) or understanding of consumers and their behavior (Pilař, Kvasničková Stanislavská and Kvasnička, 2021). However, none of the current research has focused on social network analysis and virtual teams.

Giving the gaps in the research, the presented paper identified the main communities and factors that Twitter users used to describe their experience with virtual teams through hashtags during the Covid-19 pandemic. We investigated tweets with #virtualteam or #virtualteams to describe and understand the virtual team communities. Data from the Twitter were analysed and compared for the years 2019 and 2020, to define the change of understanding and change of the key factors of virtual teams due to Covid-19. The presented paper explores, for the first time, the effects of Covid-19 pandemic on the understanding of virtual team with the use of social network analysis.

The paper is structured as follow: the introduction of this paper offers a brief theoretical background about virtual teams, social network analysis and Twitter. Second section is Materials and Methods, where we have described how the SMAHR framework was used to analyzed communities on Twitter. The Results and Discussion section is dived in the two parts and it interpret obtained results. In the first part we have described hashtag frequency analysis. The second part of Results and Discussion present a community analysis and identify the key factors of virtual teams on Twitter. In the last section of the paper, the Conclusion, we summarized the paper, and we provide a recommendation for further research.

2. Materials and methods

The data analysis was based on the SMAHR framework (Pilař *et al.*, 2021). SMAHR is a framework that is focused on social media analysis based on hashtag research. The hashtag is a specific part of the message that begins with a “#” character. On social media, hashtags are used for two reasons – to highlight values, experiences, or opinions in the posts (Zhang *et al.*, 2020) or to filter posts based on a specific hashtag (Chang and Iyer, 2012).

The data analysis process (Figure 1) is based on the SMAHR framework by Pilař et al. (2021).

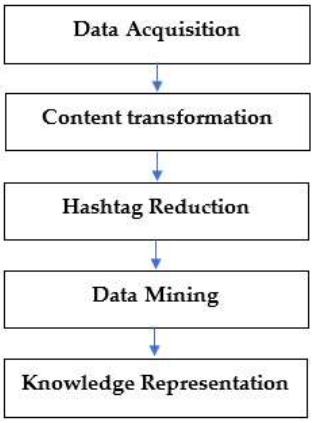

Figure 1: Five phases of social media analysis based on hashtag research (SMAHR) framework process (Pilař *et al.*, 2021)

In the first step (data acquisition) we used the Twitter API v2: Early Access (*Twitter, API v2: Early Access*, 2021) to obtain messages from Twitter. The software extracted messages that used the hashtag #virtualteam OR #virtualteams. The extracted data contained 12 765 tweets (2 650 tweets from 2019 and 10 115 tweets from 2020). To prevent potential duplicates, we transformed all letters to lower-case letter. As a part of the content transformation, we imported the dataset into Gephi 0.9.2. software via the default import module. Gephi is open-source software for graphs and networks. To create a hashtag network, we used interdependence of hashtags based on the rule from social network analysis methods: Nodes = Hashtags and Edges = their representation in one message. The next step was Hashtag reduction. In the data mining phase, the following methods were used to describe the hashtag network:

- *Frequency:* The frequency is a value that expresses the hashtag frequency within a network.
- *Community analysis and modularity:* The most complex networks contain hashtags that are commonly connected to a more significant extent than they are connected to the rest of the network (Pilař *et al.*, 2019). The cluster of such hashtags is called communities (McCurdie, Sanderson and Aitken, 2018). Modularity represents an index that identifies the cohesion of communities within a given network (Girvan and Newman, 2004). The community analysis then identifies the number of different community in the network based on the modularity detection analysis (Blondel *et al.*, 2008) as follows:

$$\Delta Q = \left[\frac{\Sigma_{in} \quad +2k_{i,in}}{2m} - \left(\frac{\Sigma_{tot} \quad +k_i}{2m}\right)^2\right] - \left[\frac{\Sigma_{in}}{2m} - \left(\frac{\Sigma_{tot}}{2m}\right)^2\right],$$

where $\sum_{in}$ is the sum of weighted links inside the community, $\sum_{tot}$ is the sum of weighted links incident to hashtags in the community, k_i is the sum of weighted links incident to hashtag i, $k_{i,in}$ is the sum of weighted links going from i to hashtags in the community, and m is the normalizing factor as the sum of weighted links for the whole graph (Blondel *et al.*, 2008; Pilař *et al.*, 2021).

The next step was network visualization, which led to the identification of individual communities. After importing the data into the Gephi program. In big data analysis, Gephi is frequently used as general complex network software. The process of uncovering hidden patterns, bursts of activity, correlations, and laws of natural or social phenomena is known as big data analysis (Yang *et al.*, 2017).The network's visualization is concentrated in the basic square without visualizing the different relationships between individual hashtags (Pilař *et al.*, 2021). The last step was the knowledge representation – a technique that uses visualization tools to represent the results of data mining (Pilař *et al.*, 2021).

3. Results and discussion

3.1 Hashtag frequency analysis

Results of frequency analysis of hashtags have shown that users on Twitter used #virtualteam and #virtualteams 2 650 times in the year 2019 and 10 115 times in 2020. The increased number of #virtualteam support the claim of Meluso, Johnson, and Bagrow (2020) that Covid-19 transform the workplace from face-to-face to virtual form.

Also, the occurrence of #covid19 has been often connected with virtual teams (3rd place in 2020). An important topic for the virtual team is leadership (as can be seen from Table 1). This result reflects those of Abarca, Palos-Sanchez and Rus-Arias (2020), who claimed that leadership is the key issue of virtual teams. The most obvious finding from the hashtag frequency analysis is that not only the occurrence of #virtualteam have been increased. Due to Covid-19, the popularity of virtual teams on Twitter has raised (see Table 1).

Table 1: Absolute values of hashtags related to #virtualteam in 2019 and 2020 (own calculation)

Hashtag	2019	2020
#remotework	359	2143
#leadership	227	1366
#covid19	<50	967
#remoteworking	50	915
#workfromhome	<50	776
#remoteteams	176	772
#wfh	<50	629
#remoteworkers	82	612
#futureofwork	91	472
#management	79	449
#virtualmeetings	<50	396

3.2 Community analysis

In 2019 there were two communities – virtual teams as a "Different way of business" and "Management in virtual teams" (see Table 2 and Figure 2). In 2019 hashtags such as #business, #onlinebusines, #entrepreneur, #entrepreneurship or #startup had connection with the #virtualteam. Companies are evolving because of technological development. The Internet, which has become increasingly important for conducting e-business, is one of the key drivers of these changes (de Souza and Batista, 2017). It has enabled companies to actively participate in international business (Šimić, Biloš and Mijoč, 2019). As Šimić, Biloš and Mijoč (2019) point out e-business tools are critical for a company's international activities since they enable to contribute considerably to economic growth by simplifying business operations and enhancing a company's competitive market presence.

Table 2: Communities in 2019 (own calculation)

Number of Communities	Size of community	Name of community	Key hashtags
0	50 %	Different way of business	#virtualassistant, #business, #onlinebusines, #teams, #entrepreneur, #entrepreneurship, #startup
1	50 %	Management in virtual teams	#remotework, #remoteteams, #futureofwork, #leadership, #management, #collaboration, #teambuilding

In 2019 the popular hashtag was #virtualassistant. A virtual assistant can be related to several topics. A virtual assistant can be used as a tool of the internet of things (virtual assistants such as Alexa, Siri, Cortana, or Google Assistant). However, also, it can refer to outsourcing work from companies with virtual assistants over the world. Both areas are researched by many scientists. For example, Graham and Jones (2016) contributed to research concerning virtual assistants and their contribution to the development of higher-quality virtual team projects and increased virtual team member technical proficiency. Recent research is concerning with intelligent anthropomorphic virtual assistants (Balsa *et al.*, 2020), reducing cognitive load and improving warfighter problems with intelligent virtual assistants (de Melo *et al.*, 2020) or intrinsic motivation in virtual assistant interaction for fostering spontaneous interactions (Li and Yanagisawa, 2021).

Community "Management in virtual teams" in 2019 saw virtual teams as a challenge to leadership (2nd position), management (9th position), and collaboration (6th position). A change in management or leadership style is also needed when transforming the work environment. That is why leadership and management is a key issue for virtual teams (Abarca, Palos-Sanchez and Rus-Arias, 2020). The occurrence of #collaboration supports Bailey and Breslin (2020) who stated that employees have to learn how to collaborate in the virtual workplace. Virtual teams also need to focus on team building (#teambuilding is in the 3rd position). The distance can mean missing out on important teambuilding chances that rely on developing relationships with other team members (Ellis *et*

al., 2008). For this reason, researchers' attention is focused on methods to implement team building within virtual teams, for example through goal setting structure (Huang *et al.*, 2003) or 3D virtual worlds and games (Ellis *et al.*, 2008). Community "Management in virtual teams" also recognizes virtual teams as a future of work and team development. Already Germain and McGuire (2014) understand the virtual team as development and possible future way of working. In the community "Management in virtual teams," we can also see the need to describe the difference and define terms, remote teams, and virtual teams.

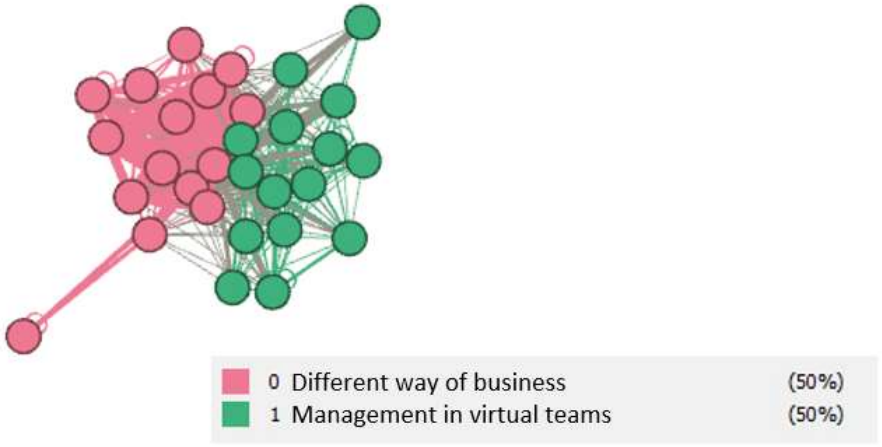

Figure 2: Community visualization of the virtual team domain in 2019 (own calculation)

In 2020 five communities were detected on Twitter (Table 3). The largest community focus on the "Effect of Covid-19 on workplace" (Figure 3). The #covid19 has been the fourth most commonly used hashtag with the #virtualteam. As we mentioned above, The Covid-19 revolutionized the workplace (Davison, 2020; Meluso, Johnson and Bagrow, 2020; Richter, 2020). Companies seek the best organization of the virtual workplace. For that reason, it is no wonder that #leadership (3rd position) and #management (11th position) are so often connected with virtual teams. We described the importance of leadership and management above. Team coaching (13th position) is also commonly connected with virtual teams. Team members may feel separated from one another and the team's goal, thus coaching actions may be especially important (Rousseau, Aubé and Tremblay, 2013), but coaching a virtual team is more difficult than coaching a collocated team (Moe *et al.*, 2015) and requires a specific approach.

Table 3: Communities in 2020 (own calculation)

Number of Communities	Size of community	Name of community	Key hashtags
1	65.94 %	Effect of Covid-19 on workplace	#remotework #leadership, #management, #covid19, #remoteteams, #remoteworkers, #workingfromhome
4	12.32 %	Virtual collaboration	#virtualmeetings, #globalteams, #virtuallearning, #webinar, #globalbiz, #virtualtraining, #crosscultural
3	9.42 %	Digital transformation	#digitaltransformation, #mobilzoom, #waas, #remoteworkforce, #flexiblework, #businesstransformation, #ittransformation
0	7.97 %	Cebu (micro-community)	#digitalmarketing, #virtualteam, #cebu, #cebucareers #cebujobs, #careers, #worklifebalance
2	4.35 %	Dawgen Global (micro-community)	#dawgenglobal, #caribbean, #advisory, #businessadvisory, #consultingfirms, #strategyconsulting

In the "Effect of Covid-19 on workplace" community, we can find topics related to #remotework, #remoteteams, #remoteworkers #workingfromhome (or #wfh, or #workfromhome), #workingremotely. As we have already mentioned the change to the virtual environment is experienced by people all over the world - so it is no surprise that so many different hashtags are used to express work in the virtual world. Further research may be undertaken to define all those terms from the linguistic and etymologic points of view.

We called the second-largest community in 2020 "Virtual collaboration". This community has focused on webinars, virtual conferences, virtual learning (and remote learning), and other virtual meetings. The virtual conference has been popular for many years. Already Kobayashi and Siio (1993) described a conferencing system that helps to connect people all over the world. Due to Covid-19, everyone has experienced the transformation from face-to-face to virtual form (Meluso, Johnson and Bagrow, 2020). The job interview has to be moved into a virtual environment (Jones and Abdelfattah, 2020), education as well (Šímová and Zychová, 2021), even scientific conferences went online (Haji-Georgi, Xu and Rosca, 2021). For that reason, it is no surprise that Community "virtual meetings" is the second largest community on Twitter.

The third-largest community in 2020 is "Digital transformation". The evolution of information technology (IT) played a critical role in the transformation to the virtual world (Pearlson and Saunders, 2001; Gibson and Cohen, 2003). According to Laitinen and Valo (2018) is IT an indispensable part of working in virtual teams. IT can be also a factor that determines the effectiveness of virtual teams (Walsh, 2019). Similarly, as in the research about virtual education by Šímová and Zychová (2021) a platform selection is an important topic. Hashtags such as #mobilzoom or #waas have been used by the community "Digital transformation".

An interesting micro-community has been created around #cebu. Province Cebu is a province of the Philippines that has experienced a boom in the economy after the 1990s. Thanks to geography, history, good policies, and leadership Cebu became a paradise for many companies (Churchill, 1993). Behind this community is only one company, The Virtual Hub, which generates a great number of posts on Twitter with hashtags such as #virtualteam, #cebu, #cebucareers, or #cebujobs. The smallest and outstanding community is the "Dawgen Global". This community was created around the company Dawgen Global, an accounting and consulting firm. All hashtags in this community have the same number of occurrences (69) – all post in this community was created by one company. These results open the question for further research about possible bias in social networking analysis.

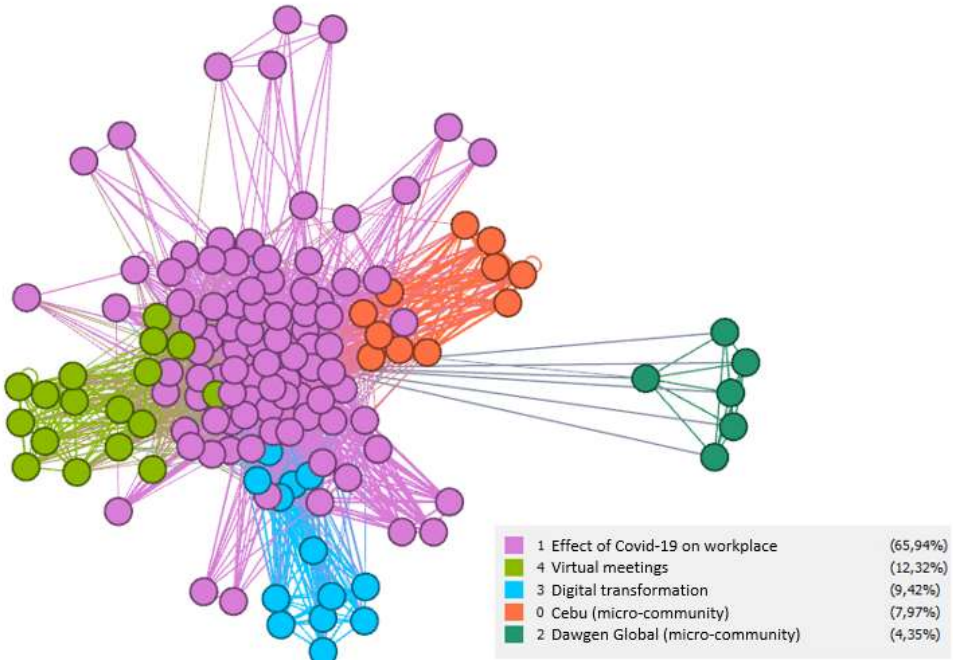

Figure 3: Community visualization of the virtual team domain in 2020 (own calculation)

4. Conclusion

This paper aimed to explore the identified communities and factors that Twitter users used to describe their experience with virtual teams through hashtags during the Covid-19 pandemic. We investigated tweets with #virtualteam or #virtualteams to described and understand the virtual team communities. Data from the Twitter were analysed and compared for the years 2019 and 2020, to define the change of understanding and change of the key factors of virtual teams due to Covid-19.

In 2019, we detected two communities on the social network Twitter – first community understands the virtual team as a "Different way of business", second accented the importance of "Management in virtual teams". In 2020 we spotted five communities on Twitter. The largest community has focused on the "Effect of Covid-19 on the workplace". The second-largest community in 2020 has been dedicated to "Virtual collaboration". The third-largest community was created around "Digital transformation" due to the change to a virtual form of communication. In 2020, we also detected on Twitter two micro-community – one around #cebu and the second around #dawgenglobal.

Our study has some limitations. The first limitation is the social media analysis by itself – the focus only on one social network, using only English keywords. The limitation of our study is also the problem of micro-communities – we didn´t remove them from the analysis, which can be seen in the results. Another limitation is that we paid attention only to #virtualteam or #virtualteams, but as our analyses showed, Twitter users don´t accept the difference between the term "virtual team" and "remote team" in the academic sense. For that reason, future research should focus on a wider scope of searching hashtags and linguistic and etymologic research should be undertaken to define all those terms.

While considering these limitations, the presented paper identified the main communities and factors that Twitter users used to describe their experience with virtual teams through hashtags during the Covid-19 pandemic. Future research should focus on a deeper understanding of those communities and factors with the use of different methods (not only social media analysis but also experimental, longitudinal, and correlation studies which will provide greater insights into understanding virtual teams). Interesting insights may also bring a study of communities on Twitter after the current pandemic. In future investigations, it might be possible to explore virtual teams on different social networks such as Instagram, Facebook, TikTok, or ResearchGate. Our research also opened the question about possible bias in social networking analysis.

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References

Abarca, V. M. G., Palos-Sanchez, P. R. and Rus-Arias, E. (2020) 'Working in Virtual Teams: A Systematic Literature Review and a Bibliometric Analysis', *IEEE Access*, 8, pp. 168923–168940. doi: 10.1109/ACCESS.2020.3023546.

Ahuja, M. K. and Galvin, J. E. (2003) 'Socialization in Virtual Groups', *Journal of Management*, 29(2), pp. 161–185. doi: 10.1177/014920630302900203.

Aldag, R. J. and Kuzuhara, L. W. (2015) *Creating high performance teams: applied strategies and tools for managers and team members*. New York ; London: Routledge, Taylor & Francis Group.

Antonakaki, D., Fragopoulou, P. and Ioannidis, S. (2021) 'A survey of Twitter research: Data model, graph structure, sentiment analysis and attacks', *Expert Systems with Applications*, 164, p. 114006. doi: 10.1016/j.eswa.2020.114006.

Bailey, K. and Breslin, D. (2020) 'The COVID-19 Pandemic: What can we learn from past research in organizations and management?', *International Journal of Management Reviews*, p. 4.

Balsa, J., Félix, I., Cláudio, A. P., Carmo, M. B., Silva, I. C. e, Guerreiro, A., Guedes, M., Henriques, A. and Guerreiro, M. P. (2020) 'Usability of an Intelligent Virtual Assistant for Promoting Behavior Change and Self-Care in Older People with Type 2 Diabetes', *Journal of Medical Systems*, 44(7), p. 130. doi: 10.1007/s10916-020-01583-w.

Berelson, B. (1952) *Content analysis in communication research.*, *Content analysis in communication research.* New York, NY, US: Free Press.

Blondel, V. D., Guillaume, J.-L., Lambiotte, R. and Lefebvre, E. (2008) 'Fast unfolding of communities in large networks', *Journal of Statistical Mechanics: Theory and Experiment*, 2008(10), p. P10008. doi: 10.1088/1742-5468/2008/10/p10008.

Bovet, A. and Makse, H. A. (2019) 'Influence of fake news in Twitter during the 2016 US presidential election', *Nature Communications*, 10(1), p. 7. doi: 10.1038/s41467-018-07761-2.

Chang, H.-C. and Iyer, H. (2012) 'Trends in Twitter Hashtag Applications: Design Features for Value-Added Dimensions to Future Library Catalogues', *Library Trends*, 61(1), pp. 248–258. doi: 10.1353/lib.2012.0024.

Churchill, P. R. (1993) 'CEBU: ABERRATION OR MODEL FOR GROWTH?', *Philippine Quarterly of Culture and Society*, 21(1), pp. 3–16. Available at: http://www.jstor.org.infozdroje.czu.cz/stable/29792109 (Accessed: 7 June 2021).

Davison, R. M. (2020) 'The Transformative Potential of Disruptions: A Viewpoint', *International Journal of Information Management*, 55, p. 102149. doi: 10.1016/j.ijinfomgt.2020.102149.

Ellis, J. B., Luther, K., Bessiere, K. and Kellogg, W. A. (2008) 'Games for virtual team building', in *Proceedings of the 7th ACM conference on Designing interactive systems - DIS '08*. *the 7th ACM conference*, Cape Town, South Africa: ACM Press, pp. 295–304. doi: 10.1145/1394445.1394477.

Frost, M. and Duan, S. X. (2020) 'Rethinking the Role of Technology in Virtual Teams in Light of COVID-19', *Virtual teams*, p. 7.

Germain, M.-L. and McGuire, D. (2014) 'The Role of Swift Trust in Virtual Teams and Implications for Human Resource Development', *Advances in Developing Human Resources*, 16(3), pp. 356–370. doi: 10.1177/1523422314532097.

Gibson, C. B. and Cohen, S. G. (eds) (2003) *Virtual teams that work: creating conditions for virtual team effectiveness*. 1st ed. San Francisco: Jossey-Bass (The Jossey-Bass business & management series).

Girvan, M. and Newman, M. E. J. (2004) 'Finding and evaluating community structure in networks', *Physical Review E*, 69(2), p. 026113. doi: 10.1103/PhysRevE.69.026113.

Graham, C. and Jones, N. B. (2016) 'Intelligent Virtual Assistant's Impact on Technical Proficiency within Virtual Teams:', *International Journal of Virtual and Personal Learning Environments*, 6(1), pp. 41–61. doi: 10.4018/IJVPLE.2016010104.

Guinea, A., Webster, J. and Staples, S. (2005) 'A Meta-Analysis of the Virtual Teams Literature', *Presented October 12, 2005 at the Symposium on High Performance Professional Teams, Queen's University, Kingston, ON Canada*. Available at: https://www.researchgate.net/publication/252063784_A_Meta-Analysis_of_the_Virtual_Teams_Literature.

Haji-Georgi, M., Xu, X. and Rosca, O. (2021) 'Academic conferencing in 2020: A virtual conference model', *Human Behavior and Emerging Technologies*, 3(1), pp. 176–184. doi: 10.1002/hbe2.235.

Hansen, D. L., Shneiderman, B., Smith, M. A. and Himelboim, I. (2020) 'Introduction to social media and social networks', in *Analyzing Social Media Networks with NodeXL*. Elsevier, pp. 3–10. doi: 10.1016/B978-0-12-817756-3.00001-7.

Huang, W. W., Wei, K.-K., Watson, R. T. and Tan, B. C. Y. (2003) 'Supporting virtual team-building with a GSS: an empirical investigation', *Decision Support Systems*, 34(4), pp. 359–367. doi: 10.1016/S0167-9236(02)00009-X.

Jones, R. E. and Abdelfattah, K. R. (2020) 'Virtual Interviews in the Era of COVID-19: A Primer for Applicants', *Journal of Surgical Education*, 77(4), pp. 733–734. doi: 10.1016/j.jsurg.2020.03.020.

Kobayashi, M. and Siio, I. (1993) 'Virtual conference room: a metaphor for multi-user real-time conferencing systems', in *Proceedings of 1993 2nd IEEE International Workshop on Robot and Human Communication*. *Proceedings of 1993 2nd IEEE International Workshop on Robot and Human Communication*, pp. 430–435. doi: 10.1109/ROMAN.1993.367679.

Laitinen, K. and Valo, M. (2018) 'Meanings of communication technology in virtual team meetings: Framing technology-related interaction', *International Journal of Human-Computer Studies*, 111, pp. 12–22. doi: 10.1016/j.ijhcs.2017.10.012.

Li, C. and Yanagisawa, H. (2021) 'Intrinsic motivation in virtual assistant interaction for fostering spontaneous interactions', *PLOS ONE*. Edited by S. Triberti, 16(4), p. e0250326. doi: 10.1371/journal.pone.0250326.

McCurdie, T., Sanderson, P. and Aitken, L. M. (2018) 'Applying social network analysis to the examination of interruptions in healthcare', *Applied Ergonomics*, 67, pp. 50–60. doi: 10.1016/j.apergo.2017.08.014.

de Melo, C. M., Kim, K., Norouzi, N., Bruder, G. and Welch, G. (2020) 'Reducing Cognitive Load and Improving Warfighter Problem Solving With Intelligent Virtual Assistants', *Frontiers in Psychology*, 11, p. 554706. doi: 10.3389/fpsyg.2020.554706.

Meluso, J., Johnson, S. and Bagrow, J. (2020) *Making Virtual Teams Work: Redesigning Virtual Collaboration for the Future*. preprint. SocArXiv. doi: 10.31235/osf.io/wehsk.

Moe, N. B., Cruzes, D. S., Dyba, T. and Engebretsen, E. (2015) 'Coaching a Global Agile Virtual Team', in *2015 IEEE 10th International Conference on Global Software Engineering*. *2015 IEEE 10th International Conference on Global Software Engineering (ICGSE)*, Ciudad Real, Spain: IEEE, pp. 33–37. doi: 10.1109/ICGSE.2015.26.

Newman, S. A. and Ford, R. C. (2020) 'Five Steps to Leading Your Team in the Virtual COVID-19 Workplace', *Organizational Dynamics*, p. 100802. doi: 10.1016/j.orgdyn.2020.100802.

Partridge, L. (2007) *Teams: learning made simple*. 1st ed. Amsterdam ; Boston: Butterworth-Heinemann.

Pearlson, K. E. and Saunders, C. S. (2001) 'There's no place like home: Managing telecommuting paradoxes', *Academy of Management Perspectives*, 15(2), pp. 117–128. doi: 10.5465/ame.2001.4615008.

Perez, C. and Germon, R. (2016) 'Chapter 7 - Graph Creation and Analysis for Linking Actors: Application to Social Data', in Layton, R. and Watters, P. A. (eds) *Automating Open Source Intelligence*. Boston: Syngress, pp. 103–129. doi: 10.1016/B978-0-12-802916-9.00007-5.

Pershad, Y., Hangge, P. T., Albadawi, H. and Oklu, R. (2018) 'Social Medicine: Twitter in Healthcare', *Journal of Clinical Medicine*, 7(6), p. 121. doi: 10.3390/jcm7060121.

Pilař, L., Kvasničková Stanislavská, L. and Kvasnička, R. (2021) 'Healthy Food on the Twitter Social Network: Vegan, Homemade, and Organic Food', *International Journal of Environmental Research and Public Health*, 18(7), p. 3815. doi: 10.3390/ijerph18073815.

Pilař, L., Kvasničková Stanislavská, L., Kvasnička, R., Bouda, P. and Pitrová, J. (2021) 'Framework for Social Media Analysis Based on Hashtag Research', *Applied Sciences*, 11(8), p. 3697. doi: 10.3390/app11083697.

Pilař, L., Kvasničková Stanislavská, L., Pitrová, J., Krejčí, I., Tichá, I. and Chalupová, M. (2019) 'Twitter Analysis of Global Communication in the Field of Sustainability', *Sustainability*, 11(24), p. 6958. doi: 10.3390/su11246958.

Richter, A. (2020) 'Locked-down digital work', *International Journal of Information Management*, 55, p. 102157. doi: 10.1016/j.ijinfomgt.2020.102157.

Rousseau, V., Aubé, C. and Tremblay, S. (2013) 'Team coaching and innovation in work teams: An examination of the motivational and behavioral intervening mechanisms', *Leadership & Organization Development Journal*, 34(4), pp. 344–364. doi: 10.1108/LODJ-08-2011-0073.

Serrat, O. (2017) 'Social Network Analysis', in Serrat, O., *Knowledge Solutions*. Singapore: Springer Singapore, pp. 39–43. doi: 10.1007/978-981-10-0983-9_9.

Šimić, M. L., Biloš, A. and Mijoč, J. (2019) 'E-business tools adoption and export performance: Empirical evidence from Croatian companies', *Journal of Entrepreneurship, Management and Innovation*, 15(4), pp. 11–34. doi: 10.7341/20191541.

Šímová, T. and Zychová, K. (2021) 'Covid-19´s impact on virtual education: direction for future research', in *Proceedings of 18th International Conference on Efficiency and Responsibility in Education*. Prague.

de Souza, E. and Batista, P. (2017) 'Strategic Antecedents and Consequents for the Performance of E-Business Companies', *Brazilian Business Review*, 14(1), pp. 59–85. doi: 10.15728/bbr.2017.14.1.4.

Taecharungroj, V. (2017) 'Starbucks' marketing communications strategy on Twitter', *Journal of Marketing Communications*, 23(6), pp. 552–571. doi: 10.1080/13527266.2016.1138139.

Townsend, A. M., DeMarie, S. M. and Hendrickson, A. R. (1998) 'Virtual teams: Technology and the workplace of the future', *Academy of Management Perspectives*, 12(3), pp. 17–29. doi: 10.5465/ame.1998.1109047.

Twitter, API v2: Early Access (2021) *Twitter*. Available at: https://developer.twitter.com/en/docs/twitter-api/early-access (Accessed: 15 February 2021).

Walsh, T. (2019) 'Virtual Team Success with the Power of Technology Advancements', in A. Gordon, P. and A. Overbey, J. (eds) *Advances in the Technology of Managing People: Contemporary Issues in Business*. Emerald Publishing Limited (The Changing Context of Managing People), pp. 99–107. doi: 10.1108/978-1-78973-073-920191009.

Yang, J., Cheng, C., Shen, S. and Yang, S. (2017) 'Comparison of complex network analysis software: Citespace, SCI2 and Gephi', in *2017 IEEE 2nd International Conference on Big Data Analysis (ICBDA)*. *2017 IEEE 2nd International Conference on Big Data Analysis (ICBDA)*, pp. 169–172. doi: 10.1109/ICBDA.2017.8078800.

Zhang, K., Geng, Y., Zhao, J., Liu, J. and Li, W. (2020) 'Sentiment Analysis of Social Media via Multimodal Feature Fusion', *Symmetry*, 12(12), p. 2010. doi: 10.3390/sym12122010.

The Paradox of Success: Fact or Fiction?

Pavlína Široká, Róbert Mudroň and Michal Jirásek
Masaryk University, Brno, Czech Republic
pavlina.siroka@mail.muni.cz
mudron@mail.muni.cz
mijirasek@mail.muni.cz
DOI: 10.34190/EIE.21.079

Abstract: The relationship between past performance, strategic change, and subsequent performance presents an important behavioral mechanism. Research in the past has identified that past success encourages strategic persistence supporting future success. However, this sequence breaks when environmental conditions change. This is described by a so-called Paradox of success. The paradox represents a situation in which the history of past successes induces strategic persistence that is – under a major environmental change, such as the deregulation – detrimental to subsequent firm performance as the firm fails to adapt its strategy. In our research, we looked at Audia et al.'s (2000) who empirically studied the Paradox of success. One of their studies focused on the U.S. airlines' behavior during the industry's deregulation in the '70s and the early '80s. In our research, we attempted to replicate the original study as closely as the availability of data and the description of the methodology allowed us. In this attempt, we experienced some difficulties and were unable to gather a full data sample nor clearly identify some steps taken by the authors. Besides the actual replication, we also conducted several additional analyses that provide further insights and partially contradict the original findings. We created boxplots for the data and conducted Welch Two Sample T-tests to analyze if the findings could be attributed to regression to the mean. However, the results still provide some indication of the mechanisms hypothesized by Audia et al. (2000). Therefore, from our perspective, the actual existence of the Paradox of success remains an open question.

Keywords: replication, Paradox of success, strategic decision making, airline industry, deregulation

1. Introduction

Does success lead to its own demise? The Paradox of success represents a situation when an organization's history of success makes it more prone to strategic persistence and that, under a radical environmental change, leads to subsequent performance decline as the company fails to adapt to the changed environment. This paper contains a replication of a study by Audia, Locke and Smith (2000) that studied the paradox. Specifically, we focused on one of their studies testing the existence of this phenomenon among U.S. airlines around the time of deregulation of the industry in 1978. This event induced a radical environmental change. Before the deregulation airlines had limited means of competing as the regulators had control over prices, routes, or entry. After the industry was deregulated, the airlines gained new opportunities in how to run their business but also faced increased competition from both the incumbents and new entrants. Researchers found that past performance above aspirational level led to less exploratory innovation (Lu and Wong, 2019). Other research focused on the effect of strategic change or inertia on subsequent performance and found that change is more beneficial when an environmental change occurs and vice versa(Goll et al., 2007). These studies focused on the two relationships that make the Paradox of success. Miller (1992) found that some successful companies concentrate on the strategy that brought them success too much until it leads to downturn of their performance. Therefore, he studied the whole sequence. The whole sequence has not been studied (as far as I could find) by other researchers than Miller (1992) and Audia et al. (2000). Therefore, further inquiry is needed.

We believe that the Paradox of success still needs to be supported. There, we choose to replicate this part of Audia et al.'s (2000) paper despite some challenges we encountered on the way, such as lack of description and limited availability of the data. Additionally, we conducted additional analyses of the airline industry at the time of deregulation to rule out some alternative explanations. Our paper contributes to the current literature by testing the validity of the original study and the presence of the Paradox of success among these airlines.

2. Industry background

The US airline industry was regulated since the early 1900s. The Civil Aeronautics Board (CAB), which had control over the entry, exit, pricing, and routes, was established in the 1930s. The regulation allowed the airlines to compete only by some means of adjusting the quality of service, flight frequencies, and marketing (Horwitz, 1986). The CAB only allowed fare increases when the costs increased, for example, due to the increase in the price of fuel. Thus, this policy did not support the creation of cost controls within the airlines (Meyer and Strong, 1992).

In general, Deregulation had been advocated in the U.S. from the early ’70s by some politicians (Ramamurti and Sarathy, 1997) as well as some economists (Borenstein, 1992). The deregulation of the airline industry began with the deregulation of air cargo in 1977 (Oster Jr and Miles-Mclean, 1988). A year later the Airline Deregulation Act (ADA) was passed, and the CAB began to loosen its grip on airlines. The change did not come overnight but in several steps over a period defined in the Act. It finished at the end of 1984 with the abolition of the CAB. Besides the domestic deregulation, the International Air Transportation Act in 1980 deregulated the international aspects of the industry and aimed at opening the international air transportation market (Toh and Shubat, 1985).

The first release of restrictions by the ADA was a free entry into the industry for every able applicant, which resulted in increased competition. The CAB established Standard Industry Fare Level (SIFL) right after the passing of the Act based upon fares in effect on July 1st, 1979. SIFL served as a benchmark and the CAB allowed the carriers to manipulate their fares in a range 5% above or a maximum of 50% below it (U.S. Department of Transportation, 2019). The regulation of the fares was fully abolished on 1st January 1983. Routes were fully deregulated in 1982 and before that, the carriers were automatically granted one chosen route with non-stop service a year on top of the normal process of applying for routes. The airline subsidy program was changed and the mutual aid agreements, which airlines made to decrease the damage made by a strike, were abolished (Cannon, 1978).

The deregulation was not the only factor influencing the industry in the ’70s and ’80s. Several broader factors brought headwinds to the industry. The formerly controlled domestic oil prices were also deregulated at this time, releasing the full effect of the price changes on the market. The carriers had to deal with a sharp increase in fuel prices that more than doubled in 1979 (Ikenberry, 1988). Fuel is a big part of the operating costs of airlines, and they reacted by reducing fuel consumption as much as possible by optimizing flight speed, the weight of equipment on board, etc.

Besides that, the growth of the economy influences demand for air transportation services. Unfortunately for the airlines, a recession came at the same time as deregulation and lasted until 1983 when GDP growth was restored and stayed above 3% for a few following years (World Bank, 2020). Additionally, many airlines lease their aircraft and use debt financing and, therefore, the development of interest rates is important to their business (Tozer-Pennington, 2019). There was a significant rise in interest rates from 1977 until their peak in 1981 when they reached 13.9%, almost double the rate in 1977. The rates remained high until 1985 after which the value dropped to 7.7%, a similar rate to the one in 1977 (Neufeld, 2020).

Overall, the deregulation period brought many challenges to U.S. airlines. The airlines had to adjust to newly open entry to the industry with additional aspects of their businesses being deregulated every year. Together with these industry changes they also had to deal with unfavorable development of some macroeconomic factors such as rising fuel prices, a struggling economy, or high-interest rates.

3. Theory overview

Previous research has linked past performance to subsequent strategic decision-making in organizations. Research by Miller (1992) focused on the sequence of positive past performance – strategic change/inertia – subsequent performance. He found that initially successful firms concentrated on their strategy too much and that led to their downturn. Audia et al. (2000) studied the same sequence in the airline and trucking industry. The paradox emerged from the research mentioned below concerning past performance and strategic decisions and also the studies concerning the effect of strategic change or inertia on subsequent performance.

Particularly positive past performance has been linked to strategic inertia (Lant, Milliken and Batra, 1992; Boeker, 1997; Amason and Mooney, 2008; Wang, Senaratne and Rafiq, 2015). Amason and Mooney (2008) suggest that the reasons for this relationship are high expectations of strongly performing organizations which makes their managers more risk-averse. Risk aversion decreases exploratory innovation to the benefit of exploitative innovations (Lu and Wong, 2019). According to Wang, Senaratne and Rafiq (2015) success leads to not only excessive exploitation of existing capabilities but also to decline in dynamic capabilities, which has a negative effect on performance. Strategic persistence in successful organizations is even more reinforced in organizations where management resort to attributing negative performance to external forces and not their

decisions (Lant, Milliken and Batra, 1992). Jiang et al. (2020) found that success influenced the CEO in a way that decreased the magnitude of strategic change. Furthermore, success pronounces the negative influence of CEO and/or TMT tenure on strategic change (Boeker, 1997). There, however, have also been identified cases when success was linked with strategic change, although the authors suspect the TMT character or resource slack to be the reason for these results (Wiersema and Bantel, 1992).

Another link in the sequence of the Paradox of success is the effect of strategic change/inertia on performance. In general, strategic change has a positive effect on performance (Kraatz and Zajac, 2001), but some researchers identified the organization needs to have sufficient resources for the change to have the desired effect (Baker III and Duhaime, 1997). The frequency of change can also influence the effect on performance. According to Klarner and Raisch (2013), regular change rhythm in a high-dynamic context has a positive effect on long-term performance. Zajac, Kraatz and Bresser (2000) found that strategic inertia is beneficial only if it means that the organization is exploiting its distinctive competencies. Goll, Brown Johnson and Rasheed (2007) found that the reason why either inertia or change might be more beneficial for an organization is the occurrence of an environmental change where strategic change becomes beneficial whereas inertia will likely lead to decline.

4. Methodology

4.1 Replication

Audia et al. (2000) provided three individual studies that support their argument in terms of the Paradox of success. In our research, we replicated one of them that is focused on the airline industry. We choose this setting as we were able to obtain the data on this population from the U.S. National Archives and Records Administration (2020). The data selected for this study were from the period of 1974 to 1983 and were originally collected by the CAB.

Audia et al. (2000) narrowed the population of airlines to 25 that were certified for the entire 10-year period. For replication, identifying those 25 airlines was challenging as various sources such as reports from the CAB, DOT or ATA had some differences in the certified air carriers they reported to be active in the given period. In the end, we were able to identify only 19 airlines that satisfied the criteria presented in the original study. Moreover, due to the vagueness of the description of methodology in the original study, the operationalization of variables was also challenging. In several cases, we had to consider different alternatives and choose the one that fits the spirit of the original study as closely as we can judge. Figure 1 contains descriptions of variables from the original study and our replication.

Measures	Description by Audia et al. (2000, 842-843)	Our Methodology
Strategic persistence - Variables	Marketing expenses per mile; General expenses per mile; Equipment expenses per mile; Percentage of scheduled aircraft miles completed; First versus economy class; First-class revenue-passenger load factor; Coach-plus-economy revenue-passenger load factor	Account* Promotion and Sales divided by row** 25 Revenue aircraft-miles scheduled; Account* General and Administrative + General Services and Administration divided by row** 25 Revenue aircraft-miles scheduled; Account* Maintenance + Aircraft and Traffic Servicing divided by row** 25 Revenue aircraft-miles scheduled; Row** 26 Scheduled revenue aircraft-miles completed / 25 Revenue aircraft-miles scheduled; Row** 44 Available seat-miles – 1st class / (44 Available seat-miles – 1st class + 45 Available seat-miles - coach); Row** 32 Revenue passenger-miles – 1st class / 44 Available seat-miles – 1st class; Row** 33 Revenue passenger -miles coach / 45 Available seat-miles - coach
- Calculation	1 – for each strategic indicator, the variance was calculated over the five-year period following the deregulation; 2- variance scores were standardized and multiplied by -1 so that positive scores indicate greater persistence; 3 – the standardized indicators were summed to yield an overall measure	The same

Measures	Description by Audia et al. (2000, 842-843)	Our Methodology
Past performance - Variables	Return on Sales (ROS)	Accounts* (Total Operating Revenues – Total Operating Expenses – Interest On Long-Term Debt And Capital Leases – Other Interest Expense) / Total Operating Revenues
- Calculation	ROS calculated for the five years preceding the deregulation; deviation from the industry median for each year and then averaged	The same
Change in performance - Variables	ROS	Accounts* (Total Operating Revenues – Total Operating Expenses – Interest On Long-Term Debt And Capital Leases – Other Interest Expense) / Total Operating Revenues
- Calculation	Same calculation as for past performance except for the five years following the deregulation; then subtracting performance before deregulation and after into a difference measure	The same
Control variables - Variables	Organizational size; Market diversity (passengers, mail, freight, cargo); Change in CEO	Size – account Total Assets***. Market diversity – passengers, mail, freight, charter = Accounts* Transport Revenues – Scheduled Passenger / Total Operating Revenues; Mail / Total Operating Revenues, Property – Freight And Passenger Baggage / Total Operating Revenues; Charter – Passenger And Property / Total Operating Revenues.
- Calculation	Size – natural logarithm of total assets; Market diversity – calculating the percentage that the largest product line contributed to the total product mix; Change in CEO between 1977 and 1978	Size – the same. Market diversity – the same. CEO – identified in Northwest Airlines

Note: *financial data **traffic data ***balance sheet data

Figure 1: Measures used in the original and replicated study

4.2 Further analyses

To further analyze the results, we wanted to explore whether some of the findings could be attributed to regression towards the mean. This explanation is not eliminated by the methodology of the replicated study and would lead to the same results as Audia et al. (2000) got. Therefore, we divided the airlines into two groups based on whether they were successful or not in the pre-deregulation era as considered by the original study. That means that we assessed whether their mean performance 5 years before the deregulation was above the industry median or below it. After that, we visualized deviations of performance of these two groups of airlines from industry performance for the 5 years before and 5 years after the deregulation. Finally, we used a Welch Two Sample t-test to statistically compare the performance of the two groups. First, we tested the whole 10-year period and then the two 5-year periods separately. These tests examined whether there are statistically significant differences in the performance of the two groups overall and if the difference changed after the deregulation. Besides effects on performance, we also calculated box plots for strategic persistence of these two groups a conducted a Welch Two Sample t-test as well.

5. Results

5.1 Replication

Figure 2 contains the comparison of descriptive statistics in Audia et al.'s (2020) and our replication. The descriptive statistics differ slightly except for a few values. The difference could be attributed to differences in samples (we haven't identified 6 airlines) and ambiguity in the methodology of the replicated study.

Variable	Mean			S.D.		
	Original	Replication	Difference	Original	Replication	Difference
1 Market diversity	0.12	0.16	-0.04	0.06	0.14	-0.08
2 Size	13.19	12.99	0.20	1.88	1.59	0.29

3 CEO Change	0.04	0.05	-0.01	0.2	0.23	-0.03
4 Strategic persistence	0	0	0	4.26	3.39	0.87
5 Past performance	0	0	0	0.08	0.03	0.05
6 Change in performance	0	0	0	0.18	0.04	0.14

Note: Audia n=25, Authors n=19

Figure 2: Descriptive statistics

Figure 3 contains the comparison of the correlation of variables in Audia et al. 's (2020) and our replication. The differences between our results and the results of the original study can be explained by the same reasons mentioned previously for the descriptive statistics. Regarding differences, one notable correlation is the control variable Market diversity that has opposite signs from the replicated study. Since its descriptive statistics are close to the replicated study, we believe that the difference stems from the particular ambiguity of individual components of this variable (especially, in the original study's distinguishing of freight and cargo components of the diversity).

	1		2		3		4		5	
	Original	Replic.	Original	Replic.	Original	Replic.	Original	Replic.	Original	Replic.
1 Market diversity	1.00	1.00								
2 Size	0.16	-0.42	1.00	1.00						
3 CEO Change	-0.34	0.06	-0.16	0.18	1.00	1.00				
4 Strategic persistence	0.05	-0.21	0.74*	0.29	0.10	0.07	1.00	1.00		
5 Past performance	-0.41*	0.17	0.15	-0.24	0.51*	0.32	0.68*	0.31	1.00	1.00
6 Change in performance	-0.23	0.07	-0.22	-0.33	-0.10	-0.24	-0.39*	-0.20	-0.36*	-0.44

Note: p< 0.05; Audia et al. n=25; Replication study n=19

Figure 3: Correlations

Figure 4 contains the comparison of results for strategic persistence between Audia et al. (2000) and our replication. Although none of our results is statistically significant, in general, they indicate the same effects on the dependent variable (except for market diversity in the second model) as the original study. Unfortunately, Audia et al. 's (2000) did not report the p-values and only indicated certain thresholds1. The most significant effect on strategic persistence has past performance (p-value 0.089).

	Model 1			Model 2		
	Audia et al. (2000)	Replication study	Difference in coeff.	Audia et al. (2000)	Replication study	Difference in coeff.
Market diversity	-0.05	-0.18 (0.863)	0.34	0.11	-0.22 (0.832)	0.56
Size	0.62 (< 0.05)	-1.16 (0.263)	-0.24	0.43 (< 0.05)	-1.01 (0.331)	-0.98
CEO change	0.18	-0.75 (0.467)	0.04	-0.24 (< 0.10)	-0.71 (0.490)	0.30
Past performance				0.83 (< 0.05)	1.83 (0.089)	-1
Multiple R2 squared	0.40 (< 0.05)	0.09 (0.676)	0.31	0.82 (<0.05)	0.27 (0.323)	0.55
Adjusted R2 squared		-0.09 (0.676)		0.42 (<0.05)	0.06 (0.323)	0.36

Note: p-values in brackets, Audia et al. (2000) only reported p-value when reached certain thresholds

Figure 4: Regression analyses for strategic persistence

Figure 5 contains the comparison of results for post-deregulation performance between Audia et al. (2000) and the replication. First, Model 3 contains only the control variables. In the model, there are no statistically significant results on the $p < 0.1$ level. However, the directions of effects are the same as in the original study for all three variables. Second, Model 4 adds a strategic persistence variable. Again, this model did not yield statistically significant results. The directions of effects are the same except for one variable (the effect of size). Apart from high p-values, the results support the findings by Audia et al. (2000).

	Model 3			Model 4		
	Audia et al. (2000)	Replication study	Difference in coeff.	Audia et al. (2000)	Replication study	Difference in coeff.
Market diversity	-0.42 (< 0.05)*	-0.18 (0.863)	-0.24	-0.46 (<0.05)	-0.22 (0.832)	-0.24
Size	-0.42 (< 0.05)	-1.16 (0.263)	0.74	0.09	-1.01 (0.331)	1.10
CEO change	-0.27 (< 0.10)	-0.75 (0.467)	0.48	-0.13	-0.71 (0.490)	0.58
Strategic persistence				-0.82 (<0.05)	-0.46 (0.655)	-0.36
R^2	0.25	0.14	0.106	0.64	0.16	0.48
Adj. R^2	N/A	-0.03		0.39	-0.08	0.47

Note: p-values in brackets, *Audia et al. (2000) only reported when reached certain thresholds

Figure 5: Models of post-deregulation performance effects

Overall, our replication shows that the relationships suggested by Audia et al. (2000) may be present among U.S. airlines. Nevertheless, due to their low statistical significance, they cannot be accepted without additional analysis.

5.2 Further analyses

Figure 6 contains box plots for the two groups of airlines (with the "successful" group having 8 airlines and the "unsuccessful" group having 11 airlines). Before the deregulation, we can see that these box plots do not overlap. This is logical as the two groups are defined on the very same values. This partially changes in the post-deregulation period. However, the "successful" group has still higher performance than the "unsuccessful" group, although the difference between the medians is lower. This supports regression towards mean rather than the Paradox of success (in which we would expect that the performance of the "unsuccessful" group will be higher). The very same is reflected in means of the two groups with the "successful" group having ROS 0.01 in the post-deregulation period compared to ROS 0.00 of the "unsuccessful" group.

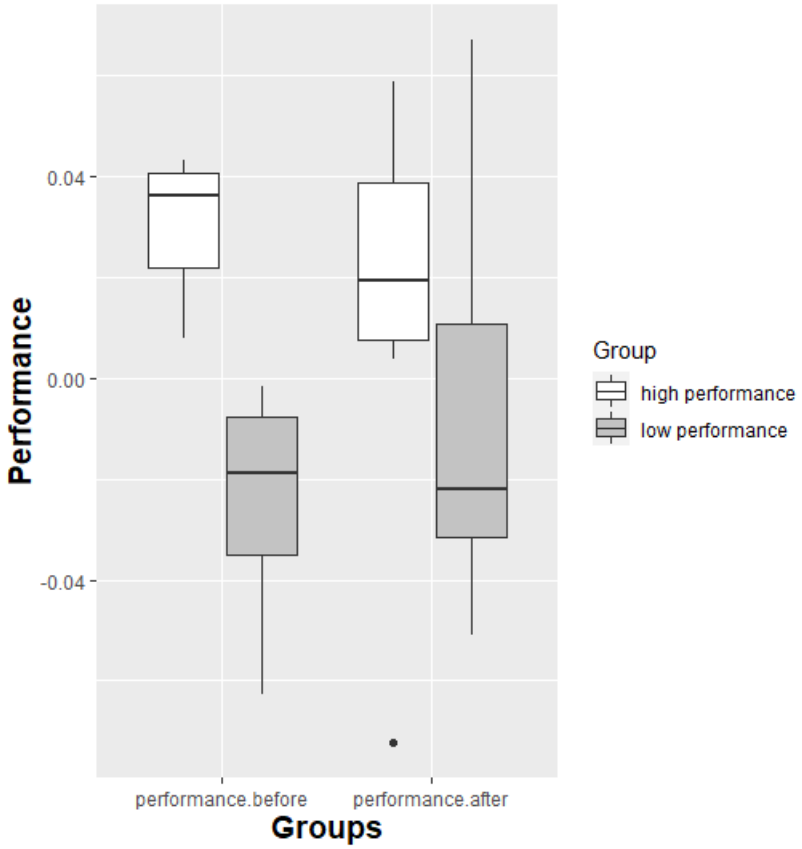

Figure 6: Box plots of airline performance grouped by the success

Furthermore, we tested the difference in the means of the two groups. The results are shown in Figure 7 for the whole 10-year period and the 5-year periods before and after deregulation. The results indicate that those two groups differ significantly in the 5 years before deregulation and the whole 10-year period. However, in the 5 years following the deregulation, the test did not find a significant difference in the means. This further supports our previous remarks from the box plots. Both groups seem to be regressing to the mean.

Welch Two Sample t-test			
	Performance 1974-1983	Performance 1974-1978	Performance 1979-1983
t	3.643	7.270	1.054
df	34.113	16.875	15.456
p-value	0.001	0.000	0.308
95 pct. confidence interval	0.016 - 0.058	0.039 - 0.070	-0.020 - 0.059
Mean in group	High performance = 0.023 Low performance = -0.014	High performance = 0.031 Low performance = -0.024	High performance = 0.014 Low performance = -0.005

Figure 7: T-test of performance of low and high performers

Figure 8 contains box plots for post-deregulation persistence of the two groups defined above. It supports the notion from previous research, that organizations with a history of success tend to be generally more persistent in their strategy than those with low past performance. T-test did not find a statistically significant difference between the persistence of the two groups (p-value 0.240)

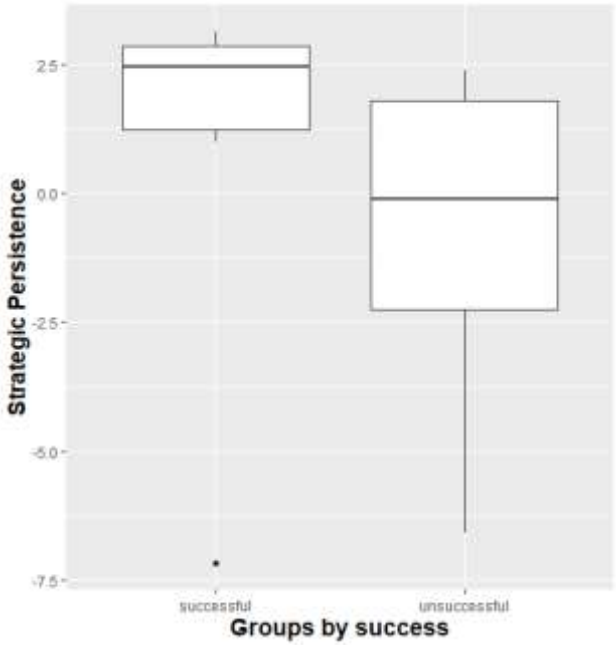

Figure 8: Box plot of persistence by groups

Figure 9 contains a boxplot for post-deregulation performance for groups divided by their persistence. The results support the suggestion that high persistence leads to lower performance, however, the difference between the performance of low and highly persistent groups is not significant (p-value 0.415) and overlaps substantially.

6. Discussion and conclusion

In this paper, we replicated a study by Audia et al (2000) focusing on the Paradox of success. The paradox describes the negative effect of past success on the organization's strategic decisions after a radical environmental change and the impact of these decisions on the subsequent performance of the organization.

We failed to fully replicate the results of the original study. Part of the discrepancies could be ascribed to data and variable operationalization: We managed to obtain data only for 19 airlines that match the criteria provided by the original study that, however, used data from 25 such airlines. Moreover, in some methodological steps, there was a lack of sufficient description that may lead to discrepancies from the original. On the other hand, in

our opinion and based on several tests with alternative operationalization, these methodological discrepancies did not have a strong impact on the results.

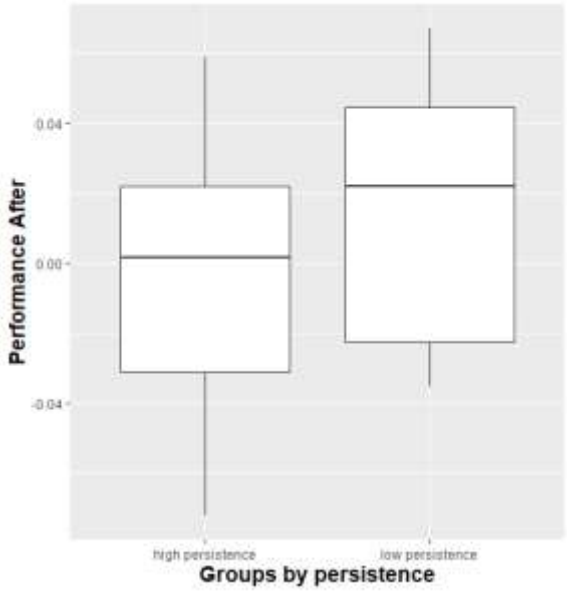

Figure 9: Boxplot for performance grouped by persistence

Despite these obstacles, we identified some indications of the same relationships as the replicated study, although without statistical significance. We believe that the lack of statistical significance may be caused by the small sample size. Certainly, further research on this topic using larger samples would shed more light on the topic.

On the other hand, we have some reservations about the original study as well. The most impactful one in our point of view is that the original methodology does not eliminate alternative explanations, including regression towards the mean (discussed below) or endogeneity. Concerning endogeneity, it is worth noting that subsequent performance is measured in the same five-year period as its explanatory variables (strategic persistence). Research that would use the full potential of longitudinal nature of data or test mechanisms in an experimental setting would provide much stronger evidence. Furthermore, other influences on the effect of change/inertia on performance are not included in this study, such as the role of resources (Baker III and Duhaime, 1997).

Results of our alternative analyses brought interesting insights into the study. The performance of the groups divided by their success before the deregulation regressed to the mean in the period after it. It leads to a question of whether the evidence of the phenomenon in Audia et al. (2000) could be, at least partially, attributed to the regression to mean rather than the Paradox of success. T-tests further supported the regression to the mean notion mentioned earlier as the difference in the mean of the two groups was statistically significant in the period before but disappeared in the period after as the performance of the two groups got closer to the mean of the whole sample. On the other hand, the persistence of the two groups much more clearly supported the proposition that past success influences strategic decision making as that group had significantly more persistence. Nevertheless, the difference between groups with low and high persistency in terms of subsequent performance is not significant (although in line with the expectations from the paradox). Thus, we cannot rule out Audia et al's (2000) findings and the effect of the Paradox of success, i.e., that after a distinct radical environmental change, the previously successful organizations will suffer performance decline because of strategic persistence and vice versa. However, according to our analyses, the effect is not large enough to bring the "unsuccessful" group above the other.

This is of course distorted by omitting airlines from the sample that were not in business for the whole 10-year period as some airlines went bankrupt less than 5 years after the deregulation. An example is Braniff International which, if it were part of the sample, would be a textbook example of the Paradox of success as it was successful before deregulation, was largely persistent, and experienced a performance downturn (bankruptcy).

Overall, we believe that the Paradox of success should be explored further, using not only larger samples, but also different methods to gain more insight into the phenomenon and identify further influencing factors some of which we believe might be different in each situation (e.g., not after deregulation). In our results, past success seemed to be followed by higher persistence and lowered performance. However, the relationship remains correlational at best and causation in the Paradox of success stays as an open question for future research.

References

Amason, A. C. and Mooney, A. C. (2008) 'The Icarus paradox revisited: how strong performance sows the seeds of dysfunction in future strategic decision-making', Strategic Organization, 6(4), pp. 407–434. doi: 10.1177/1476127008096364.

Audia, P. G., Locke, E. A. and Smith, K. G. (2000) 'The Paradox of Success: An Archival and a Laboratory Study of Strategic Persistence Following Radical Environmental Change', Academy of Management Journal, 43(5), pp. 837–853. doi: 10.5465/1556413.

Baker III, V. L. and Duhaime, I. M. (1997) 'Strategic Change in the Turnaround Process: Theory and Empirical Evidence', Strategic Management Journal, 18(1), pp. 13–38. doi: https://doi.org/10.1002/(SICI)1097-0266(199701)18:1<13::AID-SMJ843>3.0.CO;2-X.

Boeker, W. (1997) 'Strategic Change: The Influence of Managerial Characteristics and Organizational Growth', The Academy of Management Journal, 40(1), pp. 152–170. doi: 10.2307/257024.

Borenstein, S. (1992) 'The Evolution of U.S. Airline Competition', Journal of Economic Perspectives, 6(2), pp. 45–73. doi: 10.1257/jep.6.2.45.

Cannon, H. W. (1978) S.2493 - 95th Congress (1977-1978): Airline Deregulation Act. Available at: https://www.congress.gov/bill/95th-congress/senate-bill/02493 (Accessed: 29 December 2020).

Goll, I., Brown Johnson, N. and Rasheed, A. A. (2007) 'Knowledge capability, strategic change, and firm performance: The moderating role of the environment', Management Decision, 45(2), pp. 161–179. doi: 10.1108/00251740710727223.

Horwitz, R. B. (1986) 'Understanding Deregulation', Theory and Society, 15(1/2), pp. 139–174.

Ikenberry, G. J. (1988) 'The Oil Shocks and State Responses', in Reasons of State. Cornell University Press (Oil Politics and the Capacities of American Government), pp. 1–20. Available at: https://www.jstor.org/stable/10.7591/j.ctt207g7cv.4 (Accessed: 28 December 2020).

Jiang, W., Wang, L., Chu, Z., Zheng, C., 2020. How Does CEO Regulatory Focus Matter? The Impacts of CEO Promotion and Prevention Focus on Firm Strategic Change. Group & Organization Management 45, 386–416. https://doi.org/10.1177/1059601119891268

Klarner, P. and Raisch, S. (2013) 'Move to the beat—Rhythms of change and firm performance', The Academy of Management Journal, 56(1), pp. 160–184.

Kraatz, M. S. and Zajac, E. J. (2001) 'How Organizational Resources Affect Strategic Change and Performance in Turbulent Environments: Theory and Evidence', Organization Science, 12(5), pp. 632–657.

Lant, T. K., Milliken, F. J. and Batra, B. (1992) 'The Role of Managerial Learning and Interpretation in Strategic Persistence and Reorientation: An Empirical Exploration', Strategic Management Journal, 13(8), pp. 585–608.

Lu, L.-H. and Wong, P.-K. (2019) 'Performance feedback, financial slack and the innovation behavior of firms', Asia Pacific Journal of Management, 36(4), pp. 1079–1109. doi: 10.1007/s10490-018-9634-4.

Meyer, J. R. and Strong, J. S. (1992) 'From closed set to open set deregulation: An assessment of the U.S. airline industry.', Logistics and Transportation Review, 28(1). Available at: https://search.proquest.com/scholarly-journals/closed-set-open-deregulation-assessment-u-s/docview/197442478/se-2?accountid=16531.

Miller, D. (1992) 'The icarus paradox: How exceptional companies bring about their own downfall', Business Horizons, 35(1), pp. 24–35. doi: 10.1016/0007-6813(92)90112-M.

Neufeld, D. (2020) Visualizing the 200-Year History of U.S. Interest Rates, Advisor Channel. Available at: https://advisor.visualcapitalist.com/us-interest-rates/ (Accessed: 29 December 2020).

Oster Jr, C. V. and Miles-Mclean, R. (1988) 'AIR CARGO: IMPACTS OF ADAPTING TO DEREGULATION', in Transportation Research Record. 67th Annual Meeting of the Transportation Research Board. Available at: https://trid.trb.org/view/289182 (Accessed: 12 February 2021).

Ramamurti, R. and Sarathy, R. (1997) 'Deregulation and globalization of airlines', The International Trade Journal, 11(3), pp. 389–432. doi: 10.1080/08853909708523887.

The U.S. National Archives and Records Administration (2020) National Archives, National Archives. Available at: https://www.archives.gov/ (Accessed: 13 April 2021).

Toh, R. S. and Shubat, N. S. (1985) 'The Impact and Effectiveness of the International Air Transportation Competition Act of 1979', Transportation Journal, 25(2), pp. 46–54.

Tozer-Pennington, V. (2019) 'The Aviation Industry Leaders Report 2019: Tackling headwinds'. KPMG. Available at: https://assets.kpmg/content/dam/kpmg/ie/pdf/2019/01/ie-aviation-industry-leaders-report-2019.pdf (Accessed: 28 December 2020).

U.S. Department of Transportation (2019) Standard Industry Fare Level, U. S. Department of Transportation. Available at: https://www.transportation.gov/policy/aviation-policy/standard-industry-fare-level (Accessed: 29 December 2020).

Wang, C. L., Senaratne, C. and Rafiq, M. (2015) 'Success Traps, Dynamic Capabilities and Firm Performance', British Journal of Management, 26(1), pp. 26–44. doi: 10.1111/1467-8551.12066.

Wiersema, M. F. and Bantel, K. A. (1992) 'Top Management Team Demography and Corporate Strategic Change', The Academy of Management Journal, 35(1), pp. 91–121. doi: 10.2307/256474.

World Bank (2020) GDP growth (annual %) - United States | Data, The World Bank. Available at: https://data.worldbank.org/indicator/NY.GDP.MKTP.KD.ZG?end=1988&locations=US&start=1970 (Accessed: 28 December 2020).

Zajac, E. J., Kraatz, M. S. and Bresser, R. K. F. (2000) 'Modeling the Dynamics of Strategic Fit: A Normative Approach to Strategic Change', Strategic Management Journal, 21(4), pp. 429–453.

Social Entrepreneurship in Cambodia: Perspectives and Challenges

Yamuna Sithambalam
American University of Phnom Penh, Cambodia
y.sithambalam@aupp.edu.kh
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Abstract: This paper analyzes the viability of social entrepreneurship as a business model in a country that is still struggling to get out of the global poverty listing, and further analyze the key areas of challenges to those who courageously embark on social entrepreneurship model of business. Cambodia is not expected to graduate from its Least Developed Country (LDC) status until after 2025, though it has made progress in furthering its development, a new report by a UN agency said (Gaudemar, 2016). The United Nations Conference on Trade and Development (UNCTAD) projected in its latest review of the world's poorest nations, which it undertakes every three years, that the number of LDCs will fall from 48 to 32 by 2025 (Gaudemar, 2016). The literature review defines the parameters for social entrepreneurship before exploring the present coverage of social entrepreneurship in Cambodia in the context of viability, societal awareness, incentives, and challenges encountered. Qualitative and quantitative data are collected via structured survey forms. Participants are representatives of social enterprises, both local and foreign owned. This study focuses mainly on the social enterprises' efforts centered in Phnom Penh, the capital city of Phnom Penh where most of the country's economic activities take place. Both the qualitative and quantitate data confirms that social entrepreneurship is still lagging amongst the locals, primarily due to lack of education and awareness that are often classified as the pinnacle for a revolution in embracing new concepts. The limited parameters of this paper and its findings call for more in-depth methodological research in exploring the future of social entrepreneurship in Cambodia.

Keywords: social entrepreneurship, challenges, LDC

1. Introduction

Entrepreneurship has been recognized as a catalyst for sustainable products and processes, and new ventures are being held up as a universal remedy for many social and environmental concerns. In their 2007 Stanford Social Innovation Review (SSIR) review, Martin and Osberg explained the menaces of using social entrepreneurship too broadly. Organizations whose vision is socially motivated but does not have the ground-breaking vision may end up diluting the real meaning of social entrepreneurship. The definition of social entrepreneurship lacks clarity and direction. This has created a broader canopy whereby any activities that are socially beneficial, gets labelled as 'social entrepreneurship'. Martin and Osbery (2007) warned that if a broad definition is applied, social entrepreneurship will fall into disrepute, and the kernel of true social entrepreneurship will be lost (cited in Meyn, 2010). Baron (2007) defined social entrepreneurship as any venture that includes a social goal, while Dacin et al., (2010) defined it as economically sustainable ventures that create social value. Green entrepreneurship is also a type of social entrepreneurship, where the entrepreneur is enthusiastic in preserving the natural environment (Jain, 2018).

Social entrepreneurial efforts in Cambodia are seen in numerous fields including the following (USAid, 2018):

- Vocational training businesses
- Energy, environment, and livelihoods
- Health
- Agriculture
- Education
- Hospitality and tourism
- Apparel
- Handicrafts and artisanal Products

The spectrum of social and financial returns for social enterprise is illustrated with the aid of a diagram below.

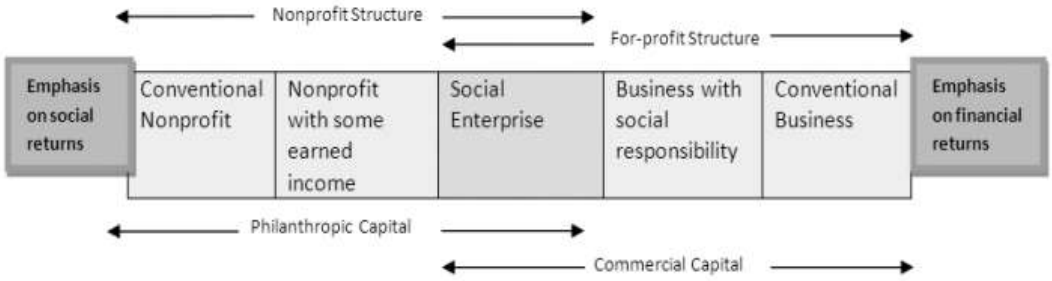

Figure 1: Spectrum of social and financial returns (Source: Stanford Social Innovation Review, Spring 2008)

Figure 1 depicts the principle, and the fundamental vagueness, of the social enterprise paradigm. Based on the spectrum, social entrepreneurship can be categorized as profit driven, philanthropic or a combination of both depending on how the establishment is funded. The fundamental undertaking is to have mechanisms to generate sustainable revenue or funding through endeavors linked to its social mission, which eventually translates into social benefits for the society.

2. Social enterprise versus NGO

In Cambodia, an entity can be registered either as a company or as non-governmental organization (NGO). There is no lawful classification for a social enterprise. The law stipulates that "charitable activities and charity-linked activities are tax-exempt" (Social Enterprise Cambodia, 2019). In theory, an NGO can have commercial activities without paying taxes provided that these activities are directly linked with its mission (such as a restaurant focusing on F&B vocational training). The closer the activity is to the core mission of the NGO, the more likely it is to be tax-exempt. But this is only the theory. In practice, it depends on how the ministry officials of the tax department interpret this law. Instead, social entrepreneurs must decide whether to operate their enterprises as a company or as an NGO, (Social Enterprise Cambodia, 2019).

Most social enterprises efforts are pioneered by expatriates who are living in Cambodia. Channo (1996) mentioned that participants at a workshop for local Cambodian NGOs related their struggles with running an NGO. Good management skills and lack of funding are cited as the main stumbling blocks. Based on an estimated figure provided by Cooperation Committee for Cambodia (CCC), local NGOs run by Cambodians spent between $2 million to $3 million per year while the international counterparts spent a whopping $240 million a year in Cambodia. Louise Coventry (2017) mentioned that non-government organizations (NGOs) in Cambodia are completely reliant on foreign funds. NGOs in Cambodia thrives under the funding of local patrons and foreign funders. Their existence is solely dependent on the financial support provided by the international donors and as a result the NGOs are unlikely be empowered.

Former Movie Studio Executive Scott Neeson's life changed completely after a 5-week visit to Cambodia. During his visit in 2003, he witnessed about 1500 children living in the capital's municipal dump, scavenging for scraps on the landfill. In 2004, Scott gave up his 26 years film career in Hollywood and emmigrated to Phnom Penh to change the lives of these children. Today, he runs the Cambodian Children's Fund (CCF) and raises funds from philanthropists and his Phnom Penh based fine dining restaurant named House of Scott (Cambodian Children's Fund, 2020). Funds raised through CCF and his dining business are channeled to donors approved activities that not only support the children, but the families and the community as well, an exemplary usage of two different types of establishments to support his mission.

What is the ethical separation between NGO and social enterprise? Should NGOs be allowed to generate revenue through commercial activities? Lyne (2012) stated that the participants from NGOs and social enterprises had differing viewpoints where all representatives of expatriate-led social enterprises registered as businesses in Cambodia voiced that NGOs are not designed to run as social enterprise. Some representatives expressed that if NGOs wish to use the social enterprise model to generate revenue, then they should set up a commercial business which can operate autonomously to support their NGO's mission.

The definition for NGO, akin to social enterprise, varies and lies in the interpretation of government bodies and scholarly authors. Aboramadan (2018) described "non-governmental organizations (NGOs) as intriguing and complex bodies that have long attracted the interests and curiosity of researchers all around the world". Putnam

(1995) cited in Aboramadan (2018) connected NGOs with the concept of social capital. This concept "is defined as the features of social organization such as networks, norms, and social trust that facilitate coordination and cooperation for mutual benefit" (Putnam, 1995 cited in Abdoramadan, 2018). NGOs are commonly defined as autonomous, non-profit making, self-governing and lobbying organisations with a concentration on the well-being of others (Gray et al., 2006). Kamat (2003) infers the hazards of NGOs trying to replicate the entities they are deriving funding from instead of portraying the mission they intend to serve and represent; and this will blur the distinction between NGOs and non-NGOs. One must be mindful of the motives of NGOs which exist to push their own agendas for personal gains. Ideally, a management framework for NGOs should offer solutions to meet financial stability, reach goals through strategic fundraising and develop social marketing techniques (Aboramadan, 2018).

Considering the varying principles behind NGO and social enterprise, I will proceed with this paper distinguishing NGOs as bodies that are purely philanthropic and social enterprises as commercial businesses that support social missions with profits or activities that benefit the society.

3. Challenges in regulating social entrepreneurship

To comprehend social entrepreneurship in Cambodia, one must be wary of the background and be able to connect to the intricate culture and history of the country, taking into consideration the country was embroiled in Khmer Rouge genocide crisis till the late 70s. While the neighbors Thailand, Vietnam, Malaysia, and Singapore were poised for growth and economic expansion, Cambodia was battling a civil war. In a recent Khmer Times article, Chea Serey, director-general for the National Bank of Cambodia (NBC) described Cambodia as "a newly developing country, with a lot of their infrastructures both soft and hard destroyed during the 30-year civil war. She briefed that peace was achieved in the late 1990s and the country has started to rebuild itself since then. That was only about 20 years ago, so there is a plethora of things that need to be done" (Haider, 2021).

Post Khmer Rouge, regulations were not in place for many aspects of businesses, NGOs streamed in to help build the country, and till this date, Cambodia is still known to be a business-friendly country for foreigners. One can set up a business after formalizing the business registration, with no minimum capital requirements enforced. Lyne (2017) indicated that 90 percent of the population in Cambodia earns its livelihood in the informal segment, and less than 8 percent of businesses are legally registered with the Ministry of Commerce.

It is important to take note that challenges for social enterprises may vary from country to country. While policy for social enterprise is hardly in existence in Cambodia, in the UK a different kind of problem is encountered. Campbell et al. (2011) described that policy makers are too willing to promote social enterprises in the UK even before investigating the activities of the social enterprise. Unless an evaluation is done, enterprises can use social enterprise as means to evade taxes. Beilefeld (2009) cited in Campbell et al., (2011) contends that there need to more research to verify the merits and demerits of social enterprises, in comparison to the philanthropic or public establishment. Seanor and Meaton (2008) cited in Campbell et al., (2011) said that there is little research within the social enterprise context that can impart knowledge on the struggles and reasons behind failed social enterprise ventures.

Lyne (2012) cited Macararavy and Annurit (2009) to infer that up till 2012, there were only two journal articles that addressed case studies of social enterprise in depth in Cambodia. First is an article that "examined social enterprises as occupational training instruments" (Lyne, 2018). The other explores "the way in which the NGO Friends International, along with its local partner 'Mith Samlanh' applied social business to fight the social exclusion of street children" (Lyne 2008). The limited research is inexplicable as NGOs existed in Cambodia as early as 1990s after the signing of the Paris Peace Agreement and by 2013 Cambodia had the second highest number of NGOs per capita in the world after Rwanda (Domashneva, 2013).

4. Present social entrepreneurship scene in Cambodia

In 2005 the International Finance Corporation (IFC) asserted that Cambodia had the most active social enterprises sector in the region, and that it could inspire new developmental approaches in other least developed countries (LDCs), (Hutchinson 2007, p. 153). Despite this optimistic projection, the level of awareness and interest for social entrepreneurship in Cambodia remains in its infancy. In 2017, Social Enterprise Cambodia (SEC) reported 85 social enterprises in Cambodia (USAid, 2018). The list of social enterprises mentioned by SEC is not exhaustive, the number may be higher as some social entrepreneurs may not have enlisted their

businesses with SEC as there is no legal requirements for them to do so. Khieng & Dahles (2014) mentioned of the increasing level of commercialization among non-profit organizations that is transferring financial dependency from philanthropic funding to revenues earned through social entrepreneurial endeavours. Another report by Khieng and Lyne (2019) presented the different notions of social enterprise and the dire need for policies to be formulated in a country where only microfinance and agricultural cooperatives received support and aids from the government.

Most social entrepreneurs collaborate and run their businesses within their own parameters and information is made available on their websites. Five such businesses are narrated below as examples of the range of social enterprises operating in Cambodia.

Example 1

Cambodia Knits is a fair-trade organization based in Phnom Penh, Cambodia. The founder is an expatriate living in Phnom Penh. The organization works with marginalized community in and near Phnom Penh. They have so far trained 120 young women on knitting and crochet skills. They produce knitted educational toys, puppets, animal toys and magnets. The women work from home and the products are regularly collected from them. The organization believes that employment is an empowering way out of poverty for marginalized communities, especially when that employment fair remuneration and functions within the constraints the communities face (Shop Satu, n.d.).

Example 2

HAVEN is another social enterprise that trains vulnerable and underprivileged young adults from shelters and very poor rural areas. The founder believes that quality work and life skills will empower these young adults and groom them for employment, perhaps inspired by the famous proverb, “give a man a fish and you feed him for a day; teach a man to fish and you feed him for a lifetime” (Haven, n.d.). Their training program emulates the Swiss apprenticeship system whereby the trainees will attend both on-the-job practical training complemented by theoretical classes customized to fit the Cambodian job market. Trainees are also provided with all paid for accommodation with a house-mom to create a family like vibe, this comes as an addition to the monthly stipend for their personal expenses and paid medical care. The 12-month training program is funded through the restaurant’s income and donations from a Swiss association behind HAVEN. Upon completion of the apprentice program, trainees start on a 4-month internship program with other restaurant operators. Haven continues to provide stipends and accommodation throughout the internship and place them on jobs once they have successfully completed the program.

Besides training, Haven is committed to sustainable practices built upon the following principles:

- Refuse
- Reduce
- Reuse
- Recycle

They substitute single-use plastic with take-away boxes, biodegradable cutleries and bags, reusable straws, and buy their produce using custom made linen bags. Used cooking is donated to Naga Earth, a company that turns it into bio diesel. Haven buys the biodiesel back from Naga to power their emergency generators. Energy and water conservation practices are also in place to reduce wastages natural resources. Waste organic produce are segregated and turned into compost for their garden or animal feed, the reusables are reused, and the recyclable are sent to recycling centers. Haven prefers to use organic local produce for their restaurant. They work closely with local farmers who supplies quality organic ingredients such as tofu and coconut milk. Most of their vegetables and fruits are supplied from their own organic garden or locally grown by reliable farmers.

Example 3

Jars of Clay Café, Phnom Penh was launched in 1998 by a missionary from UK but now owned and managed by Cambodian women. They donate 10% of their profits to the local NGOs. Although small in nature, their

contribution is valuable as they provide employment for young underprivileged women. The café now operates two outlets crewed by 20 Cambodian staff (Jars of Clays, n.d.).

Example 4

SHE Investments, was founded by two Australians and one Cambodian with an initial crowd funding of $14,000. SHE was initiated with a 'problem' in mind. The founders were keen to find out why socially and environmentally impactful investments were not progressing to the SME categories. Since their first incubation in 2015, SHE Investments have worked with 150 women through their six -month incubators. The increase in earnings were between 57% for the health incubators and 79% for the community incubators (SHE Investments, 2020).

Example 5

Footprint Café was first incepted in 2016. The café in Siam Reap, branded itself as a modern café that served local and international snacks, a wide variety of meals along with alcoholic and non-alcoholic drinks. Their first book drive collected over 8000 second-hand books from various individual and institutions in the UK, Cambridge University being one of them. Academics books are made available to the local community while the rest are put up for sale at the café which has scores of books lined as part of the interior. Proceeds from the sales are channeled to community to support educational programs in floating village and rural schools. Children from these schools are very much undernourished and often drops out of school prematurely due to the cycle of poverty that prevents many families from accessing education.

The café strives towards excellence to ensure that they are financially sustainable. The highly committed team even made it to the semi-final of the National Cambodia Barista competition. As part of their endeavor, the team initiated a social project that made environmentally sustainable metals straws which helped the disabled fit into employment

5. Research problem

Social entrepreneurship and sustainable entrepreneurship have been identified as the subcomponents of sustainable development. United Nation's goals of achieving Sustainable Development by year 2030 requires collective initiatives. Research interests for LDC such as Cambodia is evidently limited and the findings in this research will serve as an inspiration for young entrepreneurs who wish to lift the community while making economic gains.

6. Research methods

Seanor and Meaton (2008) cited in Campbell et al (2011) said that there is little research within the social enterprise context that can impart knowledge on the struggles and reasons behind failed social enterprise ventures. This paper aims to explore the advancement in social entrepreneurial efforts in Cambodia through following research questions:

- Is social entrepreneurship viable in Cambodia?
- What are the challenges faced by small business operators embarking on social entrepreneurship concept in Cambodia?
- Are there enough macro level incentives to support social entrepreneurship?

This paper relies on primary data collected through structured survey forms and secondary data collected through careful examination of literatures on social entrepreneurship and social enterprise. The sample will be selected using the purposive sampling method. Saunders et al. (2009) as cited in (Seda and Ismail, 2019) mentioned that purposive sampling allows researchers to use their personal judgment to assess and select cases that best represent the population as this is crucial in meeting the research objectives. The survey targets participants who are directly involved in socially linked businesses identified through organised groups for social and green advocates. Participants are representatives of social enterprises, both local and foreign owned, who operate from Phnom Penh, the capital city of Cambodia. The search for secondary data relies on publications by regulators and academic journals.

7. Findings

Both the qualitative and quantitative data confirmed that social entrepreneurship mindset is still lagging amongst the locals, primarily due to lack of education and awareness that are often classified as the pinnacle for a revolution in embracing new concepts. Most social entrepreneurial efforts are fueled by foreigners who have invested their efforts in giving back to the economy, and society that is still struggling to escape poverty.

The survey outcome:

Sample size (n): A total of 11 entrepreneurs and/or proxy managers took part in this survey.

Participants:

1) Foreigner (90%), 2) Local (10%)

Company Ownership:

1) Sole Trader & Partnership (81.8%), 2) Business that is Accountable to Other Business (9.1%), 3) Charity (9.1%)

Missions (participants allowed to choose more that one mission):

1)Education and literacy (54.5%), 2) Creating Employment Opportunities (45.5%), 3) Improving a Particular Community (27.4%), 4) Conservation/Protecting the Environment (18.2%), 5) Providing Affordable Housing (9.1%), 6) Providing Grant to Other Organizations (9.1%), 7) Supporting Vulnerable People (9.1%), 8) Supporting Other Social Enterprise (9.1%), 9) Others (9.1%)

What industrial classification best describes the business in terms of goods and services?

1) Wholesale & Trade (27.3%), 2) Education & Training (27.3%), 3) Agriculture, Forestry & Fishing (9.1%), 4) Handicraft Retail Sales (9.1%), 5) Arts & Recreation Services (9.1%), 6) Transport & Warehousing (9%), 7) Accommodation & Food Services (9.1%),

Does the business trade by supplying goods or services to fund your mission?

1) Yes (63.6 %), 2) No (27.3%), 3) Maybe (9.1%)

Duration in Business:

1)Since 1996 (1 participant), 2) From 2010 till 2020 (10 participants)

Two prominent sources of the gross revenue (participants may choose up to two sources):

1) Sales of Good & Services (77.8%), 2) Government Service Contracts (11.1%), 3) Grants from Government (11.1%), 4) Others (11.1%)

Gross revenue of business from all sources (trading, contracting, grants, donations, subscriptions, etc.), in the year to 31 December 2020? (round to nearest $1000)

Ranges between $3000 - $350,000 (USD). Only 8 participants disclosed their gross revenue for the year 2020.
1) $200000, 2) $4000, 3) None in year 2020, 4) $8000, 5) $2, 6) $100,000, 7) $350,000, 8) $300,000

Sources of gross revenue

1) Sales of goods and services (77.7%), 2) Government Service Contracts (11.1%), 3) Grants from the government (11.1%), 4) Other sources (11.1%)

Challenges in social entrepreneurial effort:

1) Financial, 2) Low Sales, Scaling & Penetration into New Industry, 3) Training 4) Finding new customers 5) Taxation, Lack of Support (Government and Access to Funding via Grants), 6) Quality Control, 7) Pandemic Restrictions (No Tourists)

Public Support:

1) Tremendous (10%), 2) Adequate (10%), 3) Can be Better (70%), 4) None (10%)

Local Authority Support:

1) Tremendous (0), 2) Adequate (12.5%), 3) Can be Better (50%), 4) None (37.5%)

W*hat drives and keep the mission running?*

1) Passion and the amazing professional evolution of my former staff, 2) Saving lives and having a purpose, 3) What we do has a positive effect on Cambodia, and we consider that as important, 4) Passion, 5) Commitment, 6) Education that we are providing, 7) The weavers we are supporting with our orders and the young girls in their community who can apply for scholarships with us.

The findings give an indicator of the current diagnosis for social entrepreneurial efforts in Cambodia, though there are limitations as all participants are from the capital city and the survey did not consider such efforts in other prominent cities and towns such as Siam Reap, Battambang, Kep and Kampot. Despite the limitations, the findings still serve as exemplary to future entrepreneurs who wish to connect their businesses to some humanitarian or environmental missions.

To summarize, the survey has given some valuable insights pertinent to the research questions.

Is social entrepreneurship viable in Cambodia?

The survey outcome provides preliminary evidence that social entrepreneurship is viable in Cambodia. The growth in number of social businesses from 2010 and the gross revenue for some participants' businesses are indicators that the country has a conducive environment for social businesses to thrive.

What are the challenges faced by small business operators embarking on social entrepreneurship concept in Cambodia?

The challenges mentioned by participants are not unique to social enterprises as these problems exists even in traditional business models. Most challenges revolve around issues related to staff training and retention, scaling or penetration into new markets and lack of incentives for their contributions to the community. The participants also thought that the support from both public and the regulators could be better. Support from regulators mostly refers to tax incentives and provision of grants, while lag in public support refers to lack of awareness amongst public in supporting businesses with social elements.

Are there enough macro level incentives to support social entrepreneurship?

As mentioned earlier in the literature, Cambodia does not explicitly provide any special tax relief to social businesses, and the participants acknowledged this to a certain extent. Social businesses are less visible to funders and philanthropists resulting in most incentives being channeled to NGOs. As for grants, only one participant had access to government grant while the rest were relying on revenue from their businesses to fund their social missions.

Other relevant inferences

The motivation to make a difference in the world certainly is an influencing factor for most of these survey participants. Majority of the social efforts focus on activities related to education and literacy, creation of jobs

and improving the quality of life of a particular community, as most social entrepreneurs believe these are the fundamentals that develop knowledge and skills set that could elevate community's standard of living.

8. Conclusions

The social entrepreneurship is a thriving concept, acknowledgements are due to the NGOs who have initiated this to help Cambodians live a better-quality life. Nevertheless, it is important to understand that NGOs are usually heavily funded by some means, hence the issue of survival is almost non-existent. This may not be the case for social entrepreneurs as they need sustainable growth that aligns with their humanitarian or environmental missions. This puts social enterprises that formally register their businesses and pay taxes at a cost disadvantage, says Dara Huot, CEO of Phare Performing Social Enterprise (PPSE) (Huot, 2017 cited in USAid, 2018). For social entrepreneurship to grow and thrive, there must be initiatives at both macro and micro level. Government contributions and creation of awareness amongst the society would be significant in the future growth of such enterprises. Awareness starts from school, prompting the young generation to value and appreciate the reasons behind such businesses. Large local corporations should collaborate with various companies that undertake such entrepreneurial efforts, creating a spillover benefits to the society. An event organized by Cambodian Ministry of Education, Youth and Sports in 2017 was officially certified as the Guinness World Record holder for the world's Largest Practical Business Seminar with 2,304 attendees. The seminar was co-organized with the support from International Labor Organization as a series of entrepreneurship training program for youth (International Labor Organization Website, n.d.). The success of this event is an indicator that Cambodian youths have the apt mindset for entrepreneurship, but the challenge is how to instill the interest to incorporate social elements to it. Cremonsi (2017) cited in USAid (2018) mentioned that there is growing interest amongst youths in Cambodia on socially impactful businesses. Cremonsi reiterated, given the increasing awareness in social impact amongst the youth in Cambodia, relevant enforcement units and regulators should contemplate integrating instruction on social impact and social entrepreneurship into existing business curriculum.

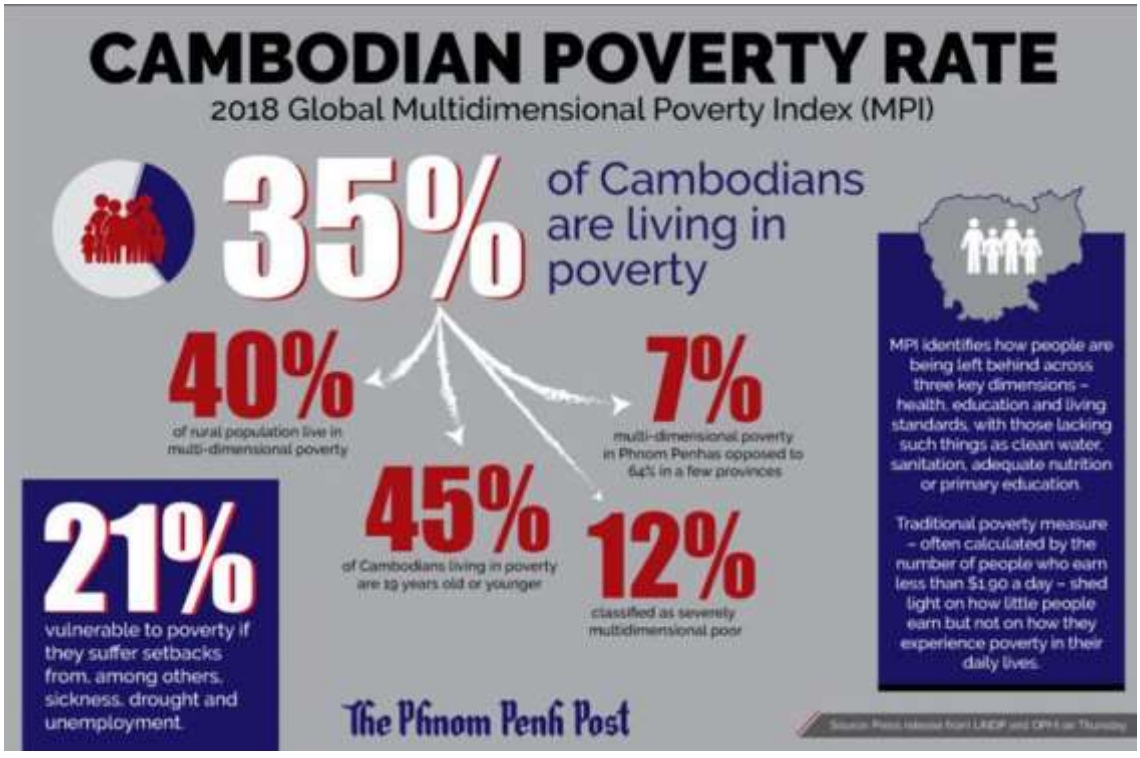

Figure 2: Cambodian poverty rate (Source: Phnom Penh Post)

Figure 2 is the 2018 Global Multidimensional Poverty Index (MPI) for Cambodia. This reflects the poverty levels in the country, also an indicator of the long journey ahead before poverty is eradicated. Dara (2018) reported that at least thirty-five percent of Cambodians are still living in poverty. In such a situation, every little effort count, and betterment comes with collective efforts from individuals, businesses, NGOS and the regulators. The findings of this paper though limited is an indicator that social enterprises can be very successful in Cambodia. Social entrepreneurship is not only about monetary handouts to the underprivileged but can come in many

forms such as training (as described in Haven example) and designing businesses with robust processes that foster both human and the environment. The whole idea is to incorporate at least some socially beneficial activities and processes into businesses that would collectively lift Cambodia to a better state in years to come. Finally, the limited parameters of this paper and its findings call for more in-depth methodological research in exploring the future of social entrepreneurship in Cambodia. More of such research would document successes amongst social entrepreneurs that can be emulated by youths for their future businesses. Lack of such data will deter youths from embracing such social business models mainly due to uncertainty, and fear of failure. It is the right time for Cambodians to jump on the bandwagon of social entrepreneurship given the abundance of untapped business opportunities and growth potential in the country.

References

Aboramadan, M. (2018) "NGOs management: A roadmap to effective practices", *Journal of Global Responsibility*, ISSN: 2041-2568.

Baron, D.P. (2007) "Corporate social responsibility and social entrepreneurship", *Journal of Economics & Management Strategy*, Vol. 16, pp. 683-717.

Cambodia Knits www.hopsatu.com/collections/cambodia-knits

Cambodia's plastic problem (2018, June 7)) Phnom Penh Post.

Cambodian Children's Fund http://cambodianchildrensfund.org/

Campbell, Perri, Kelly, Peter and Harrison, Lyn (2011) Social Enterprise, Challenges and Opportunities.

Channo, A. (1996) Donors cautious in funding Khmer NGOs, Phnom Penh Post.

Coventry, L. (2017) Cambodian Development Funding NGO, University of Nottingham Asia Research Institute.

Dacin, P.A., Dacin, M.T. and Matear, M. (2010) Social entrepreneurship: why we don't need a new theory and how we move forward from here, Academy of Management Perspectives, Vol. 24, pp. 37-57.

Dara, (2018) Cambodians Still Mired Poverty, Phnom Penh Post.

Dees, J. (1998) SOCIAL ENTERPRISE: Enterprising Nonprofits, Harvard Business Review.

Domashneva, H. (2013) NGOs in Cambodia: It's Complicated, The Diplomat.

Footprint Café https://footprintcafes.org/

Gaudemar, M. (2016) Cambodia to remain among Least Developed Countries, for now, Phnom Penh Post.

Gray, R., Collison, D. & Bebbington, J. (2006) "NGOs, Civil Society and Accountability: Making the People Accountable to Capital*", Accounting, Auditing and Accountability Journal 19*.

Haider, H (2021) Use of technology by smaller businesses is 'under-reported', Khmer Times.

Haven https://havencambodia.com/

House of Scott https://wheninphnompenh.com/house-of-scott-a-meaningful-gastronomical-experience/

Hutchinson, K. (2007) Mapping the dynamics of social enterprises and ICTD in Cambodia: Master's thesis, RMIT.

International Labour Organization, (2017) Cambodia Sets New Guinness World Record while Promoting Youth Entrepreneurship.

Jain, Trilok Kumar (2018) Towards the Theory of Green Entrepreneurship.

Jars of Clay Café http://jarsofclay.asia/

Kamat, S. (2003) NGOs and democracy: False saviours of international development, Harvard International Review, Vol. 25 No. 1, pp. 65-9.

Khieng, S.& Dahles, H. (2015) "Commercialization in the Non-Profit Sector: The Emergence of Social Enterprise in Cambodia*", Journal of Social Entrepreneurship.*

Lyne, I. (2012) "Social Enterprise and Social Entrepreneurship as Models of Sustainability for Local NGO's: Learning from Cambodia*", International Journal for Management Research*, vol. 2, no. 1, pp. 1-6.

Lyne, I. (2017) Social Enterprise and Community Development: Theory into Practice in Two Cambodian Villages, Ph.D. dissertation, Institute for Culture and Society, Western Sydney University.

Khieng, S.& Lyne, I. (2019) Social enterprises in Cambodia: Typology and institutionalization, RECMA Volume 342, Issue 4, October 2016, pages 36 to 53.

Martin, R. and Osberg, S. (2007) Social Entrepreneurship: The Case for Definition, Stanford Social Innovation Review.

Meyn, C. (2010) Investing in Social Enterprise: Phnom Penh.

Seda and Ismail (2019) Challenges facing social entrepreneurship: The implications for government policy in Egypt.

SHE Investments https://www.sheinvestments.com/

USAid (2018) Country Report: Cambodia (Online) https://pdf.usaid.gov/pdf_docs/PA00TFS2.pdf.

Entrepreneurship Education for Migrants as a Path to Social Inclusion

Maria Sotirakoglou[1], Stavroula Laspita[2] and Katerina Sarri[1]
[1]Department of Balkan, Slavic and Oriental Studies, School of Economic and Regional Studies, University of Macedonia, Thessaloniki, Greece
[2]Economics Department, University of Western Macedonia, Kastoria Campus, Greece
sotirakoglou@hotmail.com
slaspita@uowm.gr
ksarri@uom.edu.gr
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Abstract: The important role of entrepreneurship education has been widely acknowledged. From the European Commission's Green Paper on Entrepreneurship in Europe in 2003 to the 2030 Agenda for Sustainable Development of United Nations, its importance for developing citizens' entrepreneurial capacity has been emphasized, as adequate entrepreneurial skills, knowledge, and abilities can benefit the society as a whole. Besides, for specific population groups, such as migrants, the development of an entrepreneurial culture and entrepreneurial skills could have additional multiplier effects on themselves and the economies where they live in and operate. Although Europe has always been a pole of attraction for migrants, they continue to face serious socio-economic problems, such as high rates of unemployment. Their labor market integration consists a policy priority in the EU whether it is paid employment or self-employment. Although, there is a tend immigrants to show an entrepreneurial spirit in host societies, in many cases the results of their business endeavor are not the expected ones. Besides, the growing complexity of the entrepreneurial world requires the novice entrepreneur to be resilient, creative, and open-minded. At this point, the role of entrepreneurship education has to be stressed out since it does not only help them earn a sustainable income, but also it helps them gain skills and competences which can play an important role in terms of their social inclusion in the host societies. Entrepreneurial competence is one of the Key Competences for Lifelong Learning, setting out some skills necessary to work and live in the 21st Century, contributing besides employability also to personal development and active citizenship. This paper focuses on the European Union's recent policies and initiatives related to entrepreneurship education for migrants.

Keywords: entrepreneurship education, entrepreneurial competence, social inclusion, migrant entrepreneurship, life skills, policies

1. Introduction

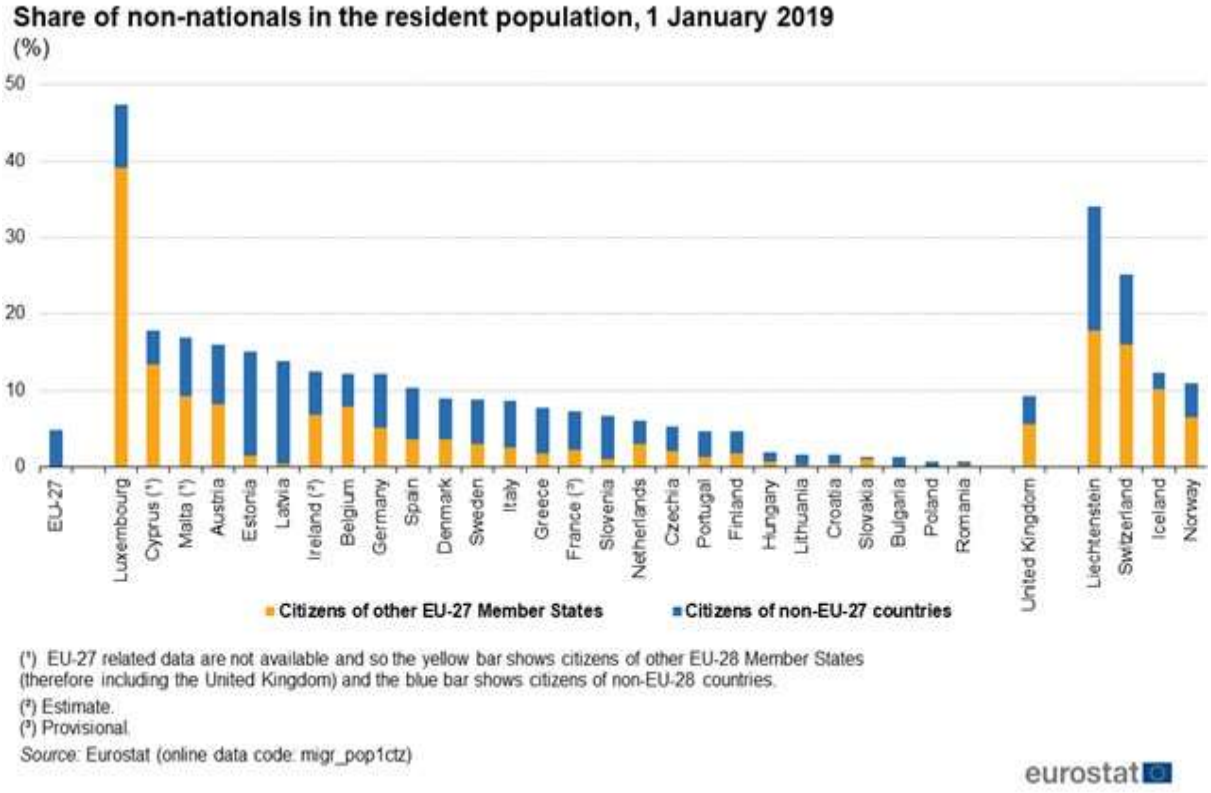
The pressing need for migrants' social inclusion is known since it affects except from the people themselves the cohesion of society (Levitas et al 2007). But what is the real meaning of the term and what are the means to achieve it? According to the EU Employment and Social Affairs Directorate social inclusion refers to ...*the development of capacity and opportunity to play a full role, not only in economic terms but also in social, psychological, and political terms...* It follows that the means to achieve this are linked to the creation of preconditions, through the development of policies, which are related to employability, housing, health improvement, poverty elimination, and skills and competences enhancement. In the same direction literature on entrepreneurship education claims that entrepreneurship education can contribute to skills and knowledge acquisition, the creation of employability's chances, and as a result the socio-economic well-being and the elimination of inequalities. Based on a critical review of theoretical and policy literature, this paper will attempt to answer the question: Does the entrepreneurship education of immigrants contribute to their social inclusion and how? The review on the relevant EU policies and initiatives will be followed by a discussion focusing on more competence-oriented methods to achieve results on their social integration.

2. Sociopolitical background

According to the official data of the International Organization for Migration (2019), the number of international migrants was 272 million (3.5% of the world's population) globally in 2019. It has been proven that some countries act as a magnet for immigrants from developing economies. More specifically, the top destination country is the United States, one of the seven major developed economies (G7), with 50.7 million international migrants, meanwhile Northern America along with Europe host more than half of all international migrants (141 million). On the opposite side, the three largest countries of origin of international migrants are India (with 17.5 million migrants living abroad), Mexico, and China (with 11.8 million and 10.7 million respectively), all three classified as developing economies (UN 2021).

Europe has always been a top destination for migrants. However, the last decade, an unprecedented influx of immigrants and refugees was recorded, mainly from Syria, Afghanistan, Iraq, even from African countries too, though in a smaller percentage. Except for the political turbulence in some countries of Asia and North Africa, causes should be sought elsewhere, such as climate change, since it contributes to some of the most important push factors of international migration which are unemployment and lack of economic prospects. The proximity of Europe to Africa and Asia seems to play a key role in its choice as destination. On the other hand, the pull factors for migration in Europe should not be underestimated. Most European citizens enjoy a high standard of living. Moreover, the presence of previous migrant communities in the European countries plays a crucial role (Migali et al 2018). These communities tend to help the potential migrants to gather valuable, discrete and unofficial knowledge through social media, transforming the nature of these networks and thereby facilitating migration (Dekker & Engbersen 2012).

According to the following table, the percentage of people residing in an EU Member State with citizenship of a non-member country on 1 January 2019 was representing 4.9% of the EU-27 population (21.8 million). Also, 13.3 million persons were living in one of the EU-27 Member States on 1 January 2019 with the citizenship of another EU-27 Member State. As one would expect there are significant differences in the rates of immigrants in EU countries, and this could be considered reasonable due to the different pull factors by country.



(1) EU-27 related data are not available and so the yellow bar shows citizens of other EU-28 Member States (therefore including the United Kingdom) and the blue bar shows citizens of non-EU-28 countries.
(2) Estimate.
(3) Provisional.
Source: Eurostat (online data code: migr_pop1ctz)

eurostat

So far, the reactions of the host societies have been contradictory. Countries with tradition in the reception of migrants such as Germany seemed more prepared in terms of integration policies and actions, but also more receptive to the new populations, recognizing the role of refugees and migrants as an opportunity for growth, subject to the creation of an appropriate environment, understanding of the migrant profile and investing through education in them (ESPON 2018). Because of this new situation a discussion has been raised among EU countries about turning this challenge into an opportunity for growth through entrepreneurship, as the positive options of ethnic entrepreneurship could overlap the possible obstacles. Even though, there was a debate in the literature over the correlation between entrepreneurship and economic growth, the view that the two are positively related eventually prevailed (Sarri & Trichopoulou 2018). According to the Global Report 2019/2020 of the Global Entrepreneurship Monitor *…entrepreneurship is a uniquely powerful mechanism for economic and social development, generating incomes and jobs while enabling and enriching individuals and communities. Truly, an engine for change…* The significance of entrepreneurship tends to be greater when vulnerable population groups get involved. According to the European Network 'Cities for Local Integration Policy' (CLIP) ethnic entrepreneurship apart from the financial benefits, such as economic growth of the local area, creation

of new jobs (in 2016, according to OECD approximately 28% of the self-employed immigrants in the EU had employees) and connection of local markets to global ones, may have other aspects related to the revival of lost professions and arts and the provision of higher value-added services (Rath 2011).

There is no unfamiliarity with ethnic entrepreneurship worldwide. A high rate of migrants already tends to show an entrepreneurial spirit in host societies. In Australia, 30% of small businesses are owned by migrants and in Germany in 2015, 44% of the owners of the newly established enterprises were foreigners (Sarri & Trichopoulou 2018). Although, according to the official data of the EU, in 2018, the percentage of self-employed migrants in the EU was only 1.9 points behind that of those born in the EU (13% vs. 14.9%) (OECD / EU 2019), IOM (2019) claims that general immigrants tend to have higher entrepreneurial activity compared to natives. Additionally, in countries such as the United States, migrants have disproportionately contributed to innovation (IOM 2019). There is a massive trend among migrants to have the willingness to run their own business as – in addition to financial impact – the implementation of business projects and activities may also contribute positively to citizens' image for them. According to Eurobarometer surveys, many European citizens express a positive view of entrepreneurship and the role of the entrepreneur in creating new jobs (Sarri & Trichopoulou 2012). Nevertheless, the fact that ethnic businesses tend to fail more than those established by natives might imply, among other things difficulties in accessing credits from official financial institutions (Desiderio 2014) as well as lack of entrepreneurial education.

3. Policies and Initiatives on entrepreneurship education

The significance of integrating migrants into host societies has been broadly acknowledged by international organizations, governments, the academic world, and civil society, as a lever for growth in local economies. At an international level, the recent formation of the United Nations Network on Migration and the global compact on migration have been milestones in the field of global migration governance. The global compact which constitutes a set of 23 objectives linked to an equal number of commitments and followed by a range of actions, in many cases include skills development, education, and entrepreneurship. Even though, the global compact is non-legally binding, it represents a near-universal consensus on the issues requiring sustained international cooperation and commitment for the creation of the conditions that will enable all migrants to enrich the host societies contributing to sustainable development at the local, national, regional, and global levels (IOM 2019).

As concerns the EU, trying to encourage the authorities to step in the direction of supporting migrants' inclusion and taking under consideration the great role of entrepreneurship education to the fulfilment of this purpose has developed several policies. Back to 2000, with the approval of 'The European Charter for Small Enterprises' Member States and the Commission are called to take action to support and encourage small enterprises in ten key areas including education and training for entrepreneurship, considering small enterprises as one of the most promising sources of new jobs, innovation, economic dynamism, and greater social inclusion. Three years later, EU's Green Paper for the entrepreneurship highlighted for one more time the importance of entrepreneurship education. It pointed out the fact that education and training would contribute to the encouragement of entrepreneurship, by supporting the development of the awareness and skills necessary for developing an entrepreneurial mindset. Although, it had been recognized that the ethnic minorities display high levels of entrepreneurial flair and even greater potential, it had been also mentioned that the available business support services seemed not to respond well enough to the specific needs of the migrants. At the end of the same year, the public debate following the Green Paper for the entrepreneurship underlined that the objectives set by the Green Book could be possible only if some extra actions took place which relates to the educational procedure and methods and more specifically to the exposure of the trainees to the business world, the skill-oriented learning, and the training of teachers on the entrepreneurship. In 2005, the Communication text from the Commission to the Council, the European Parliament, the European Economic and Social Committee and the Committee of Regions concerning the implementation of the Community Lisbon Programme Modern SME Policy for Growth and employment, refers to the need for national strategies in order to promote entrepreneurial skills. Moreover, the ability of Member States to use European Social Funds so as to reduce skills gaps by improving business-related training and lifelong learning is positively assessed even though doubts have arisen about the effectiveness of these actions. Undoubtedly, networking among policymakers to identify and promote good practices that assist ethnic entrepreneurs, was again recognized as a crucial matter.

In the following years, there were constant references to the policies and action plans of the EU for the promotion of entrepreneurship education including, in many cases, vulnerable groups of population such as

migrants and refugees. More specifically, the European Parliament and Council's Recommendation in 2006 includes in the eight key competences of lifelong learning the sense of initiative and entrepreneurship as an essential component of a knowledge-based society. In that text, special mention is made of migrants who have different learning needs due to educational disadvantages caused by personal, social, cultural, or economic circumstances and as a result, they need to be supported to fulfil their educational potentials. Two years later, the EU's initiative 'Small Business Act' (2008) creates a new policy framework integrating into the existing enterprise policy tools and building on the European Charter for Small Enterprises and the Modern SME policy through a set of 10 principles for guiding the conception and implementation of policies both at EU and Member States level. The eighth principle refers to the promotion of skills upgrading and all forms of innovation in Small Medium Enterprises, which are usually founded by ethnic entrepreneurs. Under this umbrella of applying the principles, the Commission undertakes a series of actions that seem to be less targeted but invite member states to plan more specific actions which relate among others to stepping up cooperation with the business community, to developing systematic strategies for entrepreneurship education at all levels and providing mentoring and supporting to immigrants who wish to become entrepreneurs. In 2012, in the Commission document 'Rethinking Education': Investing in skills for better socio-economic outcomes, special mention is made to the importance of investing in business skills, as it results not only in the development of new businesses but furthermore in the employability of young people. In addition, Commission proposes to member states to cooperate with the business community, developing strategies for entrepreneurship education and providing mentoring and support for migrants who wish to become entrepreneurs. The following year, the Commission returns with the publication of the Entrepreneurship Action Plan 2020 and more recently the New Skills Agenda for Europe. Both emphasize the need to promote entrepreneurship education and entrepreneurial learning under the spotlight, ending up with a wealth of initiatives across Europe. From 2015 until today, under the frame of the European Agenda on Migration and its updates, many papers of policy were published by the EU which, apart from the other challenges posed by the immigration crisis, addressed the question of ensuring that relocation responsibility is shared fairly between the Member States, integrating migrants at local and regional levels.

The most important recent EU's policy documents related to entrepreneurship education of migrants.

It appears that in the last two decades, in European level, there is a wide recognition of the importance not only of migrant entrepreneurship but of their entrepreneurship education too, even though for many decades before 2000, the European policies used to be focused mainly on the integration of migrants into paid employment (Rath 2011). In this context, several policies, initiatives, and actions have been developed and directions have been given to the Member States, which in many cases in collaboration with the private sector and civil society actors implemented relevant projects. Most of the host countries in Europe offer educational courses to newcomers mainly for improving their language skills. In Greece, for instance, a wide range of agents participate in this effort, such as the Migrant Integration Centers, Integration Training Centers of Project HELIOS, the public and private centers of Lifelong Learning Centers, the Modern Greek Language Teaching Center of the National

and Kapodistrian University of Athens, the Second Chance Schools and many Non-government organizations. However, when we talk about entrepreneurship education of migrants in Greece the number of actors tends to shrink, even more when we talk about competence-oriented entrepreneurship education. Moreover, after the EntreComp's publication (Bacigalupo et al 2016), there is an increasing interest in the implementation of competence oriented entrepreneurship education projects for migrants across Europe such as the project 'Fresh-start' in Belgium, Netherlands, and United Kingdom that provides 120 first-generation migrants with routes to social and economic inclusion by encouraging and supporting their entrepreneurial talents and teaching entrepreneurial competences (McCallum et al 2018) or the ELYME project in Italy, France, Belgium and UK which is a support entrepreneurship program targeted to support migrants in starting up their business or to support its growth with the use of effective tools and methods for assessing their entrepreneurial skills and competences. Except for these two projects, six more relative projects were approved, under the two calls for proposals 'Entrepreneurial capacity building for young migrants, which covered the following seven additional countries: Austria, Finland, Germany, Greece, Poland, Spain and Sweden. Special provision has been made for the funding of all the above by the Asylum Migration and Integration Fund (AMIF), the European Regional Development Fund (ERDF), the European Social Fund (ESF), the European Parliament and other financial instruments. These funds have been predicted to be able to support targeted initiatives to improve language and professional skills, improve access to services and promote access to the labor market.

4. The role of the entrepreneurship education of migrants to their social inclusion

It is widely accepted, that education is of vital importance for the wellbeing of the citizens and the development of societies. Education contributes to the creation of thriving economies and inclusive societies. In the last decades, special mention is made on the importance of entrepreneurship education. At the same time, several attempts take place worldwide for including entrepreneurship education in formal and informal education. The objectives of entrepreneurship education are connected to the support of entrepreneurship and the development of the entrepreneurial spirit, both drivers for growth. Although there is a relative agreement that the major rationale for entrepreneurship education is more economical than social, entrepreneurship education promotes entrepreneurship by influencing attitudes, values, and the general community culture (Mwasalwiba 2010). According to Galor and Michalopoulos (2006) there is a remarkably close correlation between the evolution of entrepreneurial spirit and the transition from stagnation to growth. In addition, the development of the entrepreneurial spirit can positively affect the way people think and act and that could apply in vulnerable population groups too. In that perspective, entrepreneurship education can affect migrant's life too. More specifically, the entrepreneurship education of migrants can have multiple effects of two perspectives on their social inclusion. The first one relates to the benefits of running a successful ethnic business. Well-educated and managing experienced migrants have more possibilities to succeed as entrepreneurs. What is more, they have better chances of widening the market where they operate as entrepreneurs (Basu & Pruthi 2021). Also, migrants' entrepreneurship leads to the creation of a stable income in the household. In addition, the entrepreneurial activity of migrants results in the creation of networks inside and outside of the ethnic community and contributes to the development of self-esteem. The self-employment of migrants can have positive effects on their recognition by native population. According to the report of the European Migration Network 'Understanding Migration in the European Union' (2018) the percentage of EU citizens who have negative or very negative feelings towards immigrants is high and tents to increase more over time (from 54% in 2014 to 57% in 2017). The same report notes that the increase of contact with immigrants tends to promote positive attitudes towards them. Consequently, the successful entrepreneurial activity of migrants, because of the appropriate education or even though the educational process itself, could lead to the coveted approval by the natives through the frequent and substantial contact, important factor of social inclusion.

The second perspective is connected to the hypothesis that competence-oriented entrepreneurship education can lead to the acquisition of life skills and competences. According to the public debate following the Green Paper 'Entrepreneurship in Europe' (2003), entrepreneurship education should favor the development of a variety of useful skills and personality traits such as the opening to lifelong learning, proactive attitude, self-reliance, creativity, problem-solving, critical thinking, and interpersonal skills, which at the same time constitute entrepreneurship skills and competences, according to the Entrepreneurship Competence framework published by CEDEFOP (Bacigalupo et al 2016). Lazear's theory (2005) holds that entrepreneurs should be jacks-of-all-trades, meaning that people should be multifaceted obtaining a set of skills and competences throughout their lives. In the previous decades, the procedure of obtaining that skills could be related to the different roles that individual would take on to acquire the varied background which was considered necessary for successful

entrepreneurial action. But nowadays, the situation is improving considerably since entrepreneurship education except knowledge tends to provide skills, competences, and attitudes. 'EntreComp' perceives entrepreneurship as a skill that applies to the entire life of the individual, from his personal development to his social life and employment (Bacigalupo et al 2016), so it could be expected that after the competence-oriented entrepreneurship education of migrants they will be able to meet the challenges of the future and they will be equipped with the adequate knowledges, skills and attitudes that are essentials for full participation in the society. In other words, they will be ready to act on opportunities and ideas, transforming them into value for others whether they are economic, cultural, or social. Besides, according to UNICEF and WHO the goal of life skills education is to equip individuals with appropriate knowledge on risk-taking behaviors and develop skills such as communication, assertiveness, self-awareness, decision-making, problem-solving, critical and creative thinking (Nasheeda et al 2018) and in many cases, the result of achieving this goal coincides with the acquisition of entrepreneurial skills and competences. Entrepreneurship education can play a crucial role in the creation of an entrepreneurial culture and the welfare of enterprises. People that are exposed to entrepreneurship education have more possibilities of establishing and successfully running a new business, which could create value for themselves, the economy, and the society as a whole. In a more detailed analysis, it seems that entrepreneurship competences are largely in line with life competences 'LifeComp' (Sala et al 2020). In the 'EntreComp' framework (Bacigalupo et al 2016) many of its fifteen sub-competences are compatible with the nine sub-competences of the 'LifeComp' (Sala et al 2020) framework which is a set of competences applying to all spheres of life that can be acquired through formal, informal and non-formal education and can help citizens to thrive in the 21st Century. This could become more coherent, with a detailed overview of the two frameworks, where in some cases of competences, such as self-awareness and self-efficacy, coping with uncertainty, ambiguity, and risk, and working with others, there is direct compatibility, meaning that entrepreneurship competences are considered as life competences too. In other cases, the compatibility is indirect or should be sought in more than one competence. The above mentioned could provide a safe path to reach the assumption that entrepreneurship education is a way of acquiring life skills and competences. Moreover, in the case of migrants, this could lead, among other things, to their social integration as through the dual result of the entrepreneurship education, they could reap not only the benefits of setting up and operating a business but also of the development of those competences that will make them better prepared for the host societies.

5. Conclusions

The theoretical and literature review of the topic showed that in the last two decades systematic efforts have taken place from EU to develop policies and actions for ethnic entrepreneurship education. Based on the guidelines of the official policy texts but also on the national strategies and making use of EU funding tools each member state of EU implemented relevant actions and projects. In this effort the role of the third sector institutions was significant, in varying degrees of involvement, to promote and apply entrepreneurship education measures for boosting ethnic entrepreneurship (Rath 2011). Even though the policy texts go back to 2000, due to the last decade's migration crisis, new questions have arisen about the entrepreneurship education of ethnic groups, while discussions are taking place about turning this challenge into an opportunity for member states. This debate should certainly take into account the diversity of ethnic groups in the light of the type of migration as in cases of forced displacements which regards mainly the asylum seekers, different measures should be taken. So far, the review has shown that the organizations that provide education courses on entrepreneurship target mainly on the acquisition of knowledge and of more general skills relevant mainly to the entrepreneurial activity. What is more, even in cases of competence-oriented education there is criticism about a value-free education remoted from everyday life and economic reality which could lead to another kind of impasse (Popovic 2014). The answer to this criticism could be related to the new competence-oriented entrepreneurship education which targets among others to the promotion of critical and sustainable thinking. Although, there have been five years since the EntreComp's publication (Bacigalupo et al 2016) there are only e few projects for migrants which have been implemented applying EntreComp as a tool, setting as an objective the acquisition of entrepreneurship competences instead of knowledge and some business skills. Thus, more efforts should be done to this direction, since the entrepreneurship education for ethnic groups of the population is not a panacea but it could pave the way to the employability and to the acquisition of competences useful for the participation in social and economic life, both driving forces of social inclusion. The present article contributes to the literature by showing that the entrepreneurship competences obtained by migrants through the educational procedure, could also be useful as life competences, contributing to their integration into the host society. It comprises a stepladder to establish a relationship between competence-oriented entrepreneurship education and social inclusion of migrants because of acquiring life competences. However,

empirical evidence is largely lacking. Thereby, future empirical research with the use of the appropriate competence-validation tools is proposed.

References

Basu, A. and Pruthi, S. (2021) From Ethnic Enclaves to Transnational Landscapes: A Review of Immigrant Entrepreneurship Research, Foundations and Trends in Entrepreneurship: Vol. 17, No. 1, pp 1–153.

Bacigalupo, M., Kampylis, P., Punie, Y., Van den Brande, G. (2016) EntreComp: The Entrepreneurship Competence Framework, Luxembourg: Publication Office of the European Union.

Commission of the European Communities, Enterprise Directorate General (2000) European Charter for Small Enterprises, Brussels.

Commission of the European Communities (2003) Green Paper: Entrepreneurship in Europe, Brussels.

Commission of the European Communities (2003) Summary Report: The public debate following the Green Paper: Entrepreneurship in Europe, Brussels.

Commission of the European Communities (2005) Communication from the Commission to the Council, the European Parliament, the European Economic and Social Committee and the Committee of Regions, Implementing the Community Lisbon Programme Modern SME Policy for Growth and employment, Brussels.

Commission of the European Communities (2006) Recommendation of the European Parliament and the Council on key competences for lifelong learning.

Dekker, R. and Engbersen, G. (2012) How social media transform migrant networks and facilitate migration, IMI Working Papers, No. 64.

Desiderio, M.V. (2014) Policies to Support Immigrants Entrepreneurship, DC Migration Policy Institute, Washington.

European Commission (2008) Think Small First: A "Small Business Act" for Europe, Brussels.

European Commission (2012) Rethinking Education: Investing in skills for better socio-economic outcomes, Strasbourg.

European Commission (2015) A European Agenda on Migration, Brussels.

European Migration Agency (2018) Understanding Migration in the European Union: insights from the European Migration Network 2008-2018 – EMN 10 Year Anniversary Report, Brussels.

Galor, O. and Michalopoulos, S. (2006) The Evolution of Entrepreneurial Spirit and the Process of Development Available at http://dx.doi.org/10.2139/ssrn.897495

Global Entrepreneurship Monitor (2020) Global Report 2019/2020, Global Entrepreneurship Research Association, London Business School, London.

Lazear, E. (2005) Entrepreneurship, Journal of Labor Economics 23, no. 4: 649-80.

International Organization for Immigration (2019) World Migration Report 2020, IOM Publishing, Geneva.

Levitas, R., Pantazis, C., Fahmy, E., Gordon, D., Lloyd, E., Patsios, D. (2007) The multy-dimensional analysis of social exclusion, Department of Sociology and School for Social Policy Townsend Centre for the International Study of Poverty and Bristol Institute for Public Affairs, University of Bristol.

OECD/European Union (2019) Self-employment and entrepreneurship indicators for immigrants, in The Missing Entrepreneurs 2019: Policies for Inclusive Entrepreneurship, OECD Publishing, Paris.

OECD/European Union (2017) The Missing Entrepreneurs 2017: Policies for Inclusive Entrepreneurship, OECD Publishing, Paris.

McCallum, E., Weicht R., McMullan L., Price A. (2016) EntreComp into Action: get inspired, make it happen, Publications Office of the European Union, Luxembourg.

Migali, S., Natale, F., Tintori, G., Kalantaryan, S., Grubanov-Boskovic, S., Scipioni, M., Farinosi, F., Cattaneo, C., Benandi, B., Follador, M., Bidoglio, G., McMahon, S. and Barbas, T. (2018) International Migration Drivers, Publications Office of the European Union, Luxembourg.

Mwasalwiba, E.S. (2010) Entrepreneurship education: a review of its objectives, teaching methods, and impact indicators, Education + Training, Vol. 52 No. 1, 2010 pp. 20-47.

Nasheeda, A., Abdullah, H.B., Krauss, S.E., & Ahmed, N.B. (2018) A narrative systematic review of life skills education: effectiveness, research gaps and priorities, International Journal of Adolescence and Youth.

Popovic, K. (2014) The Skills: A Chimera of Modern European Adult Education (Chapter 2) Challenging the 'European Area of Lifelong Learning' A Critical Response, Lifelong Learning Book Series 19 George K. Zarifis Maria N. Gravani Editors (Spinger).

Rath, J., Eurofound (2011) Promoting ethnic entrepreneurship in European cities, Publications Office of the European Union, Luxembourg.

Sala, A., Punie, Y., Garkov, V. and Cabrera Giraldez, M. (2020) LifeComp: The European Framework for Personal, Social and Learning to Learn Key Competence, Publications Office of the European Union, Luxembourg.

Sarri, K. & Trichopoulou, A. (2012) Female entrepreneurship: An approach to the Greek reality, Rosili Publishing, Athens.

Sarri, K. & Trichopoulou, A. (2018) Entrepreneurship and Social Economy: The gender perspective, Tziolas Publishing, Thessaloniki.

United Nations, General Assembly (2019) Global Compact for Safe, Orderly and Regular Migration, United Nations publication, New York.

United Nations (2021) World Economic Situation and Prospects, United Nations publication, New York.

Assessing the Transforming Power of Social Innovation Through the Perceptions of its Beneficiaries

Cristina Sousa and Maria de Fátima Ferreiro
Iscte - Instituto universitário de Lisboa, DINÂMIA'CET-Iscte, Lisbon, Portugal
cristina.sousa@iscte-iul.pt
maria.ferreiro@iscte-iul.pt
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Abstract: This paper tackles a still underexplored topic in the literature on social innovation - the assessment of its impacts, drawing on the concept of transformative social innovation. This concept stresses the changes in social relations and in dominant institutions and the emergence and dissemination of new knowledge and new practices linked to the emergence and deployment of social innovations. The empirical research considers the beneficiaries of a social innovation project - the EPAM project and uses primary data, collected through a questionnaire. The results show the beneficiaries' assessment of the impacts of this SI project on their activities, namely those relate to the development of their businesses and new partnerships, as well as to the access to new knowledge.

Keywords: transformative social innovation, impact assessment, rural territories, EPAM project

1. Introduction

This paper addresses the assessment of the effects of social innovations (SI), a topic that is still underexplored in the scientific literature. Currently, social innovation considered an important element for the development of regions and countries (Howaldt et al., 2016), being part of the solution to the major societal problems the humankind is currently facing (e.g., climate change, resource depletion, aging, inequality, structural unemployment). SI can be combined with other types of innovation (e.g., technological, commercial-oriented) bringing the satisfaction of human needs, inclusion and empowerment to the center of the analysis the social impact (Moulaert & MacCallum, 2019)

Scholars have been stressing the transforming power of social innovation (Avelino et al., 2019; Nicholls & Ziegler, 2019; Westley et al., 2017), but they are still lagging behind in the actual analysis of its effects. The insufficiency of research on the measurement of SI effects is partially related to methodological challenges (Mildenberger et al, 2020).

This research tries to overcome these challenges by proposing a design to assess a concrete initiative considering the perspective of its beneficiaries – the EPAM project. The EPAM project started in 2011 aiming the development of the medicinal and aromatic herbs value-chain in Portugal. It establishes a network of collaboration between different actors (public, private and non-profit), which conveys and promotes knowledge and social capital. Therefore, this project enables the formation of relationships between the beneficiaries (the producers) who face the same barriers in their activities and provides a space for collective action to face those barriers.

2. Impact assessment of social innovation

SI can be defined as defined as process that contributes to the building of more sustainable, resilient and inclusive societies through social change, i.e., changes in social relations (Longhurst et al, 2016). This process of social change involves new ways of doing, organizing, knowing and framing and the empowerment of actors (Avelino et al., 2019).

SI is a multidimensional concept. Moulaert et al. (2005) identify three core interrelated dimensions of social innovation: i) the content/aim of social innovation, related to the satisfaction of human needs; ii) the process of social innovation, related to changes in social relations, governance modes and participation; and iii) the outcome of social innovation, related to the satisfaction of unmet human needs, obtention of socio-political capabilities and access to resources. In a

This paper, although recognizing this multidimensional nature of SI, is mainly focused on the outcome dimension, since it is through this dimension that the effects of SI become visible. These effects will be translated

in the mitigation of the major societal problems and in the empowerment of communities, revealing the transforming power of social innovation (Avelino et al., 2019; Nicholls & Ziegler, 2019; Westley et al., 2017).

In this context, we consider that the concept of Transformative SI is particularly useful to discuss the effects of SI. This concept stresses the changes in social relations and in dominant institutions, and the emergence and dissemination of new knowledge and new practices (Avelino et al., 2019; Haxeltine et al., 2017). It provides important insights to address the novelty of agendas, institutions and agency in institutions aiming the improvement at a multidimensional and multi scale levels. The transformative power of SI is related to "socio-political levels and spatial scales with wider structures" (Castro-Arce & Vanclay, 2019, p.46), contributing to "innovations that will lead to transformation and improvements in the regional governance system" (ibidem). Therefore, the concept of Transformative SI presents both a socioeconomic and political nature.

The concept of transformative SI is also appropriate to study the processes of resource mobilization to achieve a certain objective (Avelino et al, 2020). This is particularly, useful in the context of the current research, since, as presented below, it aims to study a SI innovation initiative that promotes the development of small businesses in the value chain of Aromatic and Medicinal Products through the mobilization of a set of resources and activities.

The measurement of the effects of social innovation is relevant to several actors in the process, namely policymakers, funders/investors and social innovators (Antadze & Westley, 2012; Baturina & Bežovan, 2015; BEPA, 2014; Bund et al, 2015; Cunha & Benneworth, 2020; Murray et al., 2010, Tekula & Shah, 2016). Policymakers need to understand the effects of their initiatives to create the right conditions support SI, and to raise the effectiveness of the policies and programs. Funders/investors (including public agencies, philanthropists, charities and nonprofits) need metrics backing their funding decisions and the flow of resources to initiatives that are achieving the greatest social impact. Social innovators need to measure impact to guide their choices and efforts, to understand and communicate their role in promoting social change and fulfilling human needs, and to satisfy funder/investor's requirements. It is important to stress that the assessment of the effects of SI is important not only to the emergence of SI but also to determine which ones deserve to be scaled up (Murray et al., 2010), i.e., the ones that deserve to be replicated (used in new locations) and partially translated (being partially adapted and used in different locations) (Farmer et al., 2018).

Therefore, the interest of the actors involved in the IS process in measuring its effects is undeniable. However, measuring the effects of IS raises several questions and challenges and there is a lack of consensus on the best metrics and methods to use (Nicholls, 2015).

To begin with, there is the question of what to measure and how to measure. The metrics, models and methods developed for commercial and technological innovations are not adequate and cannot be directly applied to SI. This is linked to the appraisal of the benefits of SI which cannot be summarized to increases in sales or market shares (Murray et al., 2010). In fact, in the case of SI, social and (increasingly) environmental effects need to be included in the assessment analysis (Antadze & Westley, 2012; Ravazzoli et al., 2021). In line with the concept of Transformative SI, many of the effects are related to changes in social relations, networking, knowledge acquisition and empowerment, which are intangible and difficult to measure using "traditional" indicators (Baturina & Bežovan, 2015; Phills et al., 2008).

As stressed in previous research, networks provide resources for the social innovation process. At this realm, it is important to stress the role of both organizations from the local community and from other geographies that provide important tangible (e.g., financial resources) and intangible resources (e.g., knowledge, information, trust and legitimacy), namely in the case of rural territories (Müller & Korsgaard, 2018; Richter, 2019; Vestrum & Rasmussen, 2013). Moreover, networks with non-local actors can be very useful to acquire and disseminate knowledge, to attract resources that are not available within the locality and to scale-up social innovations (Ferreiro & Sousa, 2017; Ferreiro et al., 2021).

Likewise, there is the challenge of the choice and distinction between the level of impacts in the measurement exercise. Social innovations can have impact at micro, meso or macro levels of society (Baturina & Bežovan, 2015; Cunha & Benneworth, 2020). The micro level is related to the impact on users or direct beneficiaries of the social innovation. The mezzo level is related to the impact on the communities/local systems. The macro level is related to the diffusion of SI to other settings and places.

This challenge is interconnected with the geographic scale of the SI, which is usually conceived as emerging on a local scale, although, in some cases, the local SIs can and should be escalated to increase their use and geographical reach (Eizaguirre & Parés, 2019; Westley et al., 2014). However, it should be acknowledge that some social innovations may target deep structural problems that affect a large population and involve large-scale impacts since the beginning of the project (Păunescu, 2014). In this case the beneficiaries can be spread across regions or even countries.

Having these aspects and challenges in mind, the paper intends to perform an assessment of the effects of a social innovation project considering and responding to the following methodological challenges: i) What to measure?; ii) How to measure?; iii) In which level of analysis?; iv) In which geographical scale? The empirical analysis will be conducted using the EPAM project as a case study.

3. Empirical setting - the EPAM project

Aromatic and medicinal plants are globally commercialized and produced across the world. Its production can have an important role in the development of local communities, namely in developing countries.

In Portugal, the sector of AMP presents some developments and potential, not only in commercial/economic terms but also in environmental terms (Guapo, 2020). In fact, some recent research shows that the cultivation of these plants contributes to soil recovering from ecological damages caused by forestry fires, and to the sustainability of land management (Guapo, 2020).

According to a report on the sector (MAR-GPP, 2013), most of Portuguese producers were in coastal North and Centre and in Alentejo. The total area under production, in 2012, was about 180 ha, from which the largest portion (about 97 ha) was cultivated under organic production, in very small farms (MAR-GPP, 2013). This is a sector characterized by young and very educated producers, a reality very different from the average of the Portuguese farmers. This picture might know some evolution since 2012 (most recent available data) but the main trends of the sector prevail, namely the importance of organic production and producer's sociodemographic characteristics.

The EPAM project - Entrepreneurship in the value chain of medicinal and aromatic plants (acronym of the project in Portuguese **E**mpreender na Fileira das **PAM** em Portugal) - aimed at developing a set of tools to support the development of the AMP businesses along the value-chain. Emphasis was placed on the building collaborative solutions, between producers and between them and other players in the industry (researchers, processing companies, technical experts) and public bodies.

This project aims to change social relations in the AMP value chain, involving new ways of doing, organizing and knowing in the business and empowering the farmers. It can be, therefore, consider as a social innovation initiative, with a transformative power (Avelino et al., 2019).

The project has started in 2011, developed by a Local Development Association, ADC Moura, located in the Portuguese region (NUT III) of Baixo Alentejo, and was supported by the Portuguese Governmental Rural Network Program (Ministry of Agriculture). The project is still running, supported by the funding of several national and European programmes. It is possible to consider that the project has reached a maturity stage. In fact, the project has now developed a consolidated methodology and a set of tools to support the development of the AMP sector, acting at the level of network animation, research and information sharing, training and representation. It has been enabling the development of a strategic and innovative ecosystem, at the service of the producers of AMP. This methodology has already been scaled-up and implemented in other geographical (the project has been considered as a best practice by AGRI in 2017) and other value chains in agriculture (e.g., Barbary fig and mushrooms).

In a more systematic mode, and according to information on the project website (https://epam.pt/about-the-project/, accessed on 10th April, 2021), the EPAM project aims to:

- Foster the development of a national network related to the production and sale of aromatic and medicinal plants;
- Support entrepreneurship in the sector;

- Sharing of knowledge;
- Public policy proposals.

For this, the project entails several activities related to: dissemination of knowledge regarding best practices in the value chain; dissemination of information about AMP producers and other actors in the sector; promotion of networking through meetings and potential partner databases; development of knowledge and competencies (both regarding production and commercialization of products) through training and field visits; promotion of producers to increase their sales both in national and foreign markets. Since the beginning, the project had a national reach, involving producers and other actors from the Portuguese (continental) territory and has involved 157 producers since its beginning (Figure 1), from which currently only 136 remain active.

Figure 1: Localization of EPAM producers (Source: ADCMoura, adapted)

4. Methodology

Figure 2 presents the methodological options, taken to conduct the empirical analysis. Therefore, it presents the research design of the study that answers to the methodological challenges identified in the literature review. The data was collected through an on-line survey, based on a questionnaire sent by e-mail to all active EPAM producers (N=136) - which are the direct beneficiaries of the project. The questionnaire was sent to the business owners/entrepreneurs. Thus, we focus on the micro level, assessing the views of beneficiaries to understand whether the innovation and the process surrounding it meet their needs (Murray et al., 2010).

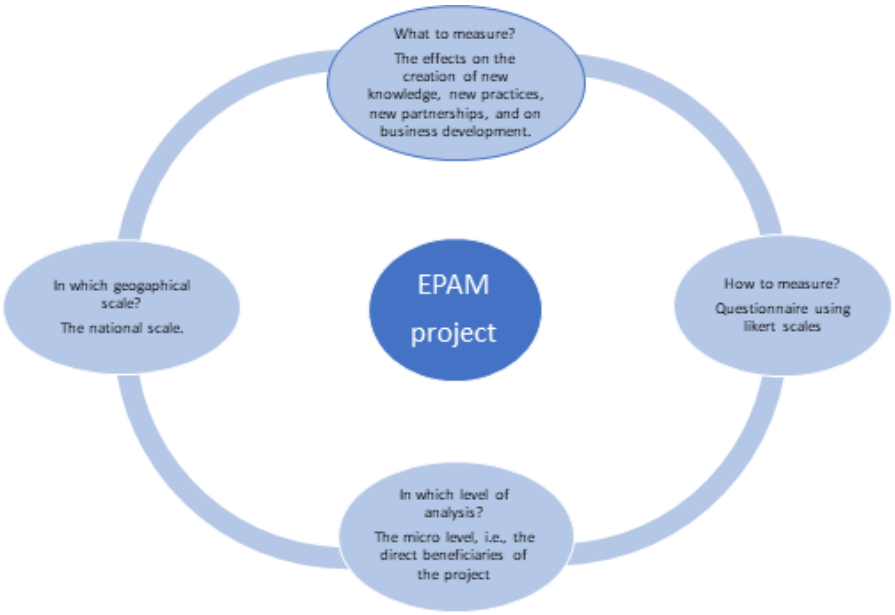

Figure 2: Operationalization of the analytical dimensions (authors' own elaboration)

The questionnaire was available between 16th November 2020 and 13th January 2021. After a remind e-mail to increase the participation, a total of 33 valid responses were obtained, corresponding to a 24.3% response rate. The respondents cover all Portuguese continental territory, which represents the geographical scale of the study (Figure 3).

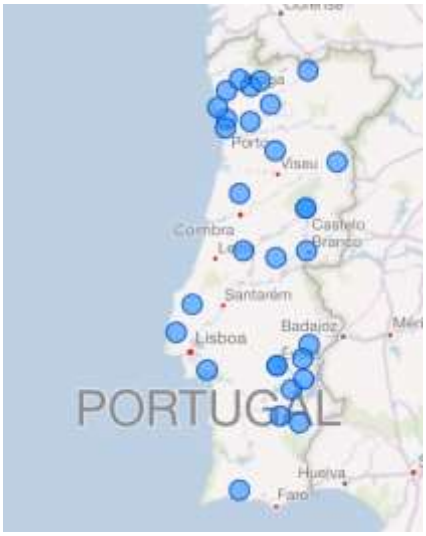

Figure 3: Localization of respondents (authors' own elaboration)

The questionnaire asked the producers to assess the effects of their participation on the EPAM network (in its various aspects including the website, producer meetings, seminars, external missions, etc.) for their activities. A 5-point Likert scale, ranging from not important to highly important, was used.

Considering the aims and activities of the EPAM project (described in section 3) and the concept of Transformative SI (which as explained in section 2 stresses the process of resource mobilization and aspects related to changes in social relations, and the emergence and dissemination of new knowledge and new practices), the questionnaire covered wide set of activities. More specifically, it included questions regarding 15 activities, where the EPAM beneficiaries could have felt the impact of their participation in the project, both in terms of the development of collaborative solutions and in terms of resource access to their business development. This included activities related to obtaining information (about markets, regulatory processes, and funding), technical knowledge, and credibility; finding new partners (commercial, research, other producers) and new business opportunities; co-creating and transferring knowledge, collaborating in commercialization; defining the strategy; promoting the organizations and its projects; and developing personal relationships.

The data was quantitatively analyzed using descriptive univariate and bivariate statistics. A correlation matrix, considering the Spearman's rho since we are dealing with ordinal variables, was used to identify dependencies across the variables showing if and how they tend to vary together.

5. Results

The assessment of the EPAM project impacts by its beneficiaries reveals that the initiative has been successful in improving relationships and cooperation in the value-chain and with other relevant actors and in developing the farmers' businesses. Figure 4 shows that all activities have a score higher than 3.3. Moreover, the respondents' average rating of the impacts of the project on their activities is 3.7. This SI seems to have more positive impacts on the following activities:

- find commercial partners
- get information about markets and clients
- get information about regulatory processes
- find other producers

These results allow two conclusions: the relevance of the project for the commercialization of AMP (getting information and establishing commercial relationships) and its importance in promoting networking in the value chain (with other producer and commercial partners).

The previous conclusions are reinforced when we consider the percentage of AMP respondents that rate the project as highly important (Figure 5). Considering the average of all activities, almost 30% of the producers consider that the SI initiative was highly important. Three activities that sand out with a higher percentage were already mentioned – 'find commercial partners', 'get information about markets and clients', and 'find other producers'. However, this angle of analysis reveals another activity in which the project is rated has having a high positive impact: the 'access to new technical knowledge'.

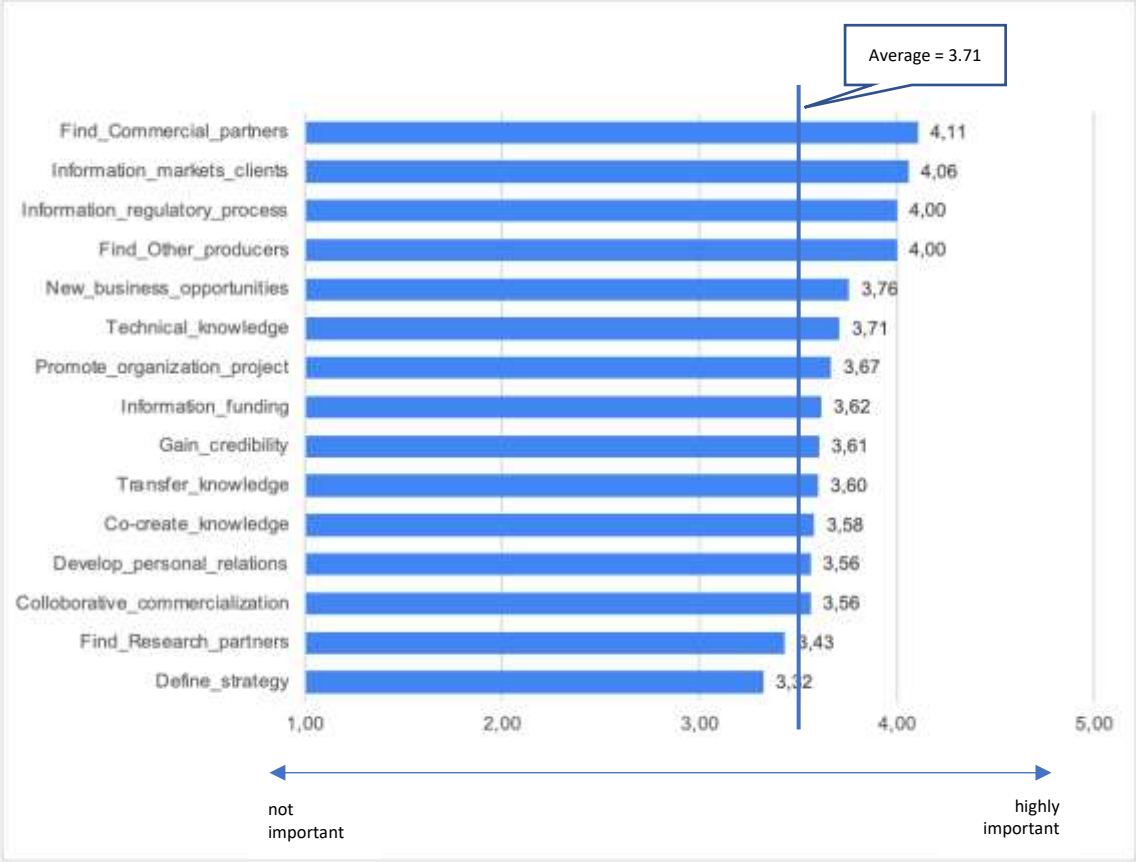

Figure 4: Average importance of the EPAM project for the AMP producers' activities (authors' own elaboration)

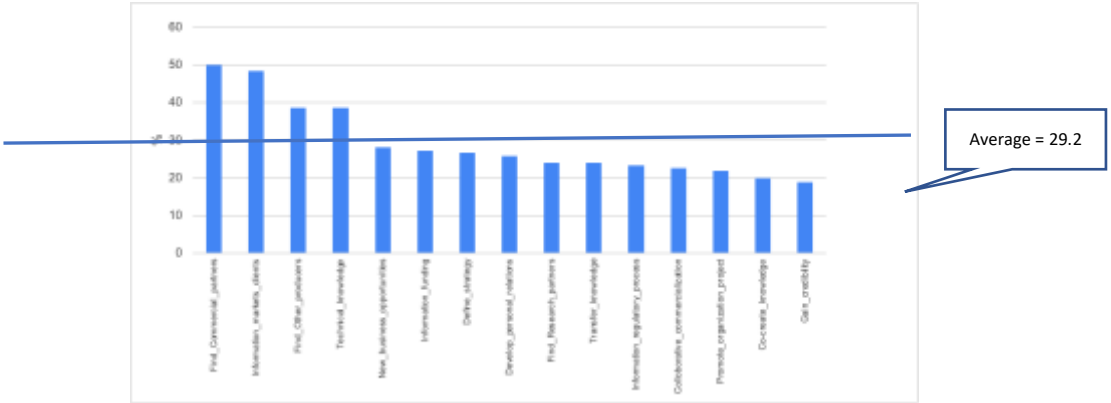

Figure 5: Percentage of AMP producers that rates EPAM has highly important (authors' own elaboration)

Figure 6 represents the correlation matrix between the 15 variables. It shows that positive correlations predominate between the variables. Negative correlations are weak and always involve the variable related to the activity 'find other producers'. A cluster analysis on the correlation coefficients reveals 4 different clusters.

- The first cluster is related to 'find other AMP producers' - which is weakly correlated to almost all other activities (the exception is the variable related to the 'development of personal relations'). As mentioned before, this is an activity where the SI seems to have a strong impact.

- The second cluster is related to the 'promotion of the business', involving the 'finding of commercial partners', the 'building of credibility' and the 'promotion of the organization'. As presented above, in this cluster the EPAM project seems to have a strong impact on the finding of commercial partners.
- The third cluster is related to the 'exploration of opportunities', based on 'access to information and knowledge', to 'find new business opportunities' and 'to sell collaboratively'. The EPAM project seems to have an undoubted impact on this cluster to the high rating attributed to three of its components: 'get information about markets'/clients and about 'regulatory processes', and 'get technical knowledge'.
- The fourth, and last, cluster is related to the 'strategic thinking of the business', being related to the 'definition of strategies', 'production of new knowledge' and 'development of personal relationships. This is the cluster where the EPAM project seems to have a lower impact.

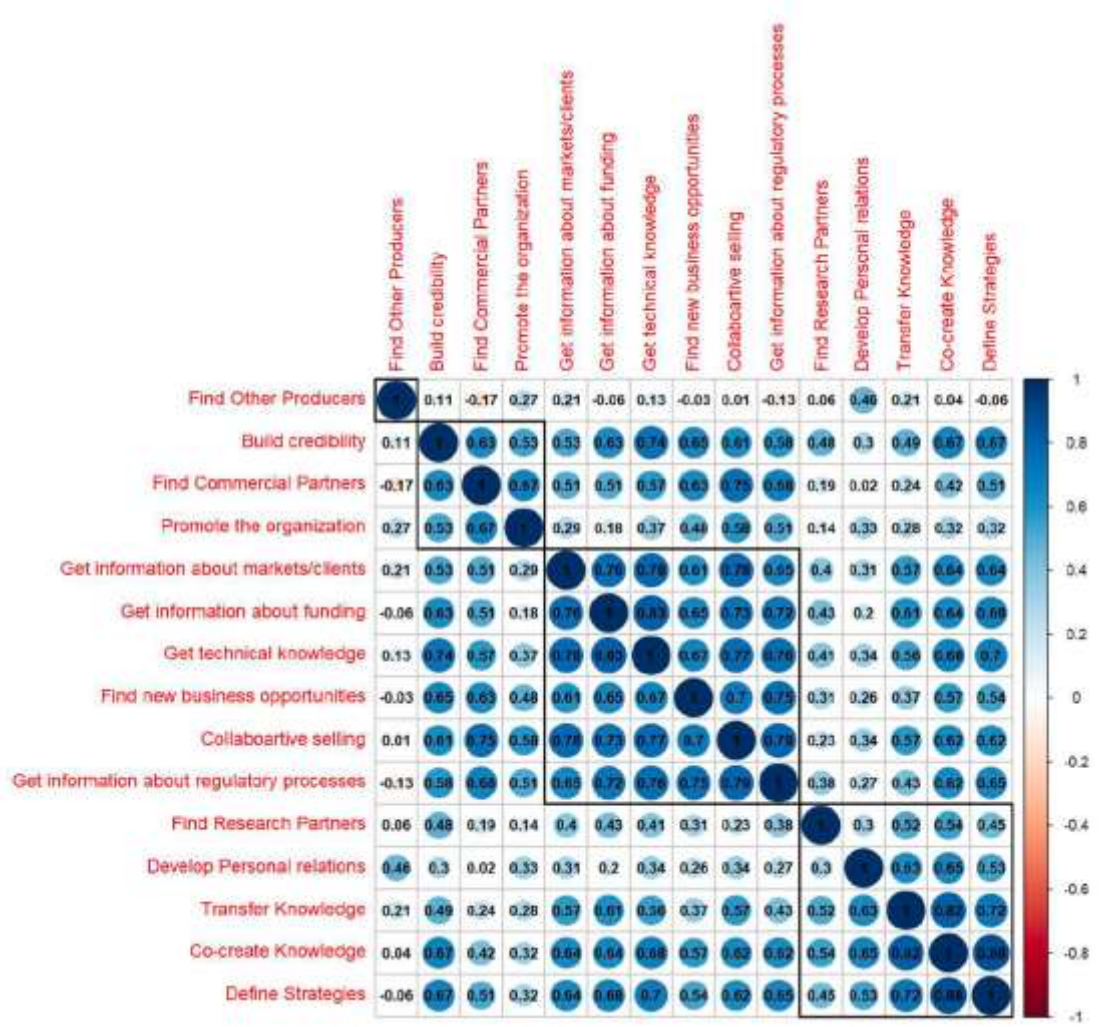

Figure 6: Correlation matrix (authors' own elaboration).

Legend: Blue colors indicate a positive correlation between variables, while red colors indicate a negative correlation. The size of the circle and the darkness of the color indicates stronger (positive or negative) correlation coefficients. The squares delineate the clusters.

6. Conclusions

The paper performed an assessment of the effects of a social innovation project, considering the perceptions of its beneficiaries, thus contributes to the still scarce literature impact assessment of SI.

For that, the paper drew on the concept of Transformative SI, considering it as a good conceptual grounding to understand the impact assessment of SI. In fact, that concept allows to frame processes of resource mobilization to achieve a goal (Avelino et al, 2020) and stresses the importance of understand how a SI is contributing to

changes in social relations, and the emergence and dissemination of new knowledge and new practices (Avelino et al., 2019).

The paper stressed the importance to perform the impact assessment of SI, and provided a systematization of the main methodological challenges of performing it. Those challenges revolve around the following questions: i) What to measure?; ii) How to measure?; iii) In which level of analysis?; iv) In which geographical scale?.

More importantly, the paper offered a research design that answers to the challenges raised by the literature and applies it to assess the impacts of a concrete social innovation initiative - the EPAM project. This project aimed at developing the value-chain of MAP in Portugal. The research design uses a survey approach, based on an on-line questionnaire to the direct beneficiaries of the project (micro level of anylsis), asking for their assessment of the importance of the project for several activities related to the aims of the project (what and how to measure), considering a national scale (geographical scale).

The results show that the beneficiaries highly value the Si initiative to the structuration of the value chain, both in terms of production activities and for the commercialization of MAP products. The perspective of the beneficiaries is vital to understand whether SI is achieving its goals (Murray et al., 2010). Although only ¼ of the beneficiaries have answered the questionnaire, the results provide some insights and practical implications.

The results suggest that this concrete SI initiative was highly relevant for the development of AMP small business, through the establishment of new networks and partnerships and access to technical knowledge and other competencies (namely related to product commercialization). This reveals the transformative power of the project (Avelino et al., 2019, Haxeltine et al., 2017), since it is promoting a change in social relations (through networking and collaboration practices with several actors) and enabling the acquisition of knowledge and the development of new practices. This confirms the value of including, in the assessment exercise, metrics that enable to capture activities related to networking, knowledge acquisition and empowerment (Baturina & Bežovan, 2015; Phills et al., 2008) and to the access of a set of intangible resources, like knowledge, information and credibility (Müller & Korsgaard, 2018; Vestrum & Rasmussen, 2013).

Moreover, the four clusters found in the analysis allowed the identification of impact of this SI project in terms of multiple dimensions of business development. The results highlight the need to develop further the dimension related to the 'strategic thinking of the business', where the EPAM project seems to have, until know, a lower impact.

This research has practical implications for SI promoters. The approach adopted in the paper offers an assessment framework that can be used by the SI promoter, a local development association, to monitor the impact of this project as it unfolds, as well as to assess the impact of other similar projects that are being developed by the same association. This can be used to develop the SI promoter activities and image (BEPA, 2014; Murray et al., 2010, Tekula & Shah, 2016), namely by: guiding its choices, activities and efforts to developed further the project; enabling to understand how the initiative is promoting social change and fulfilling the beneficiary needs; better communicating its role and contribution to build a more sustainable, resilient and inclusive society, and thus helping it raise funds and to access the resource it needs.

References

Antadze, N., & Westley, F. R. (2012). Impact metrics for social innovation: Barriers or bridges to radical change?. Journal of Social Entrepreneurship, 3(2), 133-150.

Avelino, F., Dumitru, A., Cipolla, C., Kunze, I., & Wittmayer, J. (2020). Translocal empowerment in transformative social innovation networks. European Planning Studies, 28(5), 955-977.

Avelino, F., Wittmayer, J. M., Pel, B., Weaver, P., Dumitru, A., Haxeltine, A., ... & O'Riordan, T. (2019). Transformative social innovation and (dis) empowerment. Technological Forecasting and Social Change, 145, 195-206.

Baturina, D., & Bežovan, G. (2015). Social innovation impact - Review of Research, Working Paper No. 9/2015. Seventh Framework Programme (grant agreement 613034), European Union, Brussels: Third Sector Impact.

BEPA-Bureau of European Policy Advisers. (2014). Social innovation: A decade of changes. Luxembourg: Publications Office of the European Union.

Bund, E., Gerhard, U., Hoelscher, M., & Mildenberger, G. (2015). A methodological framework for measuring social innovation. Historical Social Research, 40(3), 48–78.

Castro-Arce, K., & Vanclay, F. (2020). Transformative social innovation for sustainable rural development: An analytical framework to assist community-based initiatives. Journal of Rural Studies, 74, 45-54.

Cunha, J., & Benneworth, P. (2020). How to measure the impact of social innovation initiatives?. International Review on Public and Nonprofit Marketing, 17(1), 59-75.

Eizaguirre, S., & Parés, M. (2019). Communities making social change from below. Social innovation and democratic leadership in two disenfranchised neighbourhoods in Barcelona. Urban Research & Practice, 12(2), 173-191.

Farmer, J., Carlisle, K., Dickson-Swift, V., Teasdale, S., Kenny, A., Taylor, J., ... & Gussy, M. (2018). Applying social innovation theory to examine how community co-designed health services develop: using a case study approach and mixed methods. BMC Health Services Research, 18(1), 1-12.

Ferreiro, M. F., & Sousa, C. (2017). Social innovation and Networks: Linkages and challenges. In European Conference on Innovation and Entrepreneurship. Academic Conferences International Limited, 217-224).

Ferreiro, M.F., Sousa, C., Sheikh, F. A., & Novikova, M. (2021). Social innovation and rural territories: Exploring invisible contexts and actors in Portugal and India. Journal of Rural Studies. DOI: 10.1016/j.jrurstud.2021.04.013

Guapo, M. M. (2020). Desenvolvimento Local de Áreas Ardidas: Plantas Aromáticas e Medicinais. Dissertação no âmbito do mestrado de Biologia, Faculdade de Ciências e Tecnologia da Universidade de Coimbra.

Haxeltine, A., Pel, B., Wittmayer, J., Dumitru, A., Kemp, R., & Avelino, F. (2017). Building a middle-range theory of Transformative Social Innovation; theoretical pitfalls and methodological responses. European Public & Social Innovation Review, 2(1), 59-77.

Howaldt, J., Domanski, D., & Kaletka, C. (2016). Social Innovation: towards a new innovation paradigm. RAM. Revista de Administração Mackenzie, 17(6), 20-44.

Longhurst, N., Avelino, F., Wittmayer, J., Weaver, P., Dumitru, A., Hielscher, S., ... & Elle, M. (2016). Experimenting with alternative economies: four emergent counter-narratives of urban economic development. Current Opinion in Environmental Sustainability, 22, 69-74.

Mildenberger, G., Schimpf, G., & Streicher, J. (2020). Social Innovation Assessment? Reflections on the impacts of social innovation on society-Outcomes of a systematic literature review. European Public & Social Innovation Review, 5(2), 1-13.

MAR-GPP - Ministério da Agricultura e do Mar, Gabinete de Planeamento e Políticas (2013). As Plantas Aromáticas Medicinais e Condimentares.

Moulaert, F., & MacCallum, D. (2019). Advanced introduction to social innovation. Edward Elgar Publishing.

Moulaert, F., Martinelli, F., Swyngedouw, E., & Gonzalez, S. (2005). Towards alternative model (s) of local innovation. Urban studies, 42(11), 1969-1990.

Müller, S., & Korsgaard, S. (2018). Resources and bridging: the role of spatial context in rural entrepreneurship. Entrepreneurship & Regional Development, 30(1-2), 224-255.

Murray, R., Caulier-Grice, J., & Mulgan, G. (2010). The open book of social innovation (Vol. 24). London: Nesta.

Nicholls, A. (2015). Synthetic grid: A critical framework to inform the development of social innovation metrics, CRESSI working papers no. 14/2015.

Nicholls, A., & Ziegler, R. (Eds.). (2019). Creating economic space for social innovation. Oxford: Oxford University Press.

Păunescu, C. (2014). Current trends in social innovation research: social capital, corporate social responsibility, impact measurement. Management & Marketing, 9(2), 105.

Phills, J., Deiglmeier, K., & Miller, D. (2008). Rediscovering social innovation. Stanford Social Innovation Review, 6(4), 34-43.

Ravazzoli, E., Dalla Torre, C., Da Re, R., Marini Govigli, V., Secco, L., Górriz-Mifsud, E., ... & Nijnik, M. (2021). Can social innovation make a change in European and Mediterranean marginalized areas? Social innovation impact assessment in agriculture, fisheries, forestry, and rural development. Sustainability, 13(4), 1823.

Richter, R. (2019). Rural social enterprises as embedded intermediaries: The innovative power of connecting rural communities with supra-regional networks. Journal of Rural Studies, 70, 179-187.

Tekula, R., & Shah, A. (2016). Funding social innovation. In: Lehner, O.M. (ed.), Routledge handbook of social and sustainable finance, pp. 125-136, Routledge.

Vestrum, I., & Rasmussen, E. (2013). How community ventures mobilise resources: Developing resource dependence and embeddedness. International Journal of Entrepreneurial Behavior & Research.

Westley, F., Antadze, N., Riddell, D. J., Robinson, K., & Geobey, S. (2014). Five configurations for scaling up social innovation: Case examples of nonprofit organizations from Canada. The Journal of Applied Behavioral Science, 50(3), 234-260.

Westley, F., McGowan, K., & Tjörnbo, O. (Eds.). (2017). The Evolution of Social Innovation: Building Resilience Through Transitions. Cheltenham: Edward Elgar.

Opportunities for Economic Revitalization Through Inter-Industrial Relationships: The Case of Blue Economy

Cristina Sousa[1], Margarida Fontes[2] and Oscarina Conceição[1,3]
[1]Instituto Universitário de Lisboa (ISCTE-IUL), Portugal
[2]LNEG - Laboratório Nacional de Energia e Geologia, Lisbon, Portugal
[3]IPCA, Barcelos, Portugal
cristina.sousa@iscte-iul.pt
margarida.fontes@lneg.pt
oconceicao@ipca.pt
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Abstract: This paper proposes that collaborative relationships in the context of research and innovation projects can be a first step towards the development of new products or adaptation to new markets that may drive diversification processes in established/mature sectors; and that technology-based firms can play a key role in these processes, as intermediaries and co-innovators. It addresses the case of projects in the field of "blue economy", which aims at combining socio-economic development and sustainability in the conduction of human activities related with the ocean. Transformative activities in this field are especially important, given the weight of ocean-related traditional sectors in the economic activity of several European countries. The paper maps the interactions between new and established Portuguese industries, to investigate whether and to extent inter-sectoral relationships are leading to the development of innovative and sustainable solutions, as well as which sectors have a more determinant role. Then it looks for evidence of revitalization and transformation processes being induced by collaboration with firms from new industries. Implications for transformative innovation policies are derived.

Keywords: industrial transformation, diversification, blue economy, inter-industrial relationship, research & innovation projects, social network analysis

1. Introduction

The "Blue Economy" is considered one of the drivers of European growth, based on the development of new competences and activities that enable a sustainable exploitation of ocean resources (EC, 2012). Strategies and policies were formulated, both at the UE and national levels, to address "Blue growth", combining industrial growth objectives with sustainability concerns. These strategies have targeted a broad variety of actors engaged in ocean-related activities, namely companies from established and new industries, and have promoted the development of new transversal technologies through the support of research and innovation.

These new, transversal technologies – such as advanced materials, biotechnology, ICTs, robotics - have the potential to drive changes in established industries, contributing to their transformation and economic revitalization. However, the ways these processes take place are still underexplored. The paper addresses this gap by proposing that such revitalization can be achieved through the promotion of inter-industrial relationships between established and new industries and the adoption, by companies from the established sectors, of diversification strategies based on the exploitation of the opportunities opened by the collaborations established.

The paper conducts an empirical analysis of the role played by research and innovation projects in the creation of conditions for a fruitful interaction between previously unrelated activities in the field of Blue Economy, conducive to change in mature industries. Transformative activities in this field are especially important, given the weight of ocean-related traditional sectors in the economic activity of several European countries, and the need to revitalize their activities, particularly in the context of a post-pandemic recovery.

2. Literature review

The concept of Blue Economy emerged as result of the growing interest in the development of a set of sectors directly or indirectly related to the ocean that have a strong weight in the economy of several countries, combined with concerns about the effects of these activities upon the integrity and sustainability of ocean ecosystems (Howard, 2018; Voyer et al, 2018). This dual approach was translated in strategies and policies at the European and country level, namely research and innovation policies aiming at the revitalization of

established sectors and the development of emerging industries, while guaranteeing the sustainable use of resources (Fontes et al, 2019; EC, 2012).

The introduction of new transversal technologies has been an important element of these policies. Besides contributing to the development of new activities and businesses, these technologies are expected to play a role in the revitalization and upgrading of established sectors (Dolata, 2009), which can be particularly relevant for mature sectors experiencing economic stagnation or decline. However, the processes through which the development of new technologies can simultaneously induce changes in established sectors are still insufficiently understood (Andersen et al, 2020).

Drawing on insights from the innovation literature, which describes innovation as a combinatorial process (Schumpeter, 1934; Arthur, 2007), we argue that interactions between new technologies and established industries, along the development of the former, create conditions for new combinations between existing knowledge and the one being developed. These (re)combination processes may lead to the development of new innovative activities, providing firms in established industries with opportunities for diversification into more value-added businesses.

Corporate diversification has been described as a strategy that companies in industries that are declining or growing very slowly can use to pursue growth opportunities in other markets (Helfat & Heisenhard, 2002; Wiersema & Beck, 2017). The literature has shown that firms benefit from diversifying into businesses that are related to the ones in which they already operate – relatedness being understood as having "a common skill, resource, market, or purpose" (Rumelt, 1974:29) – since this enables existing resources or competences to be at least partly redeployed (Adner & Zemsky 2016; Luthge, 2020). This can be done both by entering into new markets based on the firm's existing resources; or introducing new products in its existing markets (Penrose, 1995).

However, the development of new products or the adjustment of existing ones to new applications will always entail a greater or lesser component of novelty that goes beyond a simple process of resource re-deployment, requiring firms to develop or access to new resources and competences. The establishment of collaborative relationships can be critical in achieving these goals, permitting to overcome the knowledge or financial constraints faced by firms from mature sectors (Hansen & Winther, 2014) and to bring together complementary competences and resources (Zeng et al, 2010). This is particularly the case when these processes are being driven by the application of new technologies, which will tend to be more distant from the firms (or even the sectors) knowledge bases (Boschma, 2005). But while relationships between established low-tech sectors and new technology-intensive ones can be critical for diversification processes (Hansen & Winther, 2014), the establishment of such relationships may not be easy, given the technological, organizational and cultural differences between them (Teixeira et al, 2008).

Technology-based firms have been found to often act as knowledge intermediaries towards established firms, through collaborative relationships in the context of research and innovation projects (Conceição et al, 2019). But difficulties may still emerge, particularly in the case of firms of more traditional sectors, which are likely to have a lower technological level and limited R&D experience (Acha & von Tunzelmann, 2004), and thus may experience some difficulties in absorbing the knowledge being developed in the projects and applying it to their business (Cohen & Levinthal, 1990).

At this level, a role can be played by a particular set of firms – knowledge intensive business services (KIBS) – which act as knowledge and know-how intermediaries in the innovation process, while simultaneously being innovators on their own right (Shearmur & Doloreux, 2017). In their interaction with their clients, KIBS mediate to sources of knowledge, information, know-how, markets and regulators, and also develop know-how, sometimes co-producing it with the client (Den Hertog, 2000). In this sense KIBS are both producers and carriers of new technology (Miles et al, 1995, 2018).

The KIBS category involves a variety of firms that are heterogeneous in knowledge bases and behaviour (Pina & Tether, 2016). One major distinction was made, in Miles et al (1995) pioneer work, between technology-based services (T-KIBS) and professional services (P-KIBS). In particular, new technology based KIBS are described as associated with emerging generic technologies or addressing generic problems requiring new technological

solutions (e.g., environmental problems), their activities arising from the uncertainties surrounding the performance of new technologies (Miles et al, 1995).

Technology KIBS firms thus emerge as instrumental in the access and use of new technologies that are distant from the knowledge base of existing (manufacturing) sectors. However, this does not exclude a role for professional KIBS (e.g., specialized consultants) that can act as information intermediaries, especially in sectors populated by less technology-oriented firms, as well as support the development of organizational skills necessary for change (Santamaría et al, 2009). Similarly, it does not exclude the role played by product-oriented technology-based firms that operate within mature sectors, developing new products that add value to existing activities, sometimes in partnership with established firms. Indeed, it can be argued that is the combined activities of these different categories of knowledge-intensive companies that have the greatest potential to create transformative processes within mature sectors.

In the case of the Blue Economy, previous research (Sousa et al, 2020) has shown that a variety of sectors are exploiting new opportunities, including both established activities related to ocean (e.g., fisheries, ports) and new activities (e.g., biotechnology, marine energies). It also provided some early evidence of cross-fertilization between firms from different sectors and suggested that more technology intensive industries can play an important role in driving the exploitation of these opportunities.

Considering the above, the paper addresses the conditions in which interaction between new technologies and established activities can bring about change in mature sectors, thus contributing to their rejuvenation and revitalization. It proposes that: (i) inter-industrial relationships in the context of research and innovation projects can be a first step towards processes of knowledge combination that lead to the development of new products or their adaptation to new markets, driving diversification processes in established/mature sectors; (ii) technology-based firms – and in particular knowledge intensive business service firms – play a key role in these processes, as co-innovators and "translators" that bring knowledge related to new technologies and support their combination with business/market competences and (material) resources of established firms. Given the sectoral composition of the Blue Economy area and the strategic goals formulated to this area, an understanding of these processes can be critical to the more adequate implementation of policies aiming at its development.

3. Methodology

The paper adopts an exploratory approach, using a descriptive analysis. The first step of the empirical analysis aims at assessing the extent and structure of the inter-industrial relationships. It uses Social Network Analysis (SNA) to map the relationships established between new and existing industries in the context of research and innovation projects, in the Blue Economy field. In a second step, the nature of these collaborative relationships - namely the role played by firms from knowledge intensive service sectors - and their potential to induce revitalization processes are illustrated through a few cases, in areas selected by their relevance for the Portuguese economy.

To map the inter-industrial relationships, data was collected on two groups of projects in the Blue Economy area with the participation of Portuguese firms: 1) European projects funded by the Horizon 2020 programme; 2) national projects funded by the Portugal 2020 programme. For this purpose searches were conducted, using a series of keywords related with the ocean and with sea-related activities and industries, in the European CORDIS database and in three national sources: the database of the National Innovation Agency and the lists of funded projects provided by the Portugal 2020 and by the Fundo Azul programmes. As a result, 96 national projects and 72 European projects involving Portuguese firms were identified. These projects involved 149 Portuguese firms from 68 industrial sectors that are the object of the analysis.

To map the interactions between the industries involved in the projects, SNA was used. Each project is a 2-mode network, where the projects are the events and the participants are the actors. Since we are focusing on inter-industry relations between Portuguese partners, only firms were included in the analysis. It is considered that two sectors (represented by the Statistical Classification of Economic Activities - NACE Rev2 – at 6 digits) form a dyad if two Portuguese companies from these sectors are collaborating in the same project. Network diagrams were prepared using the NodeXL software, that was also used to perform SNA, namely to compute centrality measures.

The sectors identified were classified along two dimensions: the technological intensity; the relationship with the sea. Regarding the former we combined the EUROSTAT High-tech Classification of Manufacturing Industries (Eurostat, 2018), for the manufacturing sector; with Miles et al (1995, 2018) classification of knowledge-intensive business services. Table 1 presents the distribution of sectors along the various categories[1].

It should be pointed out that the fact that a sector has a generic classification does not mean that it extends to all the firms operating in it. Thus, technology-based firms may be in active sectors not classified as such. In order to have a better understanding of the position and roles of the technology-based firms we conducted an additional classification of firms, according to the activities they effectively perform, based on information from their webpages, technology directories and previous research. It was concluded that, while the vast majority of the 75 firms we identified as technology-based were KIBS (most of them T-KIBS, but also a few P-KIBS), some were found to be active in primary or manufacturing sectors. Among these firms, which we labelled product-based, a small set operated in sectors classified as low-tech (5 firms in fisheries and aquaculture and food manufacturing sectors) and medium low tech (2 firms in the shipbuilding sector).

Regarding the relationship with the sea, we used as basis the Portuguese Satellite Account for the Sea (SAS)[2] (INE & DGPM, 2016). Class codes totally included in the SAS were classified as "sea industries". Those only partially or residually included in the SAS were classified as "non-sea industries", even if some of the firms use sea resources or provide goods or services to activities that take place at sea. Table 1 also presents the distribution of the sectors along these two categories.

Table 1: Sectors by technology intensity and relation with the sea

Type of sector	Nº sectors	Nº Firms
A) Technological intensity		
Primary & Manufacturing sectors (1)		
HT – High technology	2	3
M-HT - Medium high technology	7	8
M-LT – Medium low technology	8	14
LT – Low technology	25	39
Service sectors (2)		
T-KIBS – Technology knowledge intensive business services	7	55
P-KIBS – Professional knowledge intensive business services	5	10
Non-KIS – Non knowledge intensive services	14	20
B) Relation with the sea		
Sea	14	31
Non-sea	54	118
Grand Total	**68**	**149**

Legend: (1) Eurostat (2018); (2) Miles et al (1995, 2018)

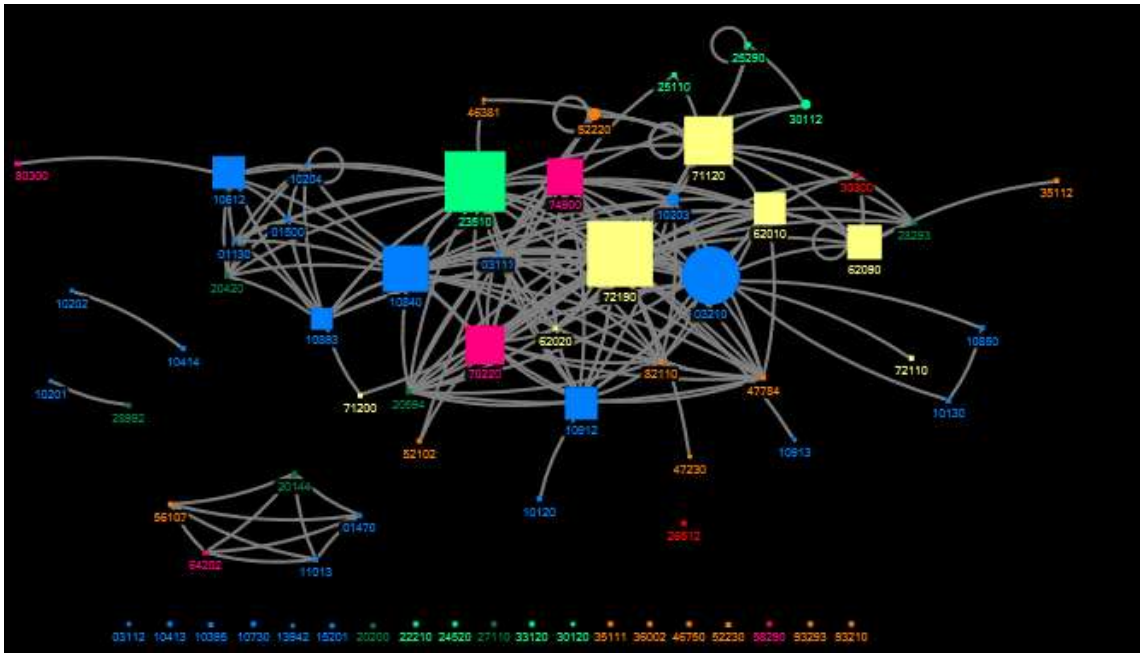
4. Results

4.1 Mapping the inter-industrial relationships

The network formed by the relationships between the sectors involved in the projects is presented in Figure 1. Table 2 presents the network centrality measures by type of sector. Degree centrality represents the activity of the sector in the network (i.e., the number of interactions it has in the projects) while the betweenness centrality captures the bridging role of the sectors (i.e., their positioning in linking other sectors that would be otherwise disconnected).

[1] A few sectors were not included in these classifications. Thus, we classified those in NACE section A (Agriculture, Forestry and Fishing) as Low Technology, and service sectors not included in the KIBS category as non-KIS services.

[2] Satellite Accounts are extensions of the central system of accounts, with additional information. In this case, the objective was to estimate the dimension and importance of the sea/ocean economy in the whole economy and to provide information on the production structure of the economic activities related to the sea.



Legend: *Shapes of the nodes*: Circles - Sea industries; Squares - Non-sea industries. *Colors of the nodes*: Blue - low tech; Light-green - medium-low tech; Dark-green - medium-high tech; Red - high tech; Yellow - T-KIBS; Pink - P-KIBS; Orange - non-KIS. *Size of the nodes* is proportional to the betweenness centrality.

Figure 1: Networks of inter-industrial relationships

Table 2: Network centrality measures by type of sectors

	Average Degree	**Average Betweenness**
Sea	4.9	9.457
Not Sea	5.3	12.993
LT	5.4	11.561
MLT	3.8	16.446
MHT	4.3	0
HT	2.5	0
Non KIS	2.9	0.360
P-KIBS	7.0	19.713
T-KIBS	11.3	44.257
Total Network	**5.2**	**12.264**

The data confirms the central role played in the network by KIBS sectors, in particular T-KIBS. The 72190 sector (R&D) occupies a central position and intermediates between other sectors, both low and high tech. In particular, it connects with and between sea-related sectors, low/medium-low technology sectors and technology/knowledge intensive ones. The strong connections with sea-industries such as fisheries and aquaculture or with food industries that are part of the sea value-chain can be explained by the high number of projects in which research-oriented firms apply biotechnology to the development of new products (food) or processes (aquaculture). Other T-KIBS sectors – 71120 (engineering) and 62010 & 62090 (ICT) - also play an intermediary role, although with a lower scope and with a less intense (direct) connection with the sea industries. The same can be said for P-KIBS involved in business or technical consultancy (70220 & 74900).

But the data also shows some dynamics that go beyond the one driven by KIBS. One low-tech sea sector (03210) has a very central position in the network. This centrality can be partly explained by the presence of product-oriented technology firms (e.g. operating in the microalgae business) that act simultaneously as innovators and as connectors to other sectors, in a similar vein to T-KIBS. Other sea industries are less visible, being connected to more central sectors through a small number of linkages.

The data equally shows a relatively high betweenness centrality of a low-tech non-sea sector (10840) concerned with food manufacture, and few other similar sectors also show some centrality, albeit lower. This reflects the

dynamics of some sectors upstream in the value-chain, which are linking to and between downstream parts of the chain and knowledge-intensive firms.

Finally, the data shows that one medium-low technology sector (23510 - cement) presents a high betweenness centrality. A more detailed examination shown that the extensive relationships driven by this sector have a diverse origin, being based on environmental motivations: an energy intensive sector has developed longstanding relationships with microalgae producers, first to develop solutions for CO2 sequestration and later becoming more closely engaged in the actual micro-algae business, through a process of diversification with the creation of a new company.

4.2 Uncovering the role of technology-based firms in revitalization processes

In this section we look in greater detail into seven illustrative cases of projects, with a view to provide evidence on collaborative activities between firms which are inducing processes of change that can have a transformative impact on established Blue Economy sectors. For this we consider sectors that are important for the Portuguese economy and in which there is evidence of relevant research and innovation collaborative activities.

Table 3 shows the weight of the sectors that compose the Blue Economy according to the Satellite Account for the Sea (SAS), based in two indicators – gross value added (GVA) and employment in the period 2010-2013 (average values) and in 2017.

Table 3: Satellite Account for the Sea – evolution of GVA and employment (by group)

Group	Gross value added (10^6 euros)		Employment - full-time equivalent (N.º)	
	2010-2013	2017	2010-2013	2017
1. Fisheries, aquaculture, processing, wholesale, retail	1 203	1 652	62 414	62 257
2. Non-living marine resources	49	58	2 333	1 720
3. Ports, transports and logistics	676	684	15 086	12 173
4. Recreation, sports, culture and tourism	1 660	2 951	45 950	78 195
5. Shipbuilding, maintenance and repair	119	154	4 404	4 883
6. Maritime equipment	159	205	9 028	6 955
7. Infrastructures and maritime works	65	286	2 850	6 455
8. Maritime services	741	691	18 615	16 247
9. New uses and resources of the ocean	7	8	88	351
Total of Ocean Satellite Account (OSA)	**4 679**	**6 688**	**160 768**	**189 236**
OSA / National economy (%)	**3,1%**	**3,9%**	**3,6%**	**4,1%**

The Table shows, first of all, that the weight of the Blue Economy in the national economy has increased between these two periods, reaching 3.9% of the national GVA and 4.1% of employment in 2017 (DGPM, 2019). Overall, the field registered an increase of 43% in GVA and 18% in employment.

Considering the individual groups of sectors, 'recreation, sports, culture and tourism' and 'fisheries, aquaculture, processing, wholesale, and retail of its products' have the greatest weight in terms of both GVA and employment, followed at a certain distance by 'maritime services' and 'ports, transports and logistics'. But we observe a diverse evolution of these groups between the two periods. There is a strong increase in both GVA and employment in 'recreation, sports, culture and tourism', which reflects the strong expansion of tourism activities. There is also an increase in the GVA of 'fisheries, aquaculture, processing, wholesale and retail of its products' (37%) but the employment remains unchanged, revealing an increase in productivity. In the case of and 'ports, transports and logistics' there is a decline in employment, associated with a very limited increase in GVA pointing to stagnation. In the case of 'maritime services' there is a decline in both GVA and employment.

Three other groups, with a lower weight - 'shipbuilding, maintenance and repair', 'infrastructures and maritime works' and 'new uses and resources of the ocean' – show a positive evolution, increasing in both GVA and employment. Increase in GVA is particularly marked in 'infrastructures and maritime works' that more than tripled; while in 'new uses and resources of the ocean' employment has tripled.

Among the groups identified above, we chose to focus on three. First, the 'fisheries, aquaculture, processing, wholesale, and retail of its products' area, because of its weight in the Blue Economy and the potential for revitalization represented by the high number of research and innovation projects targeting it. In fact, almost half of the research and innovation projects identified are in the "living resources" field, encompassing both projects whose activity is explicitly on fisheries or aquaculture (44%) and biotechnology projects that aim at the development or the sustainability of the value-chain based on marine living resources (56%) (Sousa et al, 2020).

Second the 'ports, transports and logistics', because this is a strategic area that can have a central role in the development of the Blue Economy but appears to experience stagnation and thus can benefit strongly from activities that promote its revitalization. This is also one of the areas with a greater incidence of projects, which indicates the presence of actions towards its upgrading (Sousa et al, 2020).

Finally, we focus on the 'new uses and resources of the ocean' because of the growth potential it appears to show, and also because this corresponds to an area in which the development of new technologies can be accelerated through the mobilization of resources and competences from established sectors - including growing sectors such as infrastructures and maritime works, stagnating ones such as ports, or recovering ones such as shipbuilding (Makitie et al, 2018), thus opening diversification opportunities for them. This is namely the case of one of the main areas included in this group, marine renewable energies, which is the second in terms of incidence of projects, which denotes an effective interest in its development.

Thus, while the first two areas encompass sectors in which new transversal technologies can have an revitalization role, adding value through product development, increasing efficiency and safety and improving sustainability; in the third one it is the actual development of an emerging sector that can act as driver of change to established ones that supply complementary resources and competences.

Tables 4 to 6 present some illustrative cases of the role that can be played by technology-based firms in these areas. When analyzing these cases particular attention will be given to three main aspects: i) the nature of partnerships; ii) the type of companies involved; iii) the contribution of the technology firms.

In the 'fisheries, aquaculture, processing' area (Table 4) we selected three projects that are representative of different approaches adopted in this area. Project GAIN links a T-KIBS active in marine biotechnology with a seafood farming company, to improve the efficiency and sustainability of the processes. Project ALGAVALOR links two product-oriented biotechnology firms (NACEs 10840; 10893), active in microalgae research and production, with a group of established companies from various sectors, to produce microalgae at industrial level and apply them to develop new food products, in a project also encompassing environmental concerns. A different approach is followed in project CAVIAR that brings together three technology companies, two KIBS (active in engineering and in research) and one product-oriented (10893), to add value to an underused marine resource (sea urchin gonads), creating a completely new line of business in this sector, that can be subsequently explored by the firms.

Moving to the 'ports, transports and logistics' area, we selected two illustrative cases, both showing partnerships between established and technology-based firms, but involving different types of latter (Table 5). Project GISAMP joins a P-KIBS with a group of port administration and operator companies to conduct actions (training, consultancy, technical assistance) towards the improvement of the management and safety of port infrastructures. NAVSAFETY moves further and joins a T-KIBS with a port administration company to develop monitoring systems and instruments for navigation safety in port areas. In both cases KIBS firms are contributing to upgrade the quality of port activities, but in the second case the results can also lead to the development of innovative solutions with market potential.

Finally, we turn to the activities concerning the new uses of the ocean (Table 6). Project OIPS joins a T-KIBS and an energy utility in the development of activities in a new area – floating offshore wind – which can contribute to the diversification of the energy incumbent into a new renewable energy business. At a broader level, NESSIE joins a T-KIBS active in the new materials field, with two established companies – active in shipbuilding and in metalwork – in the development of complex platforms for inspection and monitoring of marine infrastructures in diverse areas (energy, security, sea observation), thus opening business opportunities based in more complex/value-added products with a broad range of applications.

Table 4: Cases in area 'fisheries, aquaculture, processing'

Projects	Type of partnership	Technology Firms		Established Firms	
		Firm (NACE)	Area	Firm (NACE)	Area
GAIN					
Key goals: ecological intensification aquaculture (feeds, cultivation process, farm management	T-KIBS + Established	SPAROS (72190)	Biotech	Sagremarisco (47230)	Fish retail trade
ALGAVALOR					
Key goals: application of biotech to microalgae production and their use to develop new food products; environment protection	Tech product-oriented + Established	Necton (10840) Allmicroalgae (10893)	Biotech (microalgae) Biotech (microalgae)	Cimentos Maceira e Pataias (23510) Vaisa - Agricultura Intensiva (1130) Valorgado - Agricultura e Pecuária (1500) Empresa Figueirense de Pesca (10204) Narciso Dias & Filhos (10204) Ernesto Morgado (10612) Castelbel - Artigos de Beleza (20420)	Concrete Agro Agro Fish processing Fish processing Food Cosmetics
CAVIAR					
Key goals: application of biotech to add value to marine resources (sea urchin)	T-KIBS + Tech product-oriented	Ínclita Seaweed Solutions (10893) SENSE TEST (71200) Riasearch (72190)	Biotech (seaweed) Food Biotech (aquaculture)		

Table 5: Cases in area 'ports, transports and logistics'

Project	Type of partnership	Technology Firms		Established Firms	
		Firm (NACE)	Area	Firm (NACE)	Area
GISAMP					
Key goals: port security & efficiency; risk management in supply chains	T-KIBS +Established	Qualiseg (70220)	ICT	APA (52220) APDL (52220) APS (52220) Gaslink (52102)	Port administration Port Infrastructures
NAVSAFETY					
Key goals: ICT and instrumentation for maintenance and safety of port infrastructures	P-KIBS + Established	Simbiente (71120)	Environmental engineering	APFF (52220)	Port administration

Table 6: Cases in area 'new uses and resources of the sea'

Project	Type of partnership	Technology Firms		Established Firms	
		Firm (NACE)	Area	Firm (NACE)	Area
OIPS					
Key goals: floating platform combining offshore wind energy & aquaculture	T-KIBS + Established	Innovakeme (62090)	Marine energy	Empresa de Electricidade da Madeira (35112)	Energy
NESSIE					
Key goals: platforms for inspection/monitoring of marine infrastructures (e.g. energy, security)	T-KIBS + Established	Composite Solutions (71120)	Materials	A. Silva Matos (25290)	Metalwork
				Antartic Module Yard (25290)	Shipbuilding

It should be noticed that all but one of these projects also involve universities and/or public research organizations that either bring S&T knowledge in the same fields as technology firms or combine it with complementary knowledge in other fields. A good example of the latter is the NESSIE project where the materials knowledge of the T-KIBS is complemented with the knowledge of the partner research centre in underwater robotics and instrumentation. Projects also frequently include government agencies or collective organizations that can have an additional role in facilitating the interaction between the different partners or in the subsequent transformation of project results into actual businesses.

Despite the variety of situations, in terms of partner combinations and final goal of the activities performed (and also possibly in terms of actual contribution and benefits of each partner, whose assessment would require additional research) there is a common point to all these projects: the new technologies are being deployed in order to add value to the receiving sectors, improving the conditions in which their activities are being performed and often opening new product innovation opportunities, thus creating pre-conditions for product or market diversification.

5. Conclusions

The paper addressed the conditions in which inter-industrial relationships between new and established industries can contribute to the economic revitalization of the latter. For this purpose it conducted an empirical analysis of the relationships established by Portuguese firms in the context of research and innovation projects in the field of the Blue Economy. This is an area with a strong and increasing weight in the Portuguese economy, but characterized by diverse sectoral dynamics: some sectors are growing; others are stagnating, while at the same time, new activities are emerging that often have a transversal nature. This makes it an interesting setting to investigate the diverse effects of inter-sectoral interactions.

The research found some evidence of economic revitalization related to the development and implementation of new transversal technologies in the context of inter-industry collaboration networks. In these networks, technology-based firms - and particularly knowledge intensive business firms - undertake a vital role in connecting different types of firms and in combining the competences and resources from established sectors with new technologies.

These results are relevant to policies that aim to promote industrial transformation, in particular the revitalization of mature industries experiencing stagnation or decline, which became especially critical in the post-pandemic situation. They point to the need of a greater directionality of innovation policies (Mazzucato, 2018) and suggest that a potentially fruitful direction for these policies concerns the establishment or strengthening of inter-sectoral relationships between established and new industries, which can support increases in efficiency and sustainability, as well as create conditions for value-added diversification.

References

Acha, V., & von Tunzelmann, G. N. (2004). Innovation in "low tech" industries. In J. Fagerberg, D. Mowery, & R. Nelson (Eds.), *Oxford handbook of innovation*. Oxford University Press.

Adner, R., & Zemsky, P. (2016). Diversification and performance: Linking relatedness, market structure, and the decision to diversify. *Strategy Science*, 1, 32–55.

Andersen, A. D, Steen, M., Mäkitie, T., Hanson, J., Thune, T.M., & Soppe, B. (2020) The role of inter-sectoral dynamics in sustainability transitions: A comment on the transitions research agenda, *Environmental Innovation and Societal Transitions*, 34: 348–351.

Arthur, W.B. (2007). The structure of invention. *Research Polic*y, 36, 274–287.

Boschma, R. (2005) Proximity and innovation: a critical assessment, *Regional studies*, 39(19): 61-74.

Cohen, W.M. Levinthal, D.A. (1990). Absorptive Capacity : A New Perspective on Learning and Innovation. *Administrative Science Quarterly*, 35(1): 128–152.

Conceição, O., Sousa, C., & Fontes, M. (2019). Research based spin-offs as agents of knowledge dissemination: evidence from the analysis of innovation networks. In Handbook of Research on Techno-Entrepreneurship, Third Edition. Edward Elgar Publishing.

Den Hertog, P. (2000) Knowledge-intensive business services as co-producers of innovation. *International Journal of Innovation Management*, 4, 491–528.

DGPM (2019). Economia do Mar em Portugal - 2018, Retrieved at: https://96594c97-1436-40ba-b257-d6d0d780b25f.filesusr.com/ugd/eb00d2_756fc7bbd85145cbb6477a77bd608f28.pdf

Dolata, U. (2009). Technological innovations and sectoral change. Transformative capacity, adaptability, patterns of change: An analytical framework, *Research Policy* 38: 1066–1076.

EC (2012). Blue Growth opportunities for marine and maritime sustainable growth. Communication from the Commission to the European Parliament, the Council, the European Economic and Social Committee and the Committee of the Regions (COM/2012/0494 final).

EUROSTAT (2018) Eurostat indicators on High-tech industry and Knowledge – intensive services. Annex 3 – High-tech aggregation by NACE Rev.2.

Fontes, M., Sousa, C. & Conceição, O. (2019) Creating a Blue Economy: Research and innovation partnerships to accelerate the development of ocean-related industries, SPBPU IDE'19: Proceedings of the International Scientific Conference on innovations in digital economy, ACM, New York.

Hansen, T., & Winther, L. (2014). Competitive low-tech manufacturing and challenges for regional policy in the European context–lessons from the Danish experience. *Cambridge Journal of Regions, Economy and Society*, 7(3): 449-470.

Helfat, C.E., & Eisenhardt, K.M. (2004). Inter-temporal economies of scope, organizational modularity, and the dynamics of diversification. *Strategic Management Journal*, 25(13), 1217-1232.

Howard, B. C. (2018). Blue growth: stakeholder perspectives. *Marine Policy*, *87*, 375-377.

INE & DGPM (2016). Satellite Account for the Sea–2010-2013 - Methodological Report, Retrieved at: https://96594c97-1436-40ba-b257-d6d0d780b25f.filesusr.com/ugd/eb00d2_8eeb4105550b40b59b3c643cf6db71f9.pdf

Lüthge, A. (2020) The concept of relatedness in diversification research: review and synthesis, *Review of Managerial Science* 14: 1–35.

Mäkitie, T., Andersen, A. D., Hanson, J., Normann, H. E., & Thune, T. M. (2018). Established sectors expediting clean technology industries? The Norwegian oil and gas sector's influence on offshore wind power. *Journal of Cleaner Production*, 177, 813-823.

Mazzucato, M. (2018). Mission-oriented innovation policies: challenges and opportunities. Industrial and Corporate Change, 27(5), 803–815.

Miles, I., Belousova, V., & Chichkanov, N. (2018) Knowledge intensive business services: ambiguities and continuities, *Foresight*, 20(1): 1-26.

Miles, I., Kastrinos, N., Flanagan, K., Bilderbeek, R., den Hertog, P., Huitink R., & Bouman, M. (1995), "Knowledge-Intensive Business Services: Users, Carriers and Sources of Innovation", A report to DG13 SPRINT-EIMS

Penrose, E. (1959). *The theory of the growth of the firm*. London: Basil Blackwell

Pina, K. & Tether, B. (2016) Towards understanding variety in knowledge intensive business services by distinguishing their knowledge bases, *Research Policy*, 45: 401-413

Rumelt, R.P. (1974). *Strategy, Structure, and Economic Performance*. Harvard Business School Press: Boston, MA.

Santamaría, L., Nieto, M.J., & Barge-Gil, A. (2009). Beyond formal R&D: Taking advantage of other sources of innovation in low-and medium-technology industries. *Research Policy*, 38(3), 507-517.

Schumpeter, J.A. (1934). *The Theory of Economic Development*. Harvard: Economic Studies, 46.

Shearmur, R., & Doloreux, D. (2019) KIBS as both innovators and knowledge intermediaries in the innovation process: Intermediation as a contingent role*, Papers Regional Science*, 98 (1): 191-209.

Sousa, C., Fontes, M. & Conceição, O. (2020). Towards a Blue Economy: the influence of policy strategies in the research and technology orientation of Portuguese firms. Proceedings of the 15th European Conference on Innovation and Entrepreneurship, Academic Conferences International Limited.

Teixeira, A. A., Santos, P., & Brochado, A.O. (2008). International R&D Cooperation between low-tech SMEs: the role of cultural and geographical proximity. *European Planning Studies*, 16(6), 785-810.

Voyer, M., Quirk, G., McIlgorm, A. & Azmi, K. (2018). Shades of blue: what do competing interpretations of the Blue Economy mean for oceans governance? *Journal of Environmental Policy & Planning*, 20(5), 595-616.

Zeng, S.X., Xie, X.M., & Tam, C. M. (2010). Relationship between cooperation networks and innovation performance of SMEs. *Technovation*, *30*(3), 181-194.

Strategic Innovation Management at Netflix: A Case Study

Ingrid Souza[1] and Fernando Romero[1,2]
[1]Department of Production and Systems, University of Minho, Guimarães, Portugal
[2]ALGORITMI Research Centre, University of Minho, Guimarães, Portugal
engingridsouza@gmail.com
fromero@dps.uminho.pt
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Abstract: Netflix is a company that implemented a disruptive innovation and shocked the business market with its way to create and deliver value to their customers, breaking away with the old way to watch a movie at home. The culture of freedom and responsibility engaged by a radical transparency is committed by the whole company where every kind of employee at all teams share ideas and know everything about the company's strategy. This research consists of a description and analysis of the strategic approaches used by Netflix that explain its business success and demonstrates the technology and the business development made by one the most important players in the streaming service. It is entirely based on secondary data obtained through an exploratory literature review over the last ten years. The model by which Netflix manages its innovation process is based on agile frameworks who actively engage the developer's team, team leaders, and top management and have the costumer at the center of the value stream. The internal culture of the firm, based on ample freedom and responsibility, and engaged by a radical transparency, is pursued by the whole company where every kind of employee, in all teams, share ideas and know everything about the company's strategy. The article explores and emphasizes the main aspects of the company's strategy to innovation which is based on the development of specific technological approaches based on purpose made algorithms that works to map the streaming user's preferences. It is coupled with the implementation and constant dissemination of the agile mindset linked with frameworks, methods, and techniques such as Scrum, Kanban, and Agile at Scale, which together enable Netflix to sustain and promote its innovative business process. Netflix approach to innovation has become a model for many other companies over the globe to create an environment focused on customer centricity, elect quality as a statement, and align employees with strategy.

Keywords: Netflix, disruptive innovation, agile approaches, technology, business

1. Introduction

Swann (2009) argues that innovation is one of the most important economic and business phenomena of current time and a topic of great practical and policy interest, with widespread implications for the economy and society. Learning is a vital process that underlies organizational innovation and outcomes (Carmeli and Dothan, 2017; Negas et al., 2020, Swann, 2009). Nevertheless, regarding innovation, the service sector was not as deeply investigated as the manufacturing sector over the years but, considering the evolution of film industry and the emergence of the streaming services, the subject has gained space (Chapain & Stachowiak, 2017). Service can be defined as the combination between outcome and experiences provided and received by a costumer (Carvalho, 2008). To attend customers' needs the company may involve them in the production process elevating the level of customization in services (Negas et al., 2020). In some cases, the company may develop a new technology to improve an existing service in a first phase. Then, in a second phase of the process the improvement may be focused on quality and distribution of the service and finally the technology may work as a base for a new service (Barras, 1986; Negas et al., 2020).

These kinds of innovation that create a new service may be considered as disruptive. Christensen et al. (2015) contend that disruptive innovation happens when a new product or service turns obsolete their direct market competitors. What the disruption promotes is unexpected but, however, express the market or system's needs, it is not outside the system. An example is the Vinyl Discs that has become obsolete after the CD introduction, which satisfied the same need, a vehicle to reproduce music (Christensen et al., 2015; Negas et al., 2020). Another example is Netflix that started as a traditional film rental business, but its business model broke the competitors and nowadays is the biggest example for the new players in movies streaming.

The innovation business model created by Netflix created millions of satisfied and faithful customers (Blair et al., 2019) and makes it an inspiration for other companies. The Netflix concept started as an on-line movie subscription rental service, which allowed people to rent movies for a fixed monthly fee, maintaining a prioritized list of movies they wished to view (their "queue"). Movies were mailed to them or delivered electronically over the Internet. In the case of DVDs, when costumers finished watching the movie, they could return it by post and the next DVD was automatically mailed, postage free (Bennett et al., 2007).

In their famous article about the disruptive company, The Brightline Initiative (2018) contend that Netflix uses flexible and adaptable methods to aid its strategy execution and the company expects employees to "keep nimble by minimizing complexity and finding time to simplify". They also value cross-organization information sharing, which enables all employees to be directly involved in strategic decision-making (Blair et al., 2019; Brightline Initiative, 2018). The approaches and frameworks which promotes these kinds of employees' interaction and behavior aligning strategy are called Agile. The goal of this study is, through a literature review, identify which are the characteristics of the Netflix innovative business model highlighted by the authors and also to identify the agile frameworks and approaches behind the processes and operations which permit the firm's constant adaptation and innovation.

2. Methodology

This work was carried through a scoping review about disruptive innovation that created a technology business model using the concept of agility. Scoping reviews are a form of knowledge synthesis, which incorporate a range of study designs to comprehensively summarize and synthesize evidence with the aim of informing practice, programs, and policy and providing direction to future research priorities. According to Colquhoun et al. (2014), this methodology is "a form of knowledge synthesis that addresses an exploratory research question aimed at mapping key concepts, types of evidence, and gaps in research related to a defined area or field by systematically searching, selecting, and synthesizing existing knowledge". The methodology comprehensively summarizes and synthesizes information regarding some research topic, with the aim of informing further practice and research (Colquhoun et al., 2014).

It is a very popular methodology for systematizing scientific knowledge, with a steep growing expression among the scientific community during the last 7 to 8 years. This scoping review followed a 2-step approach and tried to answer the research questions: "What can we learn from the Netflix innovation model?", "How the Netflix business model is helping to design new ventures?"

A comprehensive search was made in the following databases: Google Scholar, ISI Web of Science, Scopus and ScienceDirect. The set of keywords used to make the research were [("disruptive innovation" OR "netflix" OR "agile approaches") AND ("innovation" OR "netflix" OR "technology business")] and were searched among the Title, Abstract and Keywords for the time span from 2011 to 2021.

3. Netflix history contextualization

The firm was founded in 1997 as an online DVD mail-order rental service, and nowadays Netflix is a global network of entertainment delivering movies and TV series, offering streamed content on a subscription basis on any screen of the internet-connected space (Finn, 2017). The revenue capture approach of the value proposition is based on a flat fee, and on-demand, unlimited and advertising free consumption and no-hassle online cancellation, where the members may leave and join again when they want (Fagerjord & Kueng, 2019).

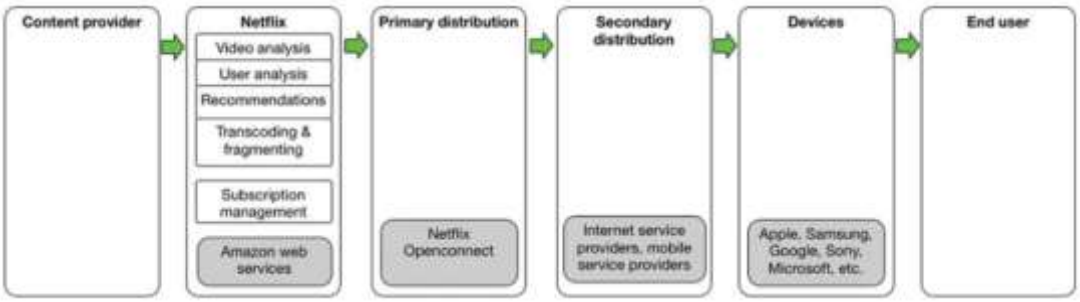

Figure 1: Core stages and actors of Netflix's streaming video service annotated with key external partners (Fagerjord & Kueng, 2019)

The streaming is not, however, a classic double-sided platform, in that it is not a marketplace that connects buyers and sellers like YouTube, for example, that matches content from millions of producers to audiences and advertisers. Netflix's network characteristics derive from its large-scale analysis of users' interactions, which it uses both to algorithmically tailor-make recommendations for each individual user and to decide which new series and films to commission (Fagerjord & Kueng, 2019). Gomez-Uribe and Hunt (2016) explain that the business strategy lies at the intersection of the Internet and storytelling. The main product and source of revenue

is the subscription service that allows members to stream any video in the streaming collection of movies and TV shows at any time on a wide range of Internet-connected devices. Figure 1 shows the flow created to engage the user.

Some authors describe Netflix as a platform business and a network business. As a platform, its central purpose is to match customers and facilitate the exchange of goods and services, thereby creating value for all participants (Evans & Schmalensee, 2016; Florance, 2016; Parker et al., 2016). Platform businesses grow and thrive, not by acquiring other businesses or fixed assets, but by connecting more and more clients within their networks (Fagerjord & Kueng, 2019).

Gomez-Uribe and Hunt (2016) contend that the internet television space is young, and competition is ripe, thus innovation is crucial. A key pillar of Netflix product is the recommendation system that helps members find videos to watch in every session. The recommendation system is not one algorithm but rather a collection of different algorithms serving different use cases that come together. That is what it creates what is called the complete Netflix experience and makes the innovation happen at the business (Gomez-Uribe & Hunt, 2016).

Another key characteristic of Netflix that is not a secret, on the contrary, they are proud to share, it is their culture of trust. At the article from Brightline Initiative (2018) about the disruptive company, it is possible to see that strategic agility is probably one of the key topics discussed in agile enterprises today, and it is the base of Netflix success. According to a recent global survey conducted by The Economist Intelligence Unit (2020), insufficient agility is the third most common barrier to successful strategy implementation. Now more than ever, the agile concept seems to be essential to any organization's success (Brightline Initiative, 2018).

An agile mindset promotes pillars as transparency, inspection and adaptation and values as courage, focus, openness, commitment, and respect (Schwaber & Sutherland, 2020). Promoting cross-functional and self-organizing teams, the role of leadership is to be servant leaders, leading by example (Modranský, Jakabová, Michal Hanák, et al., 2020). The innovation consists in treating employees as human beings, not as resources, always involving them in decisions and broking departmentalization and hierarchical structures (Manifesto for Agile Software Development, 2001; Modranský, Jakabová, Michal Hanák, et al., 2020).

4. Results and discussion

Netflix runs in very different ways than conventional media companies and has a very different culture. It is one of the many companies that rely on advanced computer technology to deliver its services (Fagerjord & Kueng, 2019). McCord (2018) explains that their engineers are treated like celebrities. Netflix's technology is indeed highly complex, it is possible to create an abstract model of it that can assist the understanding of the company's workings, and draw conclusions on its potential impact on the wider media industry (Bennett et al., 2007; Fagerjord & Kueng, 2019). The streaming company invested far more than their competitors in developing its recommendation system as an asset. Netflix created a highly powerful data mining system that, rather than relying only on a costumer's past consumption to create recommendations, also provides cross-reference usage patterns across all users to offer unique recommendations (Gomez-Uribe & Hunt, 2016; Rayna & Striukova, 2016). The business model modified nearly all of the elements of value creation and value proposition, as well as single elements of value delivery (distribution channels) and value capture (the revenue model) in creating its DVD-by-mail and later its streaming video services (Rayna & Striukova, 2016).

Figure 2 presents the innovative value cycle developed by the Netflix that is focused to expand its value networks, through customer ratings and crowdsourcing, using collective wisdom and learning to solve problems or develop a solution, on the Netflix way (Blair et al., 2019; Rayna & Striukova, 2016). Netflix completely redefined the value proposition for the industry, offering unlimited access rather than disk-by-disk rentals. Their strategy is supported by its extensive business model innovations. Weighting of particular components is likely to vary from industry to industry and from firm to firm. For some markets and firms, value creation innovations will be more important. In the Netflix context, value capture or value proposition innovations is leading to a much more significant competitive advantage (Rayna & Striukova, 2016).

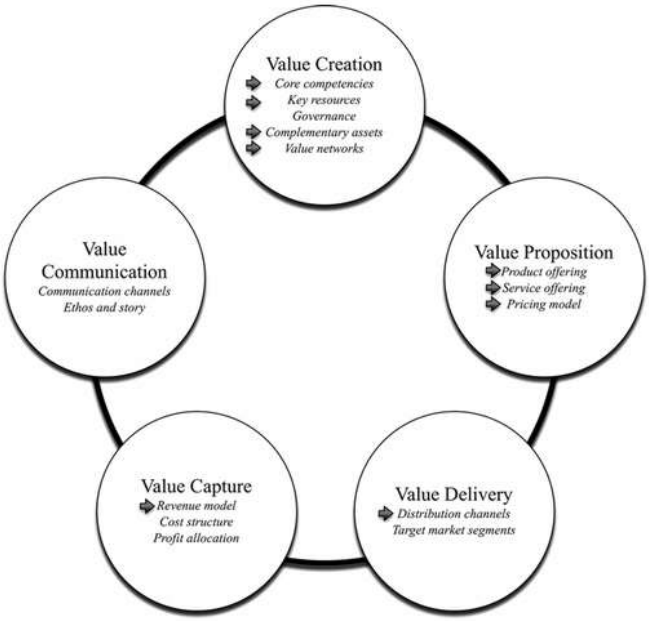

Figure 2: Components affected by Netflix's business model innovation (Rayna & Striukova, 2016)

Many authors highlight that Netflix's focus on its recommendation system has enabled the company to develop essential core competencies, such as a very fine understanding of consumption patterns and a greater understanding of success factors for film and television (Bennett et al., 2007; Fagerjord & Kueng, 2019; Gomez-Uribe & Hunt, 2016; Rayna & Striukova, 2016). The company has put that asset to good use in driving further business model innovations, most notably its foray into original content. Netflix has also developed key resources, such as the recommendation algorithm itself and its vast database of user consumption patterns and user tagging, commenting, and review behaviors (Rayna & Striukova, 2016), which are core assets of its business model.

The high emphasis on personalization enables Netflix algorithms to retain and find any audiences, even for relatively niche videos that would not make sense for broadcast TV models because their audiences would be too small to support significant advertising revenue, or to occupy a broadcast or cable channel time slot. Without personalization, all the streaming members would get the same videos recommended to them (Fagerjord & Kueng, 2019; Gomez-Uribe & Hunt, 2016). Although Gomez-Uribe and Hunt (2016) highlight as well that, to really speed up innovation, Netflix also relies on a different type of experimentation and adaptation based on analyzing historical data. This offline experiment changes from algorithm to algorithm, but it always consists of computing a metric for every tested method or formula variant that describes how well the algorithm version fits previous customer engagement, and they call that the *innovation flow* that is illustrated by Figure 3.

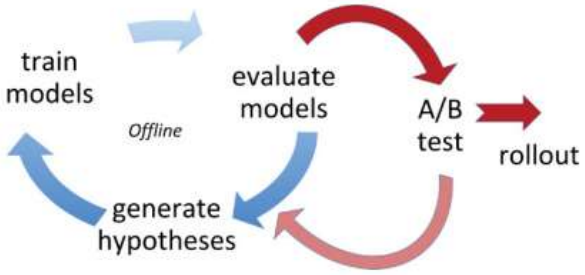

Figure 3: Netflix innovation flow (Gomez-Uribe & Hunt, 2016)

All these innovation process based on algorithm technology is considered by the Brightline Initiative (2018) part of the strategic agility concept for businesses. In order to achieve that, leaders accept responsibility for delivering their company's strategy as guiding principles. Because leaders take on such an accountability then they can cultivate an environment where employees feel they have the freedom to make the quick decisions that lead to strategic agility, such as, for example, adapt the algorithms based on customers' responses (Brightline Initiative,

2018; Gomez-Uribe & Hunt, 2016). The sense of delivering awesome experiences starts at the team, by thinking and developing, and then what the customer enjoys is a reflection about the way Netflix works (McCord, 2018).

McCord (2018) contend that, as Netflix well shows, strategic agility does not exist in isolation. It must be meditated as a combination of a trust culture, aligned with the right delivery capabilities, radical transparency and a win-win structure. All of this must coexist in order to help teams work faster and more effectively in the most varied conditions and environments (Brightline Initiative, 2018). In response to this need for increased innovation and adaptability, agile was introduced in the IT industry as a lightweight software project management development and has continuously grown in popularity in companies, such as Amazon, Bosch, Tesla and Spotify (Carmeli & Dothan, 2017; Grass et al., 2020; Lynn, 2021).

Grass et al. (2020) argue that agile teams engage in the process of continuously adapting their innovative endeavors to changes in their environments. This behavior makes their product development efforts less rigid, reduces their cycle times, and equips them with the ability to respond quickly to changing customer requirements (Grass et al., 2020; Modranský, Jakabová, Hanák, et al., 2020; Schwaber & Sutherland, 2020). Firms are being aware that software processes and value innovation requires a different way of running the organization so it can be successful (Denning, 2018). The whole firm has to become nimble, adaptable, and able to adjust on the wing to meet the shifting impulse of a marketplace driven by dynamic changes in customer value.

When it comes to achieving such high adaptability in the product development process through agile methods, Scrum is one of the most well-known and applied frameworks under the umbrella of agile methods (Grass et al., 2020; Hidalgo, 2019; Schwaber & Sutherland, 2020). The Scrum team is self-organizing, cross-functional, and consists of roles such as developers, product owner, and a scrum master. The developers are empowered and deliver increments of a continuously developing product in regular, short intervals, called Sprints (Castillo-Barrera et al., 2018; Grass et al., 2020; Schwaber & Sutherland, 2020). Due to continuous interactions between team members and with leaders and customers provided by Scrum, the importance of the people side is even more pronounced in agile teams. Understanding these human elements is central in realizing the often praised adaptability benefits of agile teams (Grass et al., 2020).

In recent years, the Lean-Kanban approach has become more popular in software development. Kanban is one of the Lean Management tools that help in managing production operations. In agile, Kanban contributes to minimize the Work-In-Process (WIP, which is the number of items that are worked on by the team at any given time) and to maximize the value produced by an organization (Ahmad et al., 2013; Anderson et al., 2012). Since Kanban is a visual method of work, it helps to ensure the transparency that is so crucial to agility runs (Anderson et al., 2012; Grass et al., 2020). This way, the focus is no longer on the power and knowledge of individual executives, but on the democratized decisions of all employees, and anchored in the individual subsystems of the organization. Regarding the strategy to create all the value delivered by the innovation, the necessity of engaged leadership is extreme, and that is one of the things helping to create the disruptive Netflix innovation (Bennett et al., 2007; Blair et al., 2019). Gopalakrishnan (2021) contend that an agile leader is seen to employ a pull approach which is inspirational in nature by supporting learning and tolerance to failure, and to act in an organizational envirnment structured as a network of small teams, with customer centricity and governance process organized as a network, avoiding hierarchies.

At Netflix, the innovation process comes from the teams, is developed by their engineers, the HR department knows how the process works, in order to hire people aligned with that (Blair et al., 2019; Florance, 2016; McCord, 2018). The top management disseminate the culture aligned with market, having the customer as the business center, and quality is an ever present statement permeating the organization and the people (Blair et al., 2019; Gomez-Uribe & Hunt, 2016; McCord, 2018; Parker et al., 2016).

Rigby et al. (2018) explain that expanding the number of agile teams, which means cross-functionality and self-organization, is an important step toward increasing the agility of a business. But equally important is how those teams interact with the rest of the organization. Even the most advanced agile enterprises (Amazon, Spotify, Google, Netflix, Bosch, SAP, Tesla) operate with a mix of agile teams and traditional structures. To ensure that bureaucratic functions don't hamper the work of agile teams or fail to adopt and commercialize the innovations developed by those teams, such companies constantly push for greater change and adaptation (Blair et al., 2019; Rigby et al., 2018; Scrum Alliance, 2018).

Table 1: The most famous agile frameworks and how they are applied in Netflix agility innovation process

Agile Approaches	Description	Netflix Adaptation	Author/Year
Scrum	Agile frameworks, like Scrum, have been pre-designed as rule-free, adaptable structures for increasing organizational agility. Scrum takes projects and breaks them down into smaller increments. The framework delivers the tasks in cycles known as sprints, which have a recommended duration of 2 week.	Netflix was saturated in an industry of early Scrum adapters, who saw the value of a framework operations model for setting clear priorities and goals, approaching work iteratively to better hit deadlines and responding quickly to exceedingly rapid demand.	(Grass et al., 2020; Scrum Alliance, 2018)
Kanban	The Kanban method in technology projects development drives developers to visualize the workflow, limit work in progress (WIP) at each workflow stage, and measure cycle time. The Kanban board provides visibility to the process because it shows assigned work of each developer, clearly communicates priorities and highlights bottlenecks.	Netflix works with detailed Agile goals involving each viewer, by creating personalized content, those assignments, once approved, will later go to the Kanban until they are achieved, verified, and eliminated, which paves the way for new tasks coming in. An agile project is considered done only when there are not any increments left to deliver.	(Anderson et al., 2012; Grass et al., 2020)
DevOps	DevOps can be succinctly defined as a mindset of molding your process and organizational structures to promote business value, software quality attributes most important to your organization and continuous improvement.	Netflix software-engineering process shows a fundamental understanding of DevOps thinking and a focus on quality attributes through automation-assisted process. Recall, DevOps practitioners espouse a driven focus on quality attributes to meet business needs, leveraging automated processes to achieve consistency and efficiency.	(Cois, 2015)
Agile at Scale	Innovation in ways of working is happening at the organizational, cross-team, cross-product level. Agile at scale is about repeating agile successes embodied in a team across an organization. Applying agile thinking to cross-product projects. Applying agile and lean thinking to development organizations. Applying agile and lean thinking to high assurance environments like medical, security, financial, safety critical, audited, regulated businesses.	Agile exists in pockets at Netflix, but as a whole, enforcing the methodology at scale is both unwieldy and counterintuitive to the structure of the individual teams. Just as agile teams compile a backlog of work to be accomplished in the future, companies that successfully scale up agile usually begin by creating a full taxonomy of opportunities. Following agile's modular approach, they may break the taxonomy into three components customer experience teams, business process teams, and technology systems teams and then integrate them.	(Macdonagh's, 2012; Rigby et al., 2018)

Rigby et al. (2018), also contend that agile teams work differently from chain-of-command bureaucracies (Rigby et al., 2018). They are largely self-governing. Senior leaders tell team members where to innovate but not how. And the teams work closely with customers, both externally and internally. Ideally, this puts responsibility for innovation in the hands of those who are closest to customers (Brightline Initiative, 2018; Denning, 2018; Rigby et al., 2018). Burchardt and Maisch (2019) argue that continuous customer involvement can be ensured easier through new digital and open platforms for exchange and online testing and, last but not least, the agile mindset. Further digital services or web-based software tools for collaboration are fostering an open culture in product development and provide potential for increased speed and quality (Alahyari et al., 2019; Burchardt & Maisch, 2019). The tools range from aligning appointments, real-time conversations, written group conversations exchanging documents and advanced online collaboration tools for collaborative production, sharing,

documenting, and communicating. Many of these tools are in their basic version available for free (Burchardt & Maisch, 2019).

Due to the space limitation it is not possible to describe and analyse in detail every aspect of agile tools and approaches applied to the management of innovation at Netflix. Table 1 summarizes the most important of them and how they are used at Netflix.

5. Conclusions

The agile environment revolves around people and outcomes. This literature review was focused to demonstrate how one of the major and pioneer services of streaming develop their innovation process. Netflix becomes disruptive and changed the way of the entertainment films industry perform their business. The way of the technology is straight designed and the level of engagement who starts in the own company, pass through the stakeholders, and reaches the final customer is unique. The engagement promoted at the teams following the Agile good practices is pointed out by the literature as cross-functionality and self-management of the team who create the Netflix technology and makes the company exactly who she is. A culture of openness, trust, commitment, and constant innovation captivates every reader and researcher looking for to understand Netflix history of success. The innovation it does not just reside on products and services created, but at the daily work of the technology teams, leaders, and top management. The Netflix contribution to scientific community is enormous, demonstrating what is creating in practice in business context. The application of methods studied at universities as algorithms and information systems development, and the leadership and innovation model taught in business schools are unique, are instances discussed in all the academic world, read in scientific papers.

The Netflix legacy and their disruptive innovation, based in top technology business, is inspirational and helps to understand what can be expected by the companies in the years to come. The enterprise is helping to design the future of entertainment and films industry, and the business model as well, which came to stay. Netflix is example of good environment to have a job position because they provide purpose to their employees engaging them in decisions and companies' values. It is also a great lab to run experiments and develop studies to understand their business and continuous innovation process.

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References

Alahyari, H., Gorschek, T., & Berntsson Svensson, R. (2019). An exploratory study of waste in software development organizations using agile or lean approaches: A multiple case study at 14 organizations. Information and Software Technology, 105, 78–94. https://doi.org/10.1016/j.infsof.2018.08.006

Anderson, D. J., Concas, G., Lunesu, M. I., Marchesi, M., & Zhang, H. (2012). A Comparative Study of Scrum and Kanban Approaches on a Real Case Study Using Simulation. In C. Wohlin (Ed.), Agile Processes in Software Engineering and Extreme Programming (pp. 123–137). Springer. https://doi.org/10.1007/978-3-642-30350-0_9

Barras, R. (1986). Towards a theory of innovation in services. Research Policy, 15(4), 161–173. https://doi.org/10.1016/0048-7333(86)90012-0

Bennett, J., Lanning, S., & Netflix, N. (2007). The Netflix Prize. In KDD Cup and Workshop in Conjunction with KDD.

Blair, T., Burrer, T., Garcia, J., Hernandez, A., Li-Southwick, Q. Y., Logar, K., Orcutt, M., & Porter, L. (2019). Netflix Company Analysis. http://tessacreates.com/wp-content/uploads/pdfs/Netflix-CompanyAnalysis.pdf

Brightline Initiative. (2018). Netflix's success demonstrates the importance of strategic agility. World Finance - The Voice of the Market. https://www.worldfinance.com/strategy/netflixs-success-demonstrates-the-importance-of-strategic-agility

Burchardt, C., & Maisch, B. (2019). Digitalization needs a cultural change – examples of applying Agility and Open Innovation to drive the digital transformation. Procedia CIRP, 84, 112–117. https://doi.org/10.1016/j.procir.2019.05.009

Cambridge dictionary. (2021). https://dictionary.cambridge.org/pt/dicionario/ingles/innovation

Carmeli, A., & Dothan, A. (2017). Generative work relationships as a source of direct and indirect learning from experiences of failure: Implications for innovation agility and product innovation. Technological Forecasting and Social Change, 119, 27–38. https://doi.org/10.1016/j.techfore.2017.03.007

Carvalho, L. M. C. (2008). Empreendedorismo e inovação: Um modelo para o sector serviços [DoctoralThesis]. Universidade de Évora. https://dspace.uevora.pt/rdpc/handle/10174/11126

Castillo-Barrera, F. E., Amador-Garcia, M., Perez-Gonzalez, H. G., Martinez-Perez, F. E., & Torres-Reyes, F. J. (2018). Adapting Bloom's Taxonomy for an Agile Classification of the Complexity of the User Stories in SCRUM. 2018 6th

International Conference in Software Engineering Research and Innovation (CONISOFT), 139–145. https://doi.org/10.1109/CONISOFT.2018.8645899

Chapain, C., & Stachowiak, K. (2017). Innovation Dynamic in the Film Industry: The Case of the Soho Cluster in London. In C. Chapain & T. Stryjakiewicz (Eds.), Creative Industries in Europe: Drivers of New Sectoral and Spatial Dynamics (pp. 65–94). Springer International Publishing. https://doi.org/10.1007/978-3-319-56497-5_4

Christensen, C. M., Raynor, M., & McDonald, R. (2015). What Is Disruptive Innovation? 11. Harvard Business Review.

Christensen, J. F. (2002). Corporate strategy and the management of innovation and technology. Industrial and Corporate Change, 11(2), 263–288. https://doi.org/10.1093/icc/11.2.263

Cois, C. A. (2015). DevOps Case Study: Netflix and the Chaos Monkey. Carnegie Mellon University - Software Engineering Institute. https://insights.sei.cmu.edu/devops/2015/04/devops-case-study-netflix-and-the-chaos-monkey.html

Colquhoun, H. L., Levac, D., O'Brien, K. K., Straus, S., Tricco, A. C., Perrier, L., Kastner, M., & Moher, D. (2014). Scoping reviews: Time for clarity in definition, methods, and reporting. Journal of Clinical Epidemiology, 67(12), 1291–1294. https://doi.org/10.1016/j.jclinepi.2014.03.013

Denning, S. (2018). Succeeding in an increasingly Agile world. Strategy & Leadership, 46(3), 3–9. https://doi.org/10.1108/SL-03-2018-0021

Evans, D. S., & Schmalensee, R. (2016). Matchmakers: The New Economics of Multisided Platforms. Harvard Business Review Press.

Fagerjord, A., & Kueng, L. (2019). Mapping the core actors and flows in streaming video services: What Netflix can tell us about these new media networks. Journal of Media Business Studies, 16(3), 166–181. https://doi.org/10.1080/16522354.2019.1684717

Florance, K. (2016). About Netflix—How Netflix Works With ISPs Around the Globe to Deliver a Great Viewing Experience. About Netflix. https://about.netflix.com/, https://about.netflix.com/en/news/how-netflix-works-with-isps-around-the-globe-to-deliver-a-great-viewing-experience

Gomez-Uribe, C. A., & Hunt, N. (2016). The Netflix Recommender System: Algorithms, Business Value, and Innovation. ACM Transactions on Management Information Systems, 6(4), 1–19. https://doi.org/10.1145/2843948

Gopalakrishnan, A. (2021). Reinventing Technology and Innovation Management using a Three Dimensional approach. https://doi.org/10.36227/techrxiv.13524026.v1

Grass, A., Backmann, J., & Hoegl, M. (2020). From Empowerment Dynamics to Team Adaptability: Exploring and Conceptualizing the Continuous Agile Team Innovation Process. Journal of Product Innovation Management, 37(4), 324–351. https://doi.org/10.1111/jpim.12525

Hidalgo, E. S. (2019). Adapting the scrum framework for agile project management in science: Case study of a distributed research initiative. Heliyon, 5(3), e01447. https://doi.org/10.1016/j.heliyon.2019.e01447

Lynn, R. (2021). The History of Agile. Planview Lean Kift. https://www.planview.com/resources/guide/agile-methodologies-a-beginners-guide/history-of-agile/

Macdonagh's, M. (2012, May 2). What does "Agile at Scale" mean? Mike MacDonagh's Blog. https://mikemacd.wordpress.com/2012/05/02/what-does-agile-at-scale-mean/

Manifesto for Agile Software Development. (2001). https://agilemanifesto.org/

McCord, P. (2018). Powerful: Building a Culture of Freedom and Responsibility. Silicon Guild. https://www.amazon.com/Powerful-Building-Culture-Freedom-Responsibility/dp/1939714095

Modranský, R., Jakabová, S., Hanák, M., & Oláh, A. (2020). Lean and Agile Project Management and the Challenges for its Implementation in SMEs in Czech Republic. Technium Social Sciences Journal, 9, 413–440. https://doi.org/10.47577/tssj.v9i1.1145

Modranský, R., Jakabová, S., Michal Hanák, & Albert Oláh. (2020). Lean and Agile Project Management and the Challenges for its Implementation in SMEs in Czech Republic. Technium Social Sciences Journal, 9, 413–440. https://doi.org/10.47577/tssj.v9i1.1145

Negas, M. C., Sousa, I. D. de, & Carvalho, L. C. (2020). Inovação e Tecnologia—Uma visão multidisciplinar (02 ed.). https://www.wook.pt/livro/inovacao-e-tecnologia-mario-carrilho-negas/23869431

Oslo Manual 2018: Guidelines for Collecting, Reporting and Using Data on Innovation, 4th Edition | en | OECD. (2018). https://www.oecd.org/science/oslo-manual-2018-9789264304604-en.htm

Parker, G. G., Alstyne, M. W. V., & Choudary, S. P. (2016). Platform Revolution: How Networked Markets Are Transforming the Economy and How to Make Them Work for You. W. W. Norton & Company.

Rayna, T., & Striukova, L. (2016). 360° Business Model Innovation: Toward an Integrated View of Business Model Innovation. Research-Technology Management. https://www.tandfonline.com/doi/full/10.1080/08956308.2016.1161401

Rigby, D. K., Sutherland, J., & Noble, A. (2018, May 1). Change Management: Agile at Scale. Harvard Business Review. https://hbr.org/2018/05/agile-at-scale

Schwaber, K., & Sutherland, J. (2020). Scrum Guide. Scrum.Org. https://www.scrumguides.org/scrum-guide.html

Scrum Alliance. (2018, June 15). The Netflix Brand of Agile. Medium. https://medium.com/scrum-alliance/the-netflix-brand-of-agile-6ea9a0e7f2b8

Swann, G. M. P. (2009). The Economics of Innovation: An Introduction. The Economics of Innovation: An Introduction. https://www.researchgate.net/publication/286329426_The_Economics_of_Innovation_An_Introduction

The Economist Intelligence Unit. (n.d.). Economist Intelligence Unit. Retrieved March 1, 2021, from https://www.eiu.com/n/

Transfer of Knowledge and Innovation in Micro and Small Construction Companies in Parana, Brazil

Kássia Esteves Souza[1], Jefferson Staduto[1] and Knut Ingar Westeren[2]
[1]State University of Western Paraná (UNIOESTE), Campus Toledo, Parana, Brazil
[2]Nord University, Faculty of Social Sciences, Levanger, Norway
kassiaestevesdesouza@yahoo.com.br
jefferson.staduto@unioeste.br
knut.i.westeren@nord.no
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Abstract: The aim of this study is to analyze the process and importance of knowledge transfer for the generation of innovation in micro and small construction companies in the cities of Toledo, Cascavel, Medianeira and Foz do Iguaçu in Parana, Brazil during the period from 2017 to 2019. To achieve this goal, we contacted 16 construction companies through a business program, ALI (Local Innovation Agents Program), which was performed in the region in partnership with the Brazilian Support Service for Micro and Small Enterprises (SEBRAE). To measure the innovation, we used a tool called the Innovation Radar which separates the innovation process into 13 dimensions. We also used a paired Wilcoxon Test to analyze the effect knowledge transfers had on innovative developments during the period of 2017-2019 for the construction companies. The results show that transfer of knowledge had a positive effect on innovation for all of the 16 construction companies in the 3-year period for at least some of the innovative dimensions. It was also demonstrated that the ALI program of SEBRAE contributed to the fulfilment of the objectives of strengthening the innovation process of the construction companies.

Keywords: construction companies, innovation, micro and small enterprises, knowledge transfers

1. Introduction

The construction industry is important for economic development in Brazil as it represents a relatively large part of the gross domestic product (GDP). In the last 10 years the sector represented an average of 5.6% of GDP. The economic crisis in Brazil starting 2014 negatively affected GDP, also hitting the construction sector, reducing its share to 3.5% of GDP. In 2018, the share was up again to 4.5% and recent years growing faster than GDP. Since 2018, the sector has had about 4% of the total employment CBIC (2018). The construction sector is what we can call “an acceleration sector”, both upwards and downwards as a response to changes in economic activity. With rising growth due to multiplier effects, it gives an above average stimulus to local and national production and income generation and vice versa in recessions Teixeira (2010). Innovations are directly linked to economic development since it provides an increase in economic advantages and the process of introduction of new ideas creates competitive advantages, Junior (2017). In the area of construction, innovation opens possibilities to acquire benefits, such as increased reliability, productivity, quality, and cost reduction, and is necessary for the company's survival in competitive markets, see Bougrain (2010) and Gambatese and Hallowell (2011). The construction sector has a potential to promote innovations. However, it suffers from low productivity, high incidence of outdated technical equipment, waste of materials, and partly disqualified workers, besides generating problematic working conditions, Munoz and Quintella (2002).

The question that guides this study is the following: What is the importance of knowledge transfer in the generation of innovations in micro and small construction companies in the cities of Toledo, Cascavel, Medianeira and Foz do Iguaçu in Parana, Brazil? We will try to find answers to this by analyzing the process, degree, and importance of knowledge transfers initiated by the ALI Program of SEBRAE for generation of innovation in construction companies classified as micro and small enterprises (MSE’s) in the cities of Toledo, Cascavel, Medianeira and Foz do Iguaçu. In addition to we want to examine the knowledge transfer process and understand the characteristics of the knowledge transfers to these construction companies and identify the degree of innovation after the transfer of knowledge have taken place.

2. Innovation

Schumpeter (1934) highlights innovation as the basis of economic development because it is one of the elements that promotes competitive advantage. Schumpeter also highlights creative destruction because it forces companies to replace old ideas with new ones.

For Schumpeter (1934), innovations can be divided into five groups, namely:

- 1. Introduction of a new good
- 2. Introduction of a new production method
- 3. Opening of a new market
- 4. Introduction of a new source of supply of raw materials or semi-manufacturing goods
- 5. Change in organization of an industry

Innovations have also been analyzed by looking at how models have evolved through different time periods. Innovation is a process often looked at in three stages, the creative phase, the actual innovation, and innovation management This began in the 1950s–60s with the linear model which looked at three stages above as a linear process. Then came the interactive models, from 1970 to 1990, that posited that innovations had different types of loops and feed-back effects and the interactive models also introduced networking as a part of innovation analysis.

Starting in the 1990s, we have seen several developments in different directions:

- The division between radical and incremental innovations (Norman and Verganti, 2014)
- Disruptive innovations (Christensen, 2013)
- Innovation systems (Lundvall, 2010)
- The open innovation concept (Chesbrough, Vanhaverbeke and West, 2006; 2014)
- Eco-innovations (OECD, 2009)

Another aspect of the innovation concept that has increased in importance is about the link between knowledge and innovations. This question has been investigated since the concepts of the knowledge economy started to emerge in the late 1990s. More or less all studies end up concluding that there is a link between knowledge and innovations—the crucial question lies in what characterizes this link, see Bathelt et al (2017) and Fagerberg et al (2005).

The Oslo Manual, OECD (2018), is commonly used to define innovations. This book builds on Schumpeter and looks at innovations as:

> *"An innovation is a new or improved product or process (or combination thereof) that differs significantly from the unit's previous products or processes and that has been made available to potential users (product) or brought into use by the unit (process)" (OECD, 2018, p. 20).*

3. The knowledge economy and knowledge transfers

There have been many attempts to define the knowledge economy starting with the definition by OECD in 1996 as "Economies which are directly based on production, distribution and use of knowledge and information", OECD (1996). For Capello (2015), there is no specific model that conceptualizes the knowledge economy, so the author outlines the definition using three distinct approaches. The first is the sectoral approach based on science with a focus on high technology. The second refers to the functional approach, using factors such as human capital, patents, R&D and information and communication technology. The third has a relational approach.

Knowledge in the company starts with focus on how human resources can be utilized for productive improvements. The Meritum (2002) project defines the knowledge capital of the company into three categories:

- *Structural capital*: The knowledge that is linked to the production structure of the company, like databases, procedures, systems, organizational routines, etc.
- *Human capital:* The knowledge that employees bring to the company, like innovation capacity, teamwork skills, creativity, experiences, etc.
- *Relational capital:* All knowledge resources that are linked to the external relations of the company.

The key for company development is then to combine the knowledge capital optimally with business capacity and market situation. Advantageous knowledge developments for the company will improve the value of the knowledge capital while the opposite is normally true for physical capital assets, Westeren et al (2018). For Nonaka and Takeuchi (1995) knowledge transfer takes place through social structures, promoting learning in the

organization (here, the company) and the empowerment of the employees in both informal or formal ways. For Beers (2003), the exchange of knowledge and experiences of companies plays an important role in the organizational learning process both through physical human contact as well as virtually through corporate portals, forums, social networks, etc.

4. Innovations in the construction sector and the Innovation Radar

4.1 The innovation radar

The Brazilian organization for service and support to micro and small enterprises (SEBRAE), works with the development of innovation strategies in MSE's, SEBRAE (2014). SEBRAE (2013a) has developed 10 guidelines to stimulate innovation within MSE's, with the most important guidelines focusing on innovative leadership, encouraging creativity and technological developments, knowledge developments of employees, and improving companies' understanding of markets and competitors.

Innovation in construction is characterized by three key elements, Amorim (1999):

- The introduction of new inputs, technologies, and equipment in production processes
- New models of project organization, skills development, and work management
- Sustainable construction methods

But the sector has also several characteristics of the production process that can limit the innovations such as low mobility of production, the complexity of the process and the durability of the product. To develop innovations, the construction company has to invest in new products like mortars, equipment, tools, waterproofing, construction systems, paint and others, in addition to improving the quality of existing products. In addition, the construction sector needs improvements to satisfy the customer through modernizations, improvement in the products offered, and quality of the workforce, Pott, Eich and Rojas (2017).

According to Toledo, Abreu and Jungles (2000), innovations in construction companies occur gradually, with a low rate of innovations each year. For Miozzo (2005) the innovations are not implemented as a whole in the company, but often related to the projects that the company is involved in. Martins and Barros (2005) point out aspects that hinder the innovation process being: lack of funds directed to research, few partnerships with research institutions and universities, low quality labor, and lack of sufficient capital invested in technological development, among others. The Innovation Radar is a tool for evaluating innovations in companies, Bachmann and Destefani (2008). It is a measure to analyze the innovation process in small companies based on its processes, results and the importance given to knowledge as a tool, which aims at improving competitiveness. It also gives a self-diagnosis of innovations in the company and links this to business viability SEBRAE (2013b; 2018). The Innovation Radar delineates innovations in 13 dimensions as shown in Figure 1, adapted from Sawhney, Wolcott and Arroniz (2006).

Source: Adapted from Sawhney, Wolcott and Arroniz (2006)

Figure 1: The innovation radar

Definition of the dimensions:

Offerings: Develop innovative new products or services.
Platform: Use common components or building blocks to create derivative offerings.
Solutions: Create integrated and customized offerings that solve end-to-end customer problems.
Customers: Discover unmet customer needs or identify underserved customer segments.
Customer Experience: Redesign customer interactions across all touch points and all moments of contact.
Value Capture: Redefine how company gets paid or create innovative new revenue streams.
Processes: Redesign core operating processes to improve efficiency and effectiveness.
Organization: Change form, function or activity scope of the company.
Supply Chain: Think differently about sourcing and fulfillment.
Presence: Create new distribution channels or innovative points of presence, including the places where offerings can be bought or used by customers.
Networking: Create network-centric intelligent and integrated offerings.
Brand: Leverage a brand into new domains.
Innovative Ambience: The support received in the generation of business innovations.

The dimensions in the Innovation Radar use a grading system and the companies are given scores according to specific criteria for each dimension, for further details see Bachmann and Destefani (2008).

Companies with:

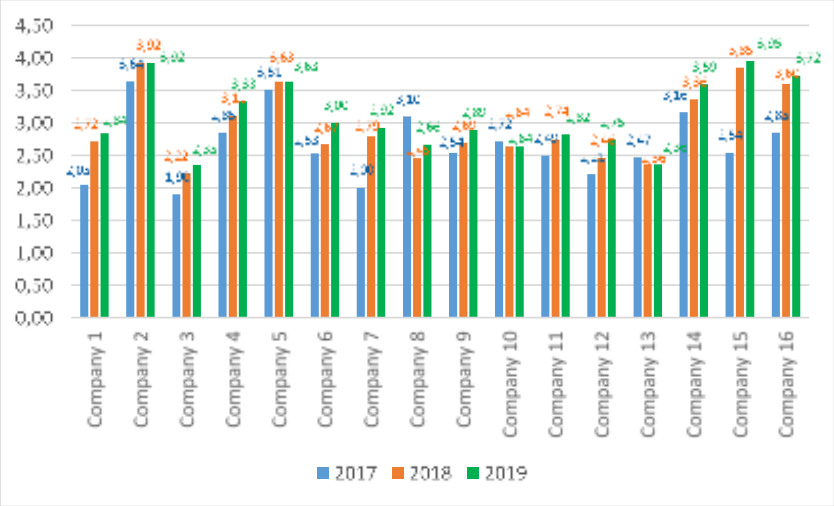
- scores from 1 - 3 are classified as no or little innovative.
- scores between 3 and 4.99 are classified as occasional innovators.
- the maximum score of 5 are classified as systemic innovators.

4.2 The innovation radar and research methodology

The empirical part of this study is based on data collected from 16 companies during their participation in the ALI program of SEBRAE. The project workers were allowed by the companies to receive the results of the ALI program as it was performed during the years 2017-2019. The project workers did also visit or call the companies to get additional information. Together with the ALI team, the project workers got first-hand confirmation that the companies understood the questions in the Innovation Radar in the same way. So, there is every reason to believe that the standard criteria of validity here are fulfilled, see Bryman (2016). The next methodology question concerns how reliable the results of the analysis are to predict the future. SEBRAE (2014; 2018) has done future predictions based on the Innovation Radar and other methods for several years, so they have built up considerable experience. Of course, all companies are unique and context dependent, but we have in our analysis looked at similar projects from SEBRAE (2014; 2018) which show that the general considerations of trends are usually consistent.

4.3 Analysis based on the innovation radar

The ALI program started in 2017 for the construction companies and the first data set, called Radar 1, was collected before the transfer of knowledge to the companies started. At the start of the project period most of the construction companies in the sample were classified as no or little innovative, with only 4 of them being considered occasional innovators, see Figure 2. 2018 is the first year with results for the construction companies after receiving knowledge transfers and Radar 2 show progress in all companies except 3. The positive development continues for most of the companies in the next year measured by Radar 3, see Figure 2. It is important to notice that some companies were more impacted than others, indicating that the transfer of knowledge and improvements of activities were not homogeneous. The variations in the Innovation Radar measurements range from -20.8% (construction company 8), up to +51.5% (construction company 15). According to Figure 3 we see positive changes in all dimensions except *Presence*. The *Network*, *Process*, *Customers* and *Organization* dimensions showed the greatest progress. We found an increase in 12 of the 13 dimensions with 8 of them revealing values above 3 (two dimensions ended with the value 3.0). These were on the average, classified as occasional or systemic innovators. Despite this progress, the dimensions *Solutions*, *Value Capture*, *Supply Chain*, and *Presence*, continued to exhibit little or no innovative gain for the companies, see Figures 4 and 5.

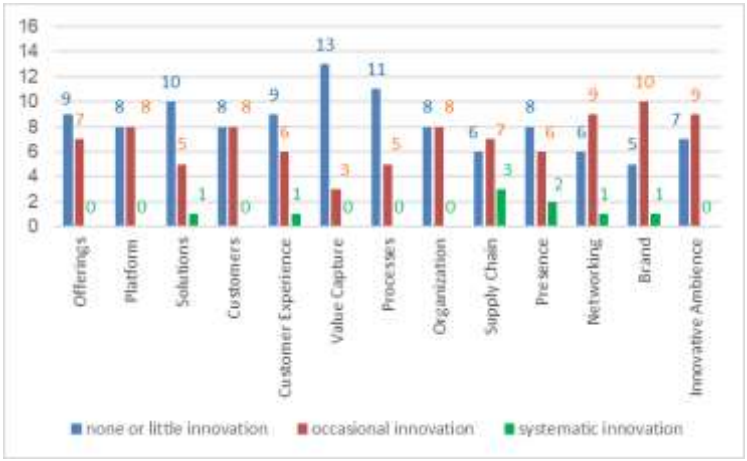


Source: Authors' data collection.

Figure 2: The innovation radar for each company for year 2017 Radar 1, 2018 Radar 2 and 2019 Radar 3

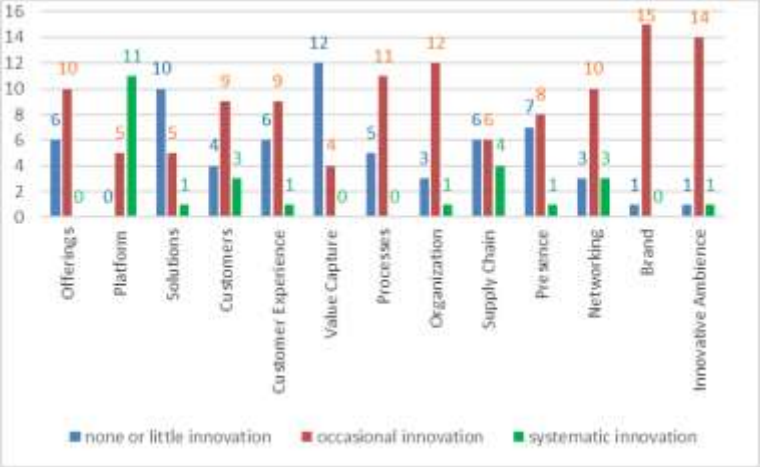
Source: Authors' data collection.

Figure 3: The innovation radar for each dimension and average value for the companies for year 2017 Radar 1, 2018 Radar 2 and 2019 Radar 3



Source: Authors' data collection.

Figure 4: The innovation radar grouping companies according to level of innovative performance in 2017



Source: Authors' data collection.

Figure 5: The innovation radar grouping companies according to level of innovative performance in 2019

When we look at Figures 4 and 5 there are still large variations in the improvements for the different dimensions. We saw only minor improvements in some dimensions, and this reinforces the lack of innovative initiatives in several companies in the group before the transfer of knowledge and implementation of innovative activities started. In the dimensions of *Solutions*, *Value Capture*, *Supply Chain* and *Presence*, despite the progress the companies showed through the period, the measurements show little or no innovative development here.

5. Paired Wilcoxon Tests based on the collected data material

We have done Paired Wilcoxon Tests to analyze the effect the transference of knowledge has had on the companies. We tested hypotheses related to each dimension where:

> *H_0 = No significant change in innovation indexes*
>
> *H_1 = Knowledge transfer influenced the indicator, generating statistical differences that were significant on a 5% level.*

Tests were performed for the 16 construction companies during the period 2017 to 2019 covering all dimensions of the Innovation Radar. The H_0 hypothesis was rejected for 5 of the 13 dimensions, demonstrating that knowledge transfer impacted the innovative improvements.

Table 1: Paired Wilcoxon test by dimension between 2017 and 2019

Dimension	Z value	Statistical probability	Reject or accept H_0
Offerings	2,73	0,04	reject
Platform	1,63	0,25	accept
Solutions	0,82	0,56	accept
Customers	2,56	0,01	reject
Customer Experience	1,46	0,16	accept
Value Capture	0,38	0,88	accept
Processes	0,56	0,30	accept
Organization	3,19	0,00	reject
Supply Chain	0,58	0,75	accept
Presence	0,82	0,50	accept
Networking	2,12	0,04	reject
Brand	1,21	0,31	accept
Innovative Ambience	3,07	0,00	reject

Source: Tests done by the authors based on the research data.

Between 2017 and 2019 the results of the analysis show that the dimensions *Offerings*, *Customers*, *Organization*, *Networking*, and *Innovative Ambience* reject the null hypothesis which means that the transfer of knowledge impacted the innovation index in these areas, demonstrating that SEBRAE's ALI program achieved the objectives here. This happened despite the difficulties the companies had due to the lack of skilled personnel, equipment, machinery, information on technological changes, and limited access to innovation funding.

6. Discussion of results and conclusions

International research on innovations in small construction companies says that a low activity of innovations generally takes place because of project-oriented work based on medium to lower skilled labor with only minor initiatives for technological change. When innovations occur, sources like Alves and Bomtempo (2007) and Bougrain (2010) state they often are triggered by:

- Cost oriented relationships
- New technologies
- Organisational developments
- Improvements of human resources
- New environmental demands

This is in line with the observations from the ALI program in this project where we saw improvements in the following areas:

- New ways of generating revenue facilitating the relationship between producers and customers
- Improvement certification processes combined with introduction of new technologies
- Transforming waste management to cost reductions and revenue generation
- New ways of organizing/new developments in employees' skills
- Improving exchange of information with customers
- New sales channels
- Reducing the cost of transportation of raw materials and semi-finished goods

The companies in the ALI program discovered that the ability to innovate can represent a great competitive advantage. Above all, they realized the importance of generating a culture that encourages the desire to do various tasks differently based on innovative initiatives. The promotion of the culture of innovation included mechanisms that encourage the generation of ideas, both spontaneously and searched for, in relation to topics of strategic interest. Innovation, therefore, is not reduced to the creation of products, processes and technology that break with the conventional way of doing things, but also on changes that can have comprehensive and lasting impact on the company.

The application of the Innovation Radar methodology forced the leaders of the companies to pay attention to their level of development linked to the various dimensions of innovation. From this diagnosis they adopted at least some of the innovation methods transferred by the ALI program. The dimensions, Offer, Customer, Organization, Network and Innovative Ambience contributed to increasing the innovative process by expanding new products and services that represented value to consumers and developed strategies that comply with the improvement areas that are mentioned above.

The project data analysis carried out in the 16 construction companies involved in the ALI program during the period 2017-2019 used the Innovation Radar to measure the changes. The data obtained in 2017 were low on innovative behavior, with 75% of construction companies classified with no or little innovative behavior and only 25% of them as occasional innovators. In the repeated study in 2019, 44% of the companies were classified as occasional innovators and 56% still with still no or little innovative activities. The changes between groups are moderate at best but we must also be aware of the progress many companies achieved within their group as indicated by the Wilcoxon tests. This happens despite the difficulties the companies faced due to the lack of skilled personnel, equipment, machinery, information on changing technologies, access to financing for innovations.

SEBRAE's ALI program directly influenced the growth of innovation initiatives and knowledge transfer of the constructors who participated in the program. The research showed that it is feasible for small and medium sized companies of the construction sector to seek knowledge and, consequently, innovate through the integration of new procedures in the daily routine in the production of their products and services. The leaders of the companies understood that the technological, employment and market areas are the first steps of the process that can initiate innovations and after the result of the ALI program it is necessary to act and improve according to the plan the company develops. This has led to a number of positive results for profitability and competitiveness for the companies that participated. The main problem for some firms was that they were not able to achieve their goal, leaving them in the same position as they were when the program started. For the future we see a need to continue research on innovations for small firms with a limited resource base like the ones in the construction sector. We need innovative advancements – not only in the high-tech and advanced knowledge level companies – but also in companies with a more limited resource base.

References

Amorim, S.L. (1999) Technological Innovations In Buildings: Differentiated Roles For Builders And Suppliers, Fluminense Federal University, Niterói.

Alves, F.C. And Bomtempo, J.V. (2007) "How To Distinguish Innovative And Non-Innovative Firms? An Approach Based On Skills To Innovate", XXXV National Economic Meeting, Recife, Brazil, December.

Bachmann, D.L. And Destefani, J.H. (2008) "Metodologia Para Estimar O Grau De Inovação Nas MPE", Seminário Nacional De Parques Tecnológicos E Incubadoras De Empresas, Aracaju, Brazil.

Bathelt, H., Cohendet, P., Henn, S. And Simon, L. (2017) The Elgar Companion To Innovation And Knowledge Creation, Edward Elgar Publishing, Cheltenham.

Beers, R.L. (2003) "Organizational Learning In Multidisciplinary Teams: Knowledge Brokering Across Communities Of Practice", Thesis (Doctor Of Philosophy) School Of Professional Psychology, Alliant University, San Francisco.

Bougrain, F. (2010) "Characteristics Of The Innovation Process In French Smes Of The Construction Industry", Proceedings, World Building Congress, TG65, Salford, USA.

Bryman, A. (2016) Social Research Methods, Oxford University Press, Oxford.

Capello, R. (2015) Regional Economics, Routledge, London.

CBIC (Brazilian Chamber Of The Civil Construction Industry). (2018) Production Statistics Depending On Activities, CBIC, Rio De Janeiro.

Chesbrough, H., Vanhaverbeke, W. And West, J. (2006) Open Innovation: Researching A New Paradigm, Oxford University Press, Oxford.

Chesbrough, H., Vanhaverbeke, W. And West, J. (2014) New Frontiers In Open Innovation, Oxford University Press, Oxford.

Christensen, C. M. (2013) The Innovator's Dilemma: When New Technologies Cause Great Firms To Fail, Harvard Business Review Press, Boston.

Fagerberg, J., Mowery, D. C. And Nelson, R. R. (2005) The Oxford Handbook Of Innovation, Oxford University Press, Oxford.

Gambatese, J. A. And Hallowell, M. (2011) "Enabling And Measuring Innovation In The Construction Industry", Construction Management And Economics, 29(6), 553-567.

Junior, C. B. M. (2017) "Inovação Igual A Crescimento Económico", Sao Paulo, 2017. In: Https://Www.Publico.Pt/2017/01/28/Sociedade/Opiniao/Inovacao-Igual-A-Crescimento-Economico-1759900 Accessed June 3 2019.

Lundvall, B.-Å. (2010) National Systems Of Innovation: Toward A Theory Of Innovation And Interactive Learning, Anthem Press, London.

Martins, M.G. And Barros, M.M.S.B. (2005) A Formação De Parcerias Como Alternativa Para Impulsionar A Inovação Na Produção De Edifícios, Boletim Técnico 391, Escola Politécnica Da USP, São Paulo.

Meritum. (2002) Guidelines For Managing And Reporting On Intangibles, Fundación Airtel-Vodafone, Madrid.

Miozzo, M. And Dewick, P. (2002) "Building Competitive Advantage: Innovation And Corporate Governance In European Construction", Research Policy, 31(6), 989-1008.

Muñoz, R. And Quintella, R. H. (2002) "A Inovação E O Sistema De Franquia Na Construção Civil De Salvador: O Caso Do Plano 100", Organizações & Sociedade, 9(23), 1-20.

Nonaka, I. And Takeuchi, H. (1995) The Knowledge-Creating Company: How Japanese Companies Create The Dynamics Of Innovation, Oxford University Press, Oxford.

Norman, D. A. And Verganti, R. (2014) "Incremental And Radical Innovation: Design Research Vs. Technology And Meaning Change", Design Issues, 30(1), 78-96.

OECD. (1996) The Knowledge Economy, OECD, Paris.

OECD. (2009) Eco-Innovation, Framework, Practices And Measurement, OECD, Paris.

OECD. (2018) Oslo Manual: Guidelines For Collecting And Interpreting Innovation Data, 3. Ed., OECD, Paris.

Pott, M.M., Eich, M.C. And Rojas, F.C. (2017) "Technological Innovations In Civil Construction", XXII Interinstitutional Seminar On Teaching, Research And Extension, Universidade De Cruz Alta, Cruz Alta, RS, Brazil.

Sawhney, M., Wolcott, R. C. And Arroniz, I. (2006) "The 12 Different Ways For Companies To Innovate", MIT Sloan Management Review, 47(3), 75.

SEBRAE. (2013a) "10 Caracteristicas Inovadora", SEBRAE, Brasilia. Http://Www.Sebraesp.Com.Br/Index.Php/40-Noticias/Inovacao/7735-Conheca-10caracteristicas-Inovadora Accessed February 15 2019.

SEBRAE. (2013b) Cadernos De Inovação Em Pequenos Negócios: Comércio E Serviços, SEBRAE, Brasília.

SEBRAE. (2014) "Agentes Locais De Inovation", SEBRAE, Brasilia. Https://Www.Sebrae.Com.Br/Sites/Portalsebrae/Programas/Agentes-Locais-De-Inova%C3%A7%C3%A3o:-Receba-O-Sebrae-Na-Sua-Empresa Accessed February 15 2019.

SEBRAE. (2018) "Perfil das Microempresas e Pequenas Empresas", SEBRAE, Brasilia. https://m.sebrae.com.br/Sebrae/Portal%20Sebrae/UFs/RO/Anexos/Perfil%20das%20ME%20e%20EPP%20-%2004%202018.pdf Accessed February 15 2019.

Schumpeter, J.A. (1934/1997) Theory of economic development, Routledge, New York.

Teixeira, L.P. (2010) Performance of Brazilian construction, Universidade Federal de Minas Gerais, Belo Horizonte.

Toledo, R.A., Abreu, A.F. and Jungles, A.E. (2000) "A difusão de inovações tecnológicas na indústria da construção civil", In: VIII Encontro Nacional De Tecnologia Do Ambiente Construido, Salvador, Brazil.

Westeren, K. I., Cader, H., de Fátima Sales, M., Similä, J. O. and Staduto, J. (2018) Competitiveness and knowledge: An international comparison of traditional firms, Routledge, London.

The Development of the University via the Development of the Endowment

Tanya Stanko[1], Igor Kuznetsov[2], Oksana Zhirosh[3], Svetlana Lavrova[4], Elena Chernyskova[1,5] and Sofya Chernogortseva[6]
[1]Ural Federal University, Ekaterinburg, Russia
[2]Tambov State University, Russia
[3]Innopolis University, Kazan, Russia
[4]European University, Saint Petersburg, Russia
[5]University of Navarra, Pamplona, Spain
[6]Higher School of Economics, Moscow, Russia
tanya.stanko@gmail.com
igkuz73@mail.ru
zirosh@mail.ru
svnlavr@gmail.com
echernyshko@alumni.unav.es
schernogorceva@hse.ru
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Abstract: The concept of the university endowment is rapidly developing in the academic landscape of Russia. While endowments were established for a selection of the largest universities over decade ago in Moscow (Skolkovo Institute of Science and Technology 53,5m EUR, Moscow State Institute of International Relations 19,2m EUR, Higher School of Economics 10,5m EUR) and Saint Petersburg (European University at Saint-Petersburg 19,8m EUR, Saint Petersburg State University 18,4m EUR), the regional medium-size universities are just starting to adopt the endowment concept. The essential question for such universities is: Where and how to start an endowment? In this paper we will describe the case of the quick and efficient endowment setup at a medium size regional university, Tambov State University. Within one year the university has created a notable endowment from scratch; started fundraising activities, launched an alumni relations office, initiated an investment portfolio and acquired the first financial results. We will cover: how the university managed to setup the professional endowment system in a disadvantaged region in such a short time; what has been done to achieve the impressive results; and what was the cost for the university? In addition, we will cover the following aspects: (a) how a regional university can rethink their strategy? (b) where to learn about best practices? (c) is it possible to launch a professional endowment with just one devoted person? (d) how to alter the financial culture at the university? (e) What are the roles of the university rector and the a region government in the project's success? (f) How to define success and failure and how do these evolve with time? (g) What are the regional specifics? (h) Competition vs cooperation with other universities. Our study provides an insight into the opportunities and challenges of academic fundraising in Russian universities. The Tambov State University case can be used as a best practice scenario for universities wishing to launch their own endowment, particularly for those located in the less economically successful areas.

Keywords: academic fundraising, endowment in academia

1. Introduction

While comprehensive fundraising campaigns soliciting alumni have long been a well-developed practice in the modern history of the US and European higher education (Dimmock et al, 2019), involving university graduates in fundraising activities in modern Russia can currently be defined as an emerging practice (Dyachkova, 2013, Jakobson et al, 2018). The academic fundraising is particularly challenging in the less economically successful areas (Stanko et al, 2019). There is a need to develop a philanthropy tradition, to develop the idea of "family connection" with universities. The promotion of funds is most vital for regional universities that are affected by the problem of "regional inequality" (Krasikova et al., 2019).

This study aims to detail a case of establishing an Endowment Fund at a regional University, Tambov State University (TSU), Russia. The Fund defines its purpose as not only raising funds but also raising resources in a broader sense of this word, for completing the set tasks, which can include projects related to social support, volunteer work, and charity. Hence, the Fund becomes a way for the University to fulfil its third mission, i.e., to contribute to the social and economic development of the country.

The rest of this paper takes the form of four chapters. Chapter 2, *Background and the case highlights*, is an overview of the University and its vision and philosophy behind the effort, and the steps of project launch. Chapter 3, *Challenges*, addresses the issues the task team has had to face so far. Chapter 4, *Operational results*, lists the results achieved to date. Finally, Chapter 5, *Conclusion*, summarises insights and outlines further steps of the project.

2. Background and the case highlights

Tambov State University is a classical university that focuses equally on education and research. It offers a variety of degree programs and well-equipped research units. The University's staff is a diverse group of experts that belong to different domains: from arts to healthcare and from engineering to humanities. This environment allowed for the development of the university as an "entrepreneurial" type.

Recently, TSU has made significant progress in terms of the improvement of financial management practices and results, which are one of the University's strategic tasks. The strategic financial goal, as formulated by the University Rector in 2015, is not only related to the ways of obtaining funds, but primarily to the ability of a university to prepare students to be successful in the "new reality" and to involve alumni in the university life. Such a vision resulted in the current distribution of the sources of the University funding, only 30% of which is funds provided by the state, while as much as 70% is obtained from other sources.

One such alternative source of funding is the University Endowment Fund, established at the University in 2010. The initiator of the Fund described the Fund's purpose evolution as first being a means of financial support of the retired faculty, with further broadening the scope to include student-related projects, volunteer work and other social projects. Thus the Fund was primarily a reaction to the request of the University management team to establish new ways of financial support of the University operations. After a while, the management team aligned its strategic plans, corporate culture and the ways of communication with the community outside of the university. The evolved version of the Fund's purpose supports the third mission of the university, which essentially is contributing to social and economic development of the country and its territories, to the progress of education system, to social, support, volunteer, and charity projects. Drawing upon the aforesaid mission, TSU considers the University to be a complex organisation, which considers its graduates as a source of growth. Hence, the TSU Endowment Fund is primarily a mechanism of involving different representatives of public and professional groups and partners in the University development, and only secondarily a means of financial support.

To summarize the benefits, such a fund is important for both the University and the public in several ways:

- 1. It ensures the transparency of charity.
- 2. It is a regular source of funding the university.
- 3. The University's practices comply with international standards.
- 4. Such a project promotes and triggers patronage practices at the regional and state levels.
- 5. It becomes a space for communication between the University and the public of the Tambov region, for finding ways to address the problems of the city and the region by united effort.

Obviously, establishing fundraising practice requires tight collaboration of all the University departments and a number of its partners (Figure 1), i.e., the Fund staff cannot work independently and autonomously. Besides, it is essential that such a project is planned as a communal effort, rather than relying on the enthusiasm and effort of a single person or several such persons. The latter will most likely lead to random, unsustainable activities, rather than to stable progressive development.

To ensure the project development, and in alignment with the third University mission, in 2020 TSU management decided to establish a new support unit – a *Center for collaboration with alumni and fundraising*. The Head of the unit upon their appointment for the position took a professional development course at the European University at Saint Petersburg (EUSPB) on "University management: attracting external funding". In addition to developing skills and knowledge, this program led to the establishment of an ongoing collaboration on financial management between TSU and EUSPB.

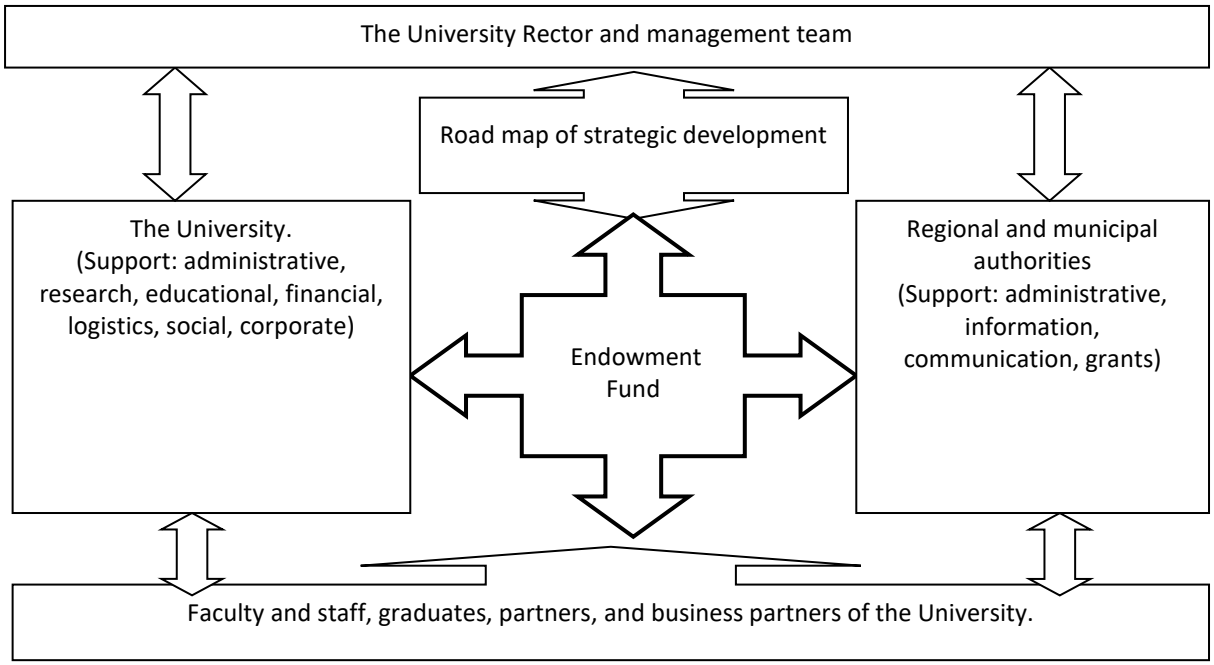

Figure 1: Scheme of functional relations of the fund

The newly established centre at TSU had to address the following task: organize communication and collaboration with the students, alumni, the University partners and local communities within the framework of establishing patronage practice and corporate culture, all with the aim of developing the University by increasing capital and involving alumni into the University activities.

3. Challenges at the initial stages of the project

The project faced a number of challenges while establishing and developing fundraising activities in the University in 2019-2020. Such challenges included organisational, financial and those related to the need of changing the stakeholders' attitudes towards fundraising. Some were expected by the project team, some came unpredicted. Key challenges and insights are listed below:

- 1. Lack of experience
- The project team had little experience in fundraising and as a result had difficulties analysing and implementing the established practices of other higher education organisations.
- The lack of staff experienced in fundraising within the University.
- 2. Lack of organizational and regulatory framework
- The enthusiasm of just one person is not likely to be a long-lasting driving power for a whole big organization.
- There is a lack of clear policies for the regulation of endowment funds' operations in Russian academic environment.
- 3. Need to raise awareness internally and externally
- At the initial stage of the project, one of the major difficulties was the lack of flexibility and awareness of the heads of the University departments, which lead to their reluctance to involve themselves in the project and take responsibility for the assigned tasks.
- Low awareness of the concept and purposes of fundraising by local residents and business communities leads to a reluctance to participate.
- The absence of fundraising culture among the University alumni and weak ties of the alumni to the University.
- Weak alignment of the concept and the strategy of fundraising with the university mission at both federal and local levels.

- Weak support of the university fundraising concept by the local and federal media.
- 4. Need for initial investments
- Prior to realizing benefits from a project it is necessary to invest in it, hence the necessity of funding the initial stage of the project. As an illustration, the costs of events held to accumulate the initial capital of the Fund can be high, while there is no guarantee that the target sum of 3 million roubles will be gathered. The University faces a dilemma of either spending the University's funds for such events or abandoning the idea of holding such fundraising events.

The listed challenges – the lack of needed expertise and allocated funds, resistance to (organisational) change, the need to act in conditions of uncertainty – seem to be, in general, characteristic of any project at its preparatory and launch stages. These initial project stages require considerable effort from the project team, which often has to rely on their own enthusiasm and persistence to complete the task.

4. Operational results

Despite the challenges discussed in Chapter 3, after just two years in operation the *Center for collaboration with alumni and fundraising* and the Endowment Fund have made considerable progress:

- 1. An organizational and legal framework has been established.
- 2. An awareness and positive sentiment have been built in both the internal and external communities.
- 3. Four projects for attracting funds have been planned and approved by the Board of Trustees: a hockey club, a student sport club, a center for publicly available equipment, and a program of scholarships and research travel grants.
- 4. A website with a user-friendly functionality for donations for the Fund has been released at www.fck-tsu68.ru
- 5. Accounts have been established in Instagram, Facebook and Vkontakte (the largest social network in Russia).
- 6. Over 1000 donations have been made to the fund, of them:
- *individual donations ranging from Ruble 10 to 50 000;*
- *donations from businesses and organizations ranging from Ruble 50 000 to 340 000.*
- 7. A group of student volunteers has been established. The group's aim is to educate the University students regarding the Fund, its purpose and activities, and thus to establish an effective environment for patronage.
- 8. A loyalty program for the donors who have contributed more than Rubles 5 000 has been launched, a Friend's Card (Figure 2). The holders enjoy 20% discount for a number of University services. Such discounts are provided by the sport center, medical center, sport and recreation camp and rehabilitation center, internet shop of TSU merch, techno-park, and the University publishing house; besides, the holders get discounts for extra-curricular courses.

Figure 2: Friend's Card of TSU

- 9. A number of events have been held for fundraising and funded:

- *Sports contests, e.g., "Derzhavin mile 2019", "Derzhavin ski track 2020".*
- *Annual alumni meetings in 2019 and 2020.*
- *Annual career forum in April 2021.*
- *A series of public talks "Success as seen by the best TSU graduates". 12 university graduates, currently successful businessmen and recognized leaders were involved in this project. As many as about 1700 students attended the talks.*
- *A digital database of the university graduates and donations is being developed.*
- 10. The Fund has doubled from Rubles 3 million to Rubles 6 million within 2020. The target principal amount by the end of 2021 is Rubles 10 million.

5. Conclusion

Until recently, higher education organisations in Russia were funded either solely by the state, or, in case of private universities, by their founders. Establishing university endowment funds by involving alumni and the local community is a new practice in the country (Jakobson et al, 2018). This study described the steps, challenges, and results of two years of the process of establishing an Endowment Fund at Tambos State University, Russia. Major learnings of the project, which can be drawn upon in future similar efforts, are related to the need to plan for such funds establishment as a collective effort involving multiple agents from within and beyond the universities; the need to educate potential donors and broader community to change: build awareness and a positive attitude towards fundraising. The latter implies that activities related to endowment funds establishment can not only contribute to the financial stability of universities, but also trigger social change, philanthropy, and greater collaboration on social and commercial development of local communities.

References

Dimmock, S., Wang, N., and Yang, J. (2019) "The Endowment Model and Modern Portfolio Theory" NBER Working Papers 25559, National Bureau of Economic Research, Inc.

Dyachkova, E.A. (2013) "Endowment Funds of Russian Universities: The Dynamics of Development", *University Management: Practice and Analysis*, Vol. 5, pp 74-89.

Jakobson, L.I., Toepler, S., and Mersianova, I.V. (2018), "Foundations in Russia: Evolving Approaches to Philanthropy", *American Behavioural Scientist*, Vol. 62, No. 13, pp 1844-1868.

Krasikova, T.Yu., Prigozhin, V.L., and Ognev, D.V. (2019), "Endowment in Russian Regional University", *Proceedings of the 1st International Conference The Individual and Society in the Modern Geopolitical Environment*, ISMGE 2019, pp 388-391.

Stanko, T., Chernyshkova, E., Zheleznov, A., Chernogortseva, S., and Lavrova, S. (2019) "Does the Location and Size of the University Affects the Academic Fundraising in Russia?", *Proceedings of the 14th European Conference on Innovation and Entrepreneurship,* ECIE 2019, Vol. 2, pp 1023-1031.

The Role of Socioemotional Wealth, Social Capital, and Long-Term Orientation in Entrepreneurial Orientation of Family Firms: A Conceptual Framework

Michele Stasa, Aleš Kubíček, Nikola Rosecká and Ondřej Machek
Department of Strategy, Faculty of Business Administration, Prague University of Economics and Business, Czech Republic
stam02@vse.cz
ales.kubicek@vse.cz
nikola.rosecka@vse.cz
ondrej.machek@vse.cz
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Abstract: Family firms representing prevalent organizational form differ from non-family firms in their entrepreneurial behaviours and attitudes. The goal of this conceptual paper is to theoretically examine three possible predictors of entrepreneurial orientation (EO) that represent main distinguishing features of the family firms: importance of socioemotional wealth (SEW), long-term orientation (LTO), and bonding social capital (BSC). Based on literature review, we present five theoretical propositions constituting a multiple mediator model. First, we suggest positive relationship between importance of SEW and EO. Family enrichment and continuation can positively affect the entrepreneurial activities in order to ensure work for the family members, to develop and extend the business operations and preferably to hand over the firm to next generation. To achieve these goals, owners have to achieve and maintain high level of entrepreneurial activities. However, SEW may also have indirect effect on EO. We consider two mediators – bonding social capital and LTO. Socioemotional wealth, in the form of social bonds and emotional attachment, support coworking experience and harmony, which further translates to trust, shared vision and group cohesiveness. The networks of relationships, which contribute to problem solving and enhance the information flow, lead to ensure the long-term wealth and control over the company. Therefore, we expect that importance of SEW lead to development of bonding social capital, which further positively affects the EO. Socioemotional wealth in form of pursuing non-economic goals (e.g., succession), lead family businesses to prioritize actions, that are oriented on long-term planning horizons. Family firms with long-term orientation should have more capacity to be proactive and engage in innovative activities (i.e., foreseeing the opportunities and threats, long-term investments, or higher investment in R&D). Therefore, we propose importance given to SEW leads to LTO, which further positively influence EO. Although long-term orientation is a frequently proclaimed aspect of family firms, it is not much known how their long-term oriented behaviour affects their strategic orientation. Based on the propositions, we present a multiple mediator model. For each variable in the model, we suggest validated constructs for measurement. Last part of this paper includes limitations and directions for future research.

Keywords: socioemotional wealth, entrepreneurial orientation, social capital, long-term orientation, family business

1. Introduction

Constantly changing and volatile environment define the companies that outperform. Entrepreneurial orientation (EO) can explain the way firms face this instability and therefore has become a relevant construct (Covin & Slevin, 1989; Miller 1983) in the study of corporate entrepreneurship. However, EO and its dimensions may vary in different organizational context (Lumpkin & Dess, 1996). The uniqueness and specifics of family businesses offer appropriate context for EO research (Nordqvist & Melin, 2010). Exactly such specific features and constructs of family firms (e.g., socioemotional wealth (SEW) preservation, pursuing non-financial goals, intrafamily succession, familiness) affect EO. While there is plenty of academic research investigating factors related to business performance, only few have considered the issues directly impacting the desired outcomes (e.g., increased performance) that results from the chosen type of strategic orientation (Campbell & Park, 2016). Review of strategic advantages of family firms by Habbershon and Williams (1999) encouraged researchers to address the question if strategic advantages result from internal or external factors. To address this, our paper focuses on more internally driven factors such as socioemotional wealth, bonding social capital and long-term orientation and their effect on entrepreneurial orientation.

Socioemotional wealth preservation theory proposes that family firms are often willing to sacrifice financial wealth to prevent the loss of their SEW (Gomez-Mejia et al., 2007). Such concerns influence the strategic decisions and management practices (Cruz et al., 2014) in a way that may decrease the level of EO. The behaviour of family firms causing lower entrepreneurial activity include risk avoidance, control preservation or slower pace

of innovations (Carney et al., 2015; Gomez-Mejia et al., 2007). Nevertheless, SEW stimulates also actions which increase the entrepreneurial activities in order to protect the firm and its reputation, to ensure the firm's continuity and well-being of the family. For instance, family firms are willing to invest in corporate entrepreneurship and innovation to assure the business survival and next generation hand over (Miller & Le Breton-Miller, 2005). Entrepreneurial activities and success depend to some extent on entrepreneur's social capital, which can be described as resources embedded in relationships both inside and outside the social group (Putnam, 2000). The potential benefits resulting from networks (bridging social capital) as well as from strong family ties and relationships (bonding social capital; BSC) positively affect the performance of family firms (e.g., Miller et al., 2009; Acquaah, 2011; Campbell & Park, 2016) and innovation (Llach & Nordqvist, 2010; Shi et al., 2015) through the shared vision, common understanding, mutual trust, knowledge sharing, and easier access to the financial, human and intellectual capital. Another characteristic that affects the entrepreneurial behaviour is the time horizon for action as well as decision-making process. Senior managers in family firms tend to have longer tenures and focuses on long-run performance and outcomes (Zellweger, 2007). Moreover, proceeding also from the socioemotional wealth perspective, family businesses aim to pass the business onto succeeding generations and building a family legacy (Ward, 1988). Altogether, long-term orientation as a distinguishing feature of family firms (Chandler et al., 2016), may represent a reason why they outcompete non-family firms (Miller & Le Breton-Miller, 2005), and could be a source of competitive advantage (Gomez-Mejia et al., 2007). Therefore, a debate in the family business field involves the extent to which the distinguishing characteristics of family firms hinder or foster the entrepreneurial behaviour. The aim of the paper is to emphasize the need for EO antecedent's investigation, the need for studying the role of LTO as a possible mediating variable, as well as the need for taking into account the heterogeneity of family firms within the research (e.g., we propose SEW to address the family firm heterogeneity within the context of this paper).

Our paper contributes to the literature in several ways. First, we propose the BSC-EO relationship, regarding which the FB research was silent contrary to the non-family business literature, where researchers suggest positive effect of social capital on EO (e.g., De Clercq et al., 2013; Kickul et al., 2010). Second contribution present the LTO and EO relationship. Although long-term orientation is a frequently proclaimed aspect of family firms, it is not much known how their long-term oriented behaviour affects strategic orientation. Moreover, academic literature has primarily focused on a theoretical level of the relationship between LTO and EO. Third, we proposed a model for future empirical investigation in which we consider the role of heterogeneity of family firms through the socioemotional wealth importance. The paper consists of three sections. In the first section, we suggest the main propositions, the model operationalization with proposed measurement scales is presented in the second section, and finally discussion with concluding remarks were provided in last subsection.

2. Model development

Entrepreneurship orientation refers to activities and behaviours characterized by set of attributes which influence entrepreneurship process (Schepers et al., 2014). While there is a plenty of academic research investigating the effects of EO on performance of family firms (e.g., Naldi et al., 2007; Chirico et al., 2011; Miller & Le Breton-Miller, 2011; Campbell & Park, 2016), only little attention has been dedicated to the antecedents. Moreover, the studies focusing on antecedents considered predominantly the effect of family involvement in ownership, management and governance (e.g., Miller & Le Breton-Miller, 2011; Block, 2012; Pimentel et al., 2017), only minority of papers covered other antecedents, such as strategic decision-making (Cruz & Nordqvist, 2012), CEO tenure (Boling et al., 2016), or socioemotional wealth (Hernández-Perlines et al., 2019). Altogether, it seems that literature investigating internal drivers of EO is fragmented, most of the relationships needs verification or further investigation.

In the remainder of this section, we first discuss the possible outcomes of SEW on the bonding SC, long-term orientation and entrepreneurial orientation. Then, we elaborate on the relationship between LTO and EO, and subsequently on the relationship between bonding SC and EO. During the model development, we discuss LTO and bonding SC as mediating variables in the SEW-EO relationship.

2.1 Socioemotional wealth importance and bonding social capital

Socioemotional wealth refers to non-financial factors derived by family members from running the family business which satisfy their needs (Gomez-Mejia et al., 2007). Debicki et al. (2016) have developed a scale used for measuring the importance of socioemotional wealth (SEWi), which consists of three dimensions: family prominence, family continuity and family enrichment. Importance of SEW is strongly related to behaviour and

strategic plans of family businesses. Generally, family firms with high importance of SEW have stronger social ties, closer relationships, high level of trust and solidarity which ensure the long-term wealth and control over the company.

The concept of social capital (SC) has been identified in the literature as the actual or potential benefits and advantages achieved through favourable social network of institutionalised relationships (Bourdieu, 1986). The networks or relationships, which contribute to problem solving, reduction of transaction costs or information flow (Lin, 1999), are considered a valuable aspect further representing potential sources of family business' competitive advantage (Pearson et al., 2008). Due to the broad definition, multiple categorisations exist in the literature. First widely accepted classification proposed by Nahapiet and Ghoshal (1998) differentiate between the structural dimension (density and connectivity of group ties), relational dimension (trust, norms and identity), and cognitive dimension (shared representations and interpretations of the group). Second categorisation differs the resources embedded from relationships among social group members (bonding social capital) and resources embedded from outside networks (bridging social capital). For the purpose of this paper, we focus on bonding social capital.

Berrone et al. (2012) suggest social ties represent a dimension of socioemotional wealth. In line with that, Debicki et al. (2016) include accumulation and conservation of social capital as the part of SEWi scale as "the importance of benefiting from the social relationships developed through the business and vice-versa". Nason et al. (2019) further argue that SEW as reference point for strategic decision-making can be influenced by the family member's socialization, particularly when work with non-family advisers. Longer average tenures of board members support the board' coworking experience and harmony, allowing them to develop bonding SC in the form of mutual understanding of strategic objectives, reduced goal conflict and collective cohesiveness of the members (Bendig et al., 2020). Bonding SC in the form of advisory tasks of the board can be used to significantly influence the performance, without disturbing the family and socioemotional preservation needs (Lohe & Calabró, 2017). Presence of mutual trust and openness (i.e., outcomes of SEW) support the employees to ask the directors for advice, which can boost the performance. Hernández and Jiménez (2014) find positive effect of SEW on CSR and social capital. In family businesses the distinction among family stakeholders and firms is distorted resulting in prioritizing the activities oriented to increase or preserve the welfare of family stakeholders. These decisions further influence the development of SC.

Proposition 1: *Importance of socioemotional wealth is positively related to bonding social capital.*

2.2 Socioemotional wealth importance and long-term orientation

Preservation of SEW represents the key differentiator between family and non-family businesses. By pursing non-economic goals (e.g., maintaining the unity of the family and family dynasty in business), family businesses tend to prioritize actions, that lead to long-term goals achievement (Chua et al., 2015), in comparison with non-family businesses that tend to focus on short-term economic goals. Moreover, noneconomic goals including succession and importance of SEW are commonly set by family business to preserve future family generations (Brigham et al., 2014). The pursuit and achievement of SEW is mainly affected by FB's long-term orientation, which further influence various policies and strategies (Lumpkin & Brigham, 2011; Brigham et al., 2014) that help family firms to align family and organizational goals (Hoffman et al., 2016). Since long-term orientation can manifest through goals, priorities, and processes, we suggest that greater importance given to non-economic goals in the form of SEWi will be reflected in a stronger long-term orientation.

Proposition 2: *Importance of socioemotional wealth is positively related to long-term orientation.*

2.3 Socioemotional wealth importance and entrepreneurial orientation

Entrepreneurial orientation original construct consists of three dimensions: risk taking, innovativeness and proactivity Entrepreneurial behaviour has been highlighted as a key factor for the long-term survival of the family businesses (Kellermanns & Eddleston, 2006) which generally struggle in the later generations to sustain entrepreneurial spirit (Eddleston et al., 2013).

On the other hand, an importance given to building and preserving SEW may also lead to a conservative strategy as an owning family aims to maintain control of the business (Miller & Le Breton-Miller, 2014). However, prior empirical finding of a positive relationship between SEW and EO by Hernández-Perlines et al. (2019) suggest that the positive effect of SEW on organizational entrepreneurial behaviour prevails.

Proposition 3: *Importance of socioemotional wealth is positively related to entrepreneurship orientation.*

2.4 Long-term orientation and entrepreneurial orientation

Although long-term orientation is a frequently proclaimed aspect of family firms, it is not much known how their long-term oriented behaviour affects their strategic orientation. Academic literature has primarily focused on a theoretical level of the relationship between LTO and EO (for a literature review regarding EO, see Hernández-Linares & López-Fernández, 2018).

Family firms with long-term perspective should have a larger capacity for innovation and proactivity (Lumpkin et al., 2010), make investment decisions for extended time periods and invest more heavily in R&D. Such behaviour is a foundation of a long-term orientation construct consisting of three dimensions: continuity, futurity and perseverance (Brigham et al., 2014). On the other hand, Lumpkin et al. (2010) suggest LTO will positively influence only specific aspects of EO. Namely authors propose the positive impact of LTO on innovativeness, proactiveness and autonomy but negative one on risk taking and competitive aggressiveness.

There are only two empirical studies: both providing evidence of the positive relationship between LTO and EO. Eddleston et al. (2012) found that this relationship is positively moderated by family-to-firm unity, while Schepers et al. (2020) found a participative decision-making style to be a significant positive moderator.

Proposition 4: *Long-term orientation is positively related to entrepreneurship orientation.*

2.5 Bonding social capital and entrepreneurial orientation

Non-family business literature has proved positive effect of social capital on entrepreneurial orientation (Manev et al., 2005; Kickul et al., 2010; De Clercq et al., 2013). However, most researchers did not differ between SC dimensions or applied categorization proposed by Nahapiet and Ghoshal (1998). Only Cao et al. (2015) examined the effect of bonding SC on entrepreneurial orientation. Their findings suggest inverted U-shape relationship between CEO's bonding SC with organizational members and EO. The authors explain the inflection point by the cost of redundant information, shared mental framework and groupthink, which inhibit the discovery of new opportunities. Therefore, for non-family firms, moderate amount of bonding SC is optimal for EO maximalization.

Bonding social capital in family business literature is measured by heterogeneous items. While some authors used single-item measures (e.g., tie strength (Lee et al., 2008), or board members' firm tenure (Bendig et al., 2020)), other applied single-construct measures. For example, Sanchez-Famoso et al. (2019) measured the bonding SC by close relationships, loyalty, shared vision, values and objectives. On the other hand, Campbell and Park (2016) used scale consisting of trust, reciprocity, shared vision and homophily. By these heterogeneous measures we can observe few items represents also the relational and cognitive dimension of social capital. EO is positively affected by the trust between the network actors and goal congruence (De Clercq et al., 2013; Rodrigo-Alarcón et al., 2018), but curvilinear influenced by the cognitive social capital (i.e., shared goals and vision, common culture). De Clercq et al. (2013) further noted, that internal knowledge sharing works as a critical intermediate mechanism that enable trust and goal congruence to boost the firm's EO. In terms of family business literature, bonding SC, which may vary among FBs (Discua Cruz et al., 2012), is positively related to decision-making quality (Mustakallio et al., 2002) and innovations (Shi et al., 2015).

Since entrepreneurial process occurs through social interactions and networks (Anderson et al., 2007), SC contributes to EO development in terms of easier access to resources, markets, information and technologies. Bonding SC should help family firm' management to see the "big picture" (i.e., to consolidate perspectives from various functions and business levels), which further represents a rich source of information from whole enterprise about changing market demands, technologies, industry conditions or potential problems. Such extensive source of information enables family firms to coordinate resources, act on entrepreneurial opportunities and confidently decide on riskier initiatives. Shared goals, vision and culture can further promote mutual understanding and the exchange of ideas, which combined with existing knowledge led to greater proactiveness. Trust between family firm members reduce monitoring costs. By minimizing such costs, saved money and time could be devoted to innovative activities.

Proposition 5: *Bonding social capital is positively related to entrepreneurial orientation.*

3. Model operationalization

Based on the propositions, Figure 1 represents the expected relationships of four variables in a multiple mediator model. LTO acts as one of the drivers of entrepreneurial orientation.

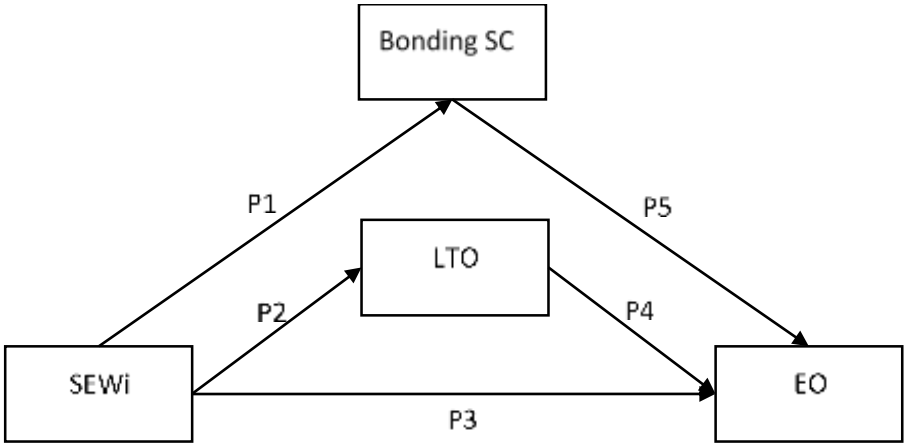

Figure 1: Proposed model

The propositions might be tested in IBM SPSS using Hayes' (2018) conditional process analysis (PROCESS) macro. For variable measurement, we suggest usage of following scales. *Socioemotional wealth importance (SEWi)* should be measured by Debicki et al.'s (2016) scale consisting of family prominence, family continuity and family enrichment. To measure *long-term orientation,* we assume using Brigham's et al.'s (2014) construct consisting of futurity, continuity and perseverance. *Bonding social capital* can be measured by shared vision among family members (used by Uhlaner et al., 2015). Finally, to measure *entrepreneurial orientation (EO),* we suggest using the original unidimensional construct consisting of innovativeness, risk-taking and proactiveness (Covin & Slevin, 1989). Further, two more dimensions – autonomy and competitive aggressiveness could be added to the original construct (Lumpkin & Dess, 1996). The empirical investigation of the model should also control for other variables affecting entrepreneurial orientation. Between such variables may researchers include firm size, firm age, and industry affiliation.

4. Discussion and conclusion

In this conceptual paper, we proposed a multiple mediator model with expected variables affecting entrepreneurial orientation, as well as the expected mediating variables of SEW-EO relationship. Family firms differ from their non-family counterparts in their entrepreneurial behaviours and attitudes. SEW affects the entrepreneurial behaviour, both directly and indirectly through bonding SC and LTO. Directly, we propose that achieving SEW goals in form of family enrichment and continuation force family firms to maintain high level of entrepreneurial activities. Indirectly, SEW and its components represent the basis for forming the social ties, shared vision and trust (i.e., bonding SC), as well as family firm continuity, which translates into prioritizing long-term goals and horizons. Further, both development of BSC and LTO positively influence entrepreneurship.

Proposed framework represents several contributions to the literature. First, we present novel relationships. Although LTO is a frequently proclaimed aspect of family firms, it is not much known how it affects strategic orientation. Second, we proposed a model for future empirical investigation, in which we have consider the role of heterogeneity of family firms through the SEW.

For sure, this paper has several limitations. First, we present chosen variables in the model, however, other variables may exist and represent possible EO antecedents. In fact, Hernández-Linares and López-Fernández (2018) suggest researchers to investigate variables such as succession, family characteristics, nationality, religion or culture. Second, both SEW and LTO constructs include continuity presenting threatening overlap, which do not apply for the rest of the dimensions. Third, business environment is dynamic, specifically for family firms and their SEW preservation efforts, which when endangered, could considerably affects LTO and behaviour in general. Finally, proposed model is theoretical, and the propositions need to be validated. Therefore, future research should address and empirically examine the model.

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References

Acquaah, M. (2011). Utilization and value of social networking relationships in family and nonfamily firms in an African transition economy. *European Management Journal*, 29, 347-361.

Anderson, A. R., Park, J., & Jack, S. (2007). Entrepreneurial social capital. Conceptualizing social capital in new high-tech firms, *International Small Business Journal*, 25(3), 245-272.

Bendig, D., Foege, J. N., Endriß, S., & Brettel, M. (2020). The Effect of Family Involvement on Innovation Outcomes: The Moderating Role of Board Social Capital. *Journal of Product Innovation Management*, 37(3), 249-272.

Berrone, P., Cruz, C., & Gomez-Mejia, L. R. (2012). Socioemotional wealth in family firms: theoretical dimensions, assessment approaches, and agenda for future research. *Family Business Review,* 25(3), 258–279.

Block, J. H. (2012). R&D investments in family and founder firms: An agency perspective*. Journal of Business Venturing,* 27, 248-265.

Boling, J. R., Pieper, T. M., & Covin, J. G. (2016). CEO tenure and entrepreneurial orientation within family and nonfamily firms. *Entrepreneurship Theory and Practice*, 40, 891-913.

Bourdieu, P. (1986). "The forms of capital", in Richardson, J. (Ed.), *Handbook of Theory and Research for the Sociology of Education*, Greenwood, New York, NY, 241-258.

Brigham, K. H., Lumpkin, G. T., Payne, G. T., & Zachary, M. A. (2014). Researching long-term orientation: A validation study and recommendations for future research. *Family Business Review*, 27(1), 72-88.

Campbell, J. M., & Park, J. (2016). Internal and external resources of competitive advantage for small business success: validation across family ownership. *International Journal of Entrepreneurship and Small Business*, 27(4), 505.

Cao, Q., Simsek, Z., & Jansen, J. J. P. (2015). CEO Social Capital and Entrepreneurial Orientation of the Firm. *Journal of Management*, 41(7), 1957–1981.

Carney, M., Van Essen, M., Gedajlovic, E. R., & Heugens, P. P. (2015). What do we know about private family firms?A meta-analytical review. *Entrepreneurship Theory and Practice*, 39, 513-544.

Chandler, J. A., Zachary, M. A., Brigham, K. H., & Payne, G. T. (2016). *Long-term orientation: Reviewing the past and identifying future opportunities for family business research*. In the Routledge Companion to Family Business, Routledge: London, UK, 100–119.

Chirico, F., Sirmon, D. G., Sciascia, S., & Mazzola, P. (2011). Resource orchestration in family firms: Investigating how entrepreneurial orientation, generational involvement, and participative strategy affect performance. *Strategic Entrepreneurship Journal*, 5, 307-326.

Chua, J. H., Chrisman, J. J., & De Massis, A. (2015). A closer look at socioemotional wealth: Its flows, stocks, and prospects for moving forward. *Entrepreneurship Theory and Practice*, 39(2), 173–182.

Covin, J. G., & Slevin, D. P. (1989). Strategic management of small firms in hostile and benign environments. *Strategic Management Journal*, 10, 75-87.

Cruz, C., Larraza-Kintana, M., Garcés-Galdeano, L., & Berrone, P. (2014). Are family firms really more socially responsible? *Entrepreneurship Theory and Practice*, 38, 1295-1316.

Cruz, C., & Nordqvist, M. (2012). Entrepreneurial orientation in family firms: a generational perspective. *Small Business Economics*, 38, 33-49.

Debicki, B. J., Kellermanns, F. W., Chrisman, J. J., Pearson, A. W., & Spencer, B. A. (2016). Development of a socioemotional wealth importance (SEWi) scale for family firm research. *Journal of Family Business Strategy*, 7(1), 47-57.

De Clercq, D., Dimov, D., & Thongpapanl, N. T. (2013). Organizational Social Capital, Formalization, and Internal Knowledge Sharing in Entrepreneurial Orientation Formation. *Entrepreneurship Theory and Practice*, 37(3), 505–537.

Discua Cruz, A., Howorth, C., & Hamilton, E. (2012). Intrafamily Entrepreneurship: The Formation and Membership of Family Entrepreneurial Teams. *Entrepreneurship Theory and Practice*, 37(1), 17–46.

Eddleston, K. A., Kellermanns, F. W., Floyd, S. W., Crittenden, V. L., & Crittenden, W. F. (2013). Planning for Growth: Life Stage Differences in Family Firms. *Entrepreneurship Theory and Practice*, 37(5), 1177–1202.

Eddleston, K. A., Kellermanns, F. W., & Zellweger, T. M. (2012). Exploring the entrepreneurial behavior of family firms: Does the stewardship perspective explain differences? *Entrepreneurship Theory and Practice*, 36(2), 347-367.

Gomez-Mejia, L. R., Haynes, K. T., Núñez-Nickel, M., Jacobson, K. J., & Moyano-Fuentes, J. (2007). Socioemotional wealth and business risks in family-controlled firms: Evidence from Spanish olive oil mills. *Administrative science quarterly*, 52(1), 106-137.

Habbershon, T. G., & Williams, M. L. (1999). A Resource-Based Framework for Assessing the Strategic Advantages of Family Firms. *Family Business Review*, 12(1), 1–25.

Hayes, S. C., & Hofmann, S. G. (2018). *Process-based CBT: The science and core clinical competencies of cognitive behavioral therapy.* Oakland, CA: New Harbinger.

Hernández, A. J. C., & Jiménez, D. J. (2014). Knowledge management practices for corporate social responsibility: A family business perspective. Paper presented at the *Proceedings of the European Conference on Knowledge Management, ECKM, 1* 198-204.

Hernández-Linares, R., & López-Fernández, M. C. (2018). Entrepreneurial orientation and the family firm: Mapping the field and tracing a path for future research. *Family Business Review,* 31(3), 318-351.

Hernández-Perlines, F., Moreno-García, J., & Yáñez-Araque, B. (2019). The influence of socioemotional wealth in the entrepreneurial orientation of family businesses*. International Entrepreneurship and Management Journal.*

Hoffman, C., Wulf, T., & Stubner, S. (2016). Understanding the performance consequences of family involvement in the top management team: The role of long-term orientation. *International Small Business Journal*, 34(3), 345-368.

Kellermanns, F. W., & Eddleston, K. A. (2006). Corporate entrepreneurship in family firms: A family perspective. *Entrepreneurship theory and practice*, 30(6), 809-830.

Kickul, J., Liao, J., Gundry, L., & Iakovleva, T. (2010). Firm resources, opportunity recognition, entrepreneurial orientation and performance: the case of Russian women-led family businesses*. International Journal of Entrepreneurship and Innovation Management,* 12(1), 52.

Lee, S., Phan, P. H., & Yoshikawa, T. (2008). The Role of the Board and Its Interaction with the Successor's Human Capital in the Asian Family Enterprise. *Multinational Business Review*, 16(2), 65–88.

Llach, J., & Nordqvist, M. (2010). Innovation in family and non-family businesses: a resource perspective. *International Journal of Entrepreneurial Venturing*, 2(3/4), 381-399.

Lin, N. (1999). Building a network theory of social capital. *Connections*, 22(1), 28-51.

Lohe, F.-W., & Calabró, A. (2017). Please do not disturb! Differentiating board tasks in family and non-family firms during financial distress. *Scandinavian Journal of Management,* 33(1), 36–49.

Lumpkin, G. T., & Brigham, K. H. (2011). Long-term orientation and intertemporal choice in family firms. *Entrepreneurship Theory and Practice*, 35(6), 1149–1169.

Lumpkin, G. T., Brigham, K. H., & Moss, T. W. (2010). Long-term orientation: Implications for the entrepreneurial orientation and performance of family businesses. *Entrepreneurship & Regional Development*, 22(3-4), 241-264.

Lumpkin, G. T., & Dess, G. G. (1996). Clarifying the entrepreneurial orientation construct and linking it to performance. *Academy of Management Review,* 21, 135-172.

Manev, I. M., Gyoshev, B. S., & Manolova, T. S. (2005). The role of human and social capital and entrepreneurial orientation for small business performance in a transitional economy. International *Journal of Entrepreneurship and Innovation Management*, 5(3/4), 298.

Miller, D. (1983). The correlates of entrepreneurship in three types of firms. *Management Science*, 29, 770-791.

Miller, D., & Le Breton-Miller, I. (2005). *Managing for the long run: Lessons in competitive advantage from great family businesses.* Cambridge, MA: Harvard Business School Press.

Miller, D., & Le Breton-Miller, I. (2011). Governance, social identity, and entrepreneurial orientation in closely held public companies. *Entrepreneurship Theory and Practice,* 35, 1051-1076.

Miller, D., & Le Breton-Miller, I. (2014). Deconstructing socioemotional wealth. *Entrepreneurship: Theory and Practice,* 38(4), 713-721.

Miller, D., Lee, J., Chang, S., & Le Breton-Miller, I. (2009). Filling the institutional void: The social behavior and performance of family vs non-family technology firms in emerging markets. J*ournal of International Business Studies*, 40(5), 802–817.

Mustakallio, M., Autio, E., & Zahra, S. A. (2002). Relational and Contractual Governance in Family Firms: Effects on Strategic Decision Making. *Family Business Review*, 15(3), 205–222.

Nahapiet, J., & Ghoshal, S. (1998). "Social capital, intellectual Capital, and the organizational advantage", *Academy of Management Review,* 23(2), 242-266.

Naldi, L., Nordqvist, M., Sjöberg, K., & Wiklund, J. (2007). Entrepreneurial orientation, risk taking, and performance in family firms. *Family Business Review*, 20, 33-47.

Nason, R. S., Mazelli, A., & Carney, M. (2019). The ties that unbind: Socialization and business-owning family reference point shift. Academy *of Management Review,* 44(4).

Nordqvist, M., & Melin, L. (2010). Entrepreneurial families and family firms. *Entrepreneurship & Regional* Development, 22, 211-239.

Pearson, A. W., Carr, J. C., & Shaw, J. C. (2008). Toward a theory of familiness: A social capital perspective. *Entrepreneurship Theory and Practice*, 32, 949-969.

Pimentel, D., Couto, J. P., & Scholten, M. (2017). Entrepreneurial orientation in family firms: Looking at a European outermost region. *Journal of Enterprising Culture,* 25, 441-460.

Putnam, R. (2000). *Bowling alone: The collapse and revival of American community*. New York, NY: Simon & Schuster.

Rodrigo-Alarcón, J., García-Villaverde, P. M., Ruiz-Ortega, M. J., & Parra-Requena, G. (2018). From social capital to entrepreneurial orientation: The mediating role of dynamic capabilities. *European Management Journal*, 36(2), 195–209.

Sanchez-Famoso, V., Pittino, D., Chirico, F., Maseda, A., & Iturralde, T. (2019). Social capital and innovation in family firms: The moderating roles of family control and generational involvement. *Scandinavian Journal of Management*, 35(3),1-13.

Schepers, J., Voordeckers, W., Steijvers, T., & Laveren, E. (2014). The entrepreneurial orientation–performance relationship in private family firms: the moderating role of socioemotional wealth. *Small Business Economics*, 43(1), 39–55.

Schepers, J., Voordeckers, W., Steijvers, T., & Laveren, E. (2020). Long-Term Orientation as a Resource for Entrepreneurial Orientation in Private Family Firms: The Need for Participative Decision Making. *Sustainability*, 12(13), 5334-5356.

Shi, H. X., Shepherd, D. M., & Schmidts, T. (2015). Social capital in entrepreneurial family businesses: the role of trust. *International Journal of Entrepreneurial Behavior & Research,* 21(6), 814–841.

Uhlaner, L. M., Matser, I. A., Berent-Braun, M. M., & Flören, R. H. (2015). Linking Bonding and Bridging Ownership Social Capital in Private Firms. *Family Business Review*, 28(3), 260–277.

Ward, J. L. (1988). The special role of strategic planning for family businesses. *Family business review*, 1(2), 105-117.

Zellweger, T. (2007). Time horizon, costs of equity capital, and generic investment strategies of firms. *Family business review*, 20(1), 1-15.

Business Model Development in European Aerospace Start-ups: The Case of the SpaceUp Project

Erik Steinhöfel and Katrin Singer
Fraunhofer IPK, Division Corporate Management, Berlin, Germany
mail@eriksteinhoefel.de
Katrin.Singer@ipk.fraunhofer.de
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Abstract: In their quest for market establishment and organizational maturity, business model development (BMD) plays a crucial role for start-ups. After foundation, primary focus is no longer on generating promising business ideas, but on commercializing a start-up's inherent potential. This particularly applies to innovative, technology-based start-ups. Here, superior functions in relation to existing solutions resulting from advancements in technologies and the value associated with such functional superiority are center of entrepreneurial activity and BMD. This study presents the BMD methodology applied for supporting 60 technology-based, aerospace-related start-ups on their path to becoming leading companies in their field and the results of its application in the frame of the SpaceUp project. The methodology was carried out in a two-stage process. First, a questionnaire was provided to the start-ups to capture and assess their business model (BM). In a second step, based on the information provided, a detailed evaluation of the start-ups' BM was carried out and starting points for further development were generated. In order to assess the relevance and usefulness of the results generated by applying the methodology, a quantitative survey was conducted among the start-ups. The survey showed that the generated results were perceived as beneficial by the start-ups and that the application of the methodology therefore proved successful in the project.

Keywords: business model development, business model innovation, business model patterns, entrepreneurship, start-ups, aerospace

1. Introduction

As it is becoming increasingly difficult today to differentiate in the market and achieve long-term competitive advantage through product, service and process innovation (Brasseur et al. 2017; Pohle und Chapman 2006; Stern und Jaberg 2010), the business model (BM) has been established as a new and viable innovation object (Bucherer et al. 2012; Chesbrough 2010; Foss und Saebi 2017). In comparison to products, services and processes, BMs show a higher degree of abstraction and an inherently higher complexity (Wirtz 2021). Thus, innovative BMs are more difficult to imitate than product and process innovations (von den Eichen et al. 2014).

The relevance of BM innovation or business model development (BMD) in practice is reflected in both, its significance for managers and its influence on corporate success. The former is proven by the IBM Institute for Business Value (IBV) in a study among 3000 managers from 50 countries and 26 industries. According to the survey, 35% of the outperformers and 45% of the underperformers surveyed consider the innovation of BM to be of highest priority for the company's management in the next 2-3 years (IBV 2021). The relevance for the success of companies is, among others, proven in a study by Lindgardt et al. (2009). Accordingly, BM innovators and product and process innovators generate above-average returns for their shareholders compared to their industries. Furthermore, BM innovators outperform product and process innovators with regard to returns by more than four times (Lindgardt et al. 2009; Halecker et al. 2014).

Against this background, the development of BMs, ranging from incremental changes of an existing BM to the development of completely new, innovative BMs, bears the potential to contribute to the success of start-ups and small and medium-sized enterprises (SMEs), which share similar characteristics. These comprise that SMEs and start-ups are mostly small organizations that typically have informal structures and relationships, and are therefore flexible and subject to resource constraints (Terziovski 2010; Gimenez-Fernandez et al. 2020).

The following section summarizes the current state of BMD in SMEs before a method for BMD is presented. In subsequence, the project, in which the method was applied, as well as its application in the project and related results are illustrated.

2. Business model development in SMEs

Regardless of the significance of BMD for managers and corporate success, it is evident that SMEs are largely unfamiliar with the concept of (Heikkilä et al. 2016) or, where known, only have a divergent and ambiguous understanding of BM though (Becker 2011).

This is also reflected in SMEs' efforts of developing BMs. SMEs predominantly do not follow a uniform, structured approach for BMD (Buliga 2014; Halecker et al. 2014; Lindgren 2012; Marolt et al. 2016; Rieger et al. 2015; Wagner et al. 2015). According to Halecker et al. (2014) only 31% of companies with fewer than 250 employees and 39% of companies with 250 to 9,999 employees have a highly or very highly structured BMD process in place, whereas 44% of companies with more than 10,000 employees do. BMD in SMEs is thus predominantly intuitive and unstructured (Buliga 2014; Marolt et al. 2016; Rieger et al. 2015). This deficit can be attributed to the fact, amongst others, that BMD is a challenging, very complex and difficult task for SMEs and that both, time and resources for conducting BMD, are scarce (Buliga 2014; Lindgren 2012; Rieger et al. 2015).

A comparable picture is drawn by studies that deal with the BMD tools in SMEs. Heikkilä et al. (2016) and Bouwman et al. (2016) find that the majority of SMEs is not aware of BM ontologies or tools for BMD. Lindgren (2012) also points out that SMEs in particular lack tools to analyse BMs. However, if SMEs are already aware of tools, they are often perceived as too academic or complex to go through a complete cycle of BMD applying those tools (Heikkilä et al. 2016). The low level of awareness regarding tools is also reflected in their limited application. Wagner et al. (2015) find that the Business Model Canvas (BMC) according to Osterwalder und Pigneur (2011) is known to only half of the companies surveyed and used by 33%. The Business Model Navigator (BMN) according to Gassmann et al. (2021) is not known to any of the companies. The interviews also show that, in general, no uniform method is used for BMD (Wagner et al. 2015). This is supported by Marolt et al. (2016), who state that companies that have made changes to their BM have not used any known ontologies or tools. This is also confirmed by the study of Heikkilä und Bouwman (2018), according to which only 19% of the 1597 companies surveyed that pursue BMD use formal methods. Of these, 7% used the BMC, 3% used Maurya (2012) Lean Canvas, and 9% used other methods, with SWOT analysis being the most frequently mentioned alternative.

3. Business model development in the SpaceUp project

In the following the SpaceUp project, the BMD methodology applied in the project, its application as well related results are presented.

3.1 SpaceUp project

The overall objective of SpaceUp was to contribute to the safeguarding and further development of a competitive and entrepreneurial space industry at a European level. Hence, existing innovative European aerospace start-ups were supported in their development into leading companies by the project consortium, which consists of 10 partners: Aviaspace Bremen, EBAN, Fraunhofer IPK, IASP, GI Group, IBS Consulting, SME4SPACE, 200 Crowd, Consorzio di ricerca Hypatia and Lazio Innova. The core of the project comprised a defined set of support services tailored to the needs of the targeted start-ups provided by the consortium in conjunction with so-called Space Academies. In this context, a total of 60 start-ups were supported with regard to BMD and further topics.

3.2 Methodology for BMD

The BMD method applied in SpaceUp developed by Steinhöfel (Forthcoming 2021) is based on the state of BMD in SMEs and considers strengths and weaknesses of the BMD methods by Bucherer (2010), Gassmann et al. (2021), Osterwalder and Pigneur (2011), Schallmo (2018) and Wirtz (2021). The scope of the method reaches from incremental over radical adoption of existing BMs to the development of completely new, innovative BMs for SMEs. According to Steinhöfel (Forthcoming 2021) a BM comprises a set of elements that can be further broken down into sub-elements. In this context, the underlying logic of a BM is that tangible and intangible resources (resources) are utilized in primary and supporting activities (value creation) to provide customers with offerings at a certain price (value proposition) leading to the generation of revenues and to the incurrence of costs (profit equation). As illustrated in Figure 1 the BM is understood as an open system imbedded in and interacting with its micro and macro environment.

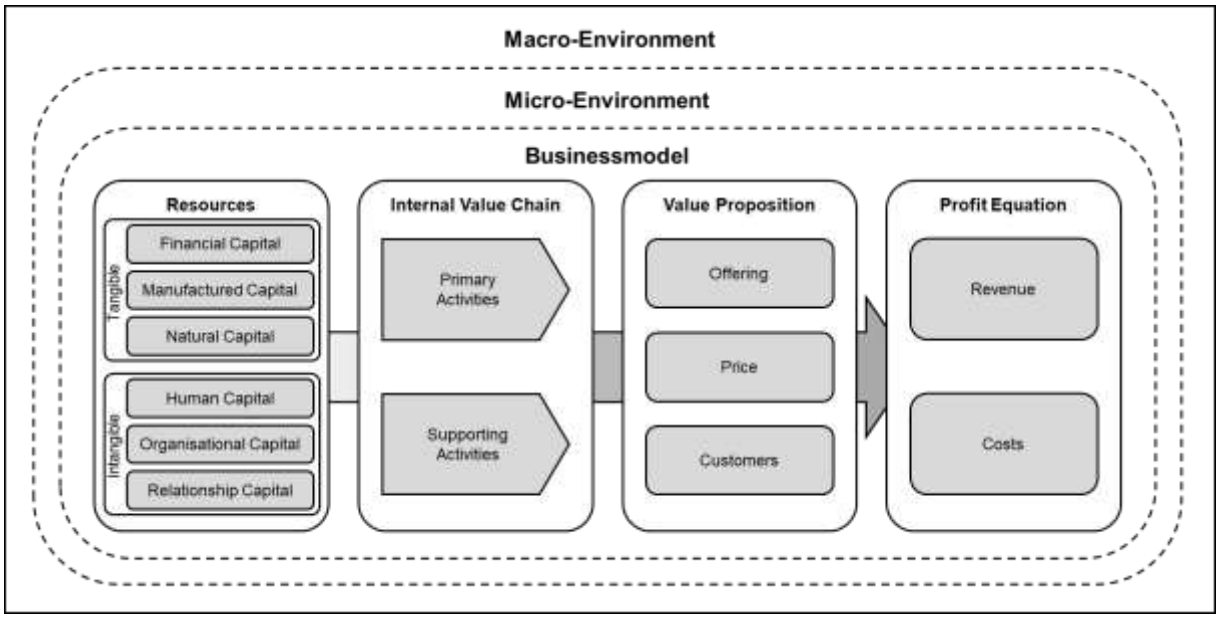

Figure 1: Business model with its elements and sub-elements (Steinhöfel Forthcoming 2021)

The application of the method is generally based on a workshop approach, which is implemented through a series of workshops. The procedure for BMD according to the method comprises four phases, namely: initiation, development, implementation and controlling (Figure 2).

The aim of the initiation phase is to record and evaluate both, the existing BM and the environment of an organisation. To this end, the organisation's objectives are captured as a reference point for BMD and the elements and sub-elements of the existing BM are described. Regarding the environment, the macro-environment in the form of political-legal, economic, social, technological and ecological factors to which the organisation is exposed and which it cannot control are recorded on the one hand. On the other hand, the micro-environment, the immediate economic environment of the company, is captured. The latter includes, among others, competitors with their respective BM. Based on these steps, the existing BM and the environment are evaluated regarding strengths and weaknesses as well as opportunities and threats. These form the basis for the following phase.

The goal of the development phase is to generate, evaluate, prioritize and select options for BMD and to create a BM roadmap. In doing so, resources are considered as a starting point for BMD and implementation orientation is targeted in order to consider the scarcity of resources of SMEs. Furthermore, the adaption of existing BMs and the development of completely new BMs are supported in order to enable a short- to long-term BMD. In addition, a BM roadmap is elaborated. Within the roadmap prioritized BM options are documented in a logical sequence in terms of content and time in the form of development paths for the short- to long-term BMD.

The goal of the implementation phase is the realisation of a selected option to adapt the existing BM or to introduce a BM that is new to an organization. For this purpose, the selected BM option is first detailed. Subsequently, a gap analysis between the existing BM and the BM resulting from the realisation of the option is carried out in order to work out the required changes for each BM element. The documented changes are then used to derive measures for implementation and to plan them in their entirety.

The objective of the control phase is the continuous monitoring of a BM and its environment in order to initiate further BMD cycles if necessary, as well as the continuous optimisation of an organisation's BMD in order to secure the achievement of corporate objectives. For this purpose, it is necessary to develop a monitoring system that can be used to continuously monitor the achievement of objectives on the basis of quantitative data and to proactively identify changes in the corporate environment that could potentially influence the BM and affect target achievement. If such changes are identified and/or objectives are not achieved or if BMD is pursued on a rotational basis, a further cycle of BMD is initiated. The optimization of BMD is based on the documentation of BMD cycles and the experience and knowledge gained in this context (Steinhöfel Forthcoming 2021).

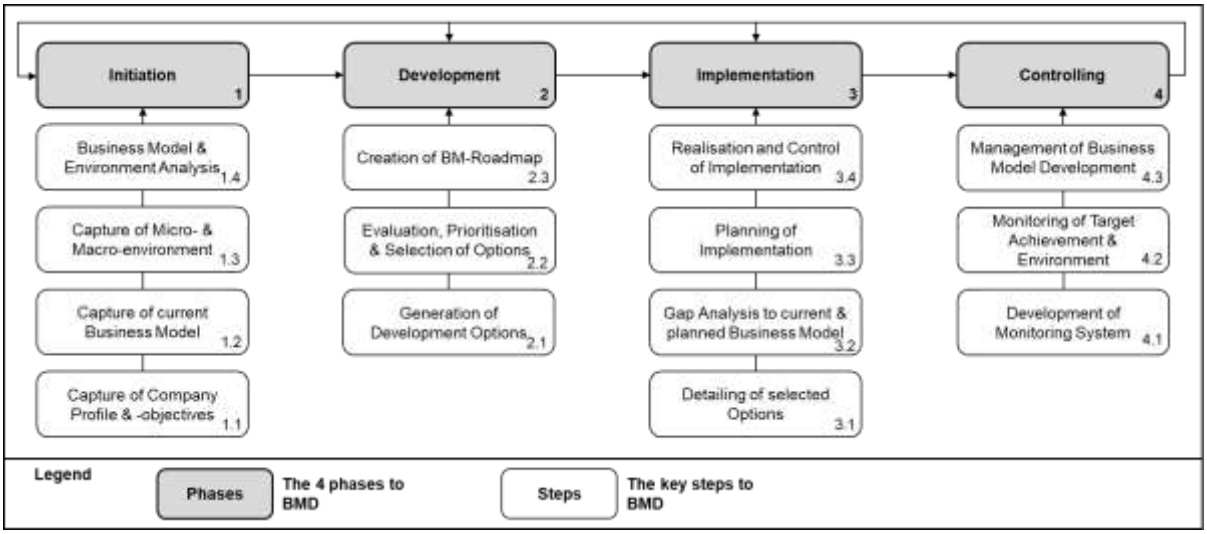

Figure 2: Procedural model of BMD according to Steinhöfel (Forthcoming 2021)

The procedural model allows the allocation of tools and supporting materials to the respective phases and steps. In addition to checklists and templates, these include in particular a catalogue comprising 370 BM patterns as well as an associated taxonomy for their application, a BM roadmap architecture and a documentation model as well as a questionnaire for analysing BMs and the corporate environment. These were specifically developed for the application of the method (Steinhöfel Forthcoming 2021).

3.3 Application and results of BMD in SpaceUp

The objective of BMD in SpaceUp was to capture and evaluate the existing BM of 60 start-ups and to provide them with options for further development. For this purpose, the Initiation and Development Phase were implemented in SpaceUp. The procedure is described in the following.

3.3.1 Initiation phase

In the frame of the initiation phase both, the existing BM and the environment of the start-ups, were captured and evaluated by means of a questionnaire, which was structured in eight sections.

The first section captured the company profile with general information about the company in the form of seven open questions. The second section focused on general corporate objectives. These were captured through five questions that focused on the vision, mission, core values, short- to medium-term financial and non-financial objectives, as well as the strategy pursued and the measures currently being implemented in this regard. The following, third section, aimed at capturing the current BM as the foundation for its subsequent evaluation. The individual elements of the BM, which represent individual questionnaire sections, are detailed in the following.

Resources were differentiated into six different types of capital and captured as well as assessed through eight questions. The capital types include financial, manufactured, natural, human, organisational and relational capital. For this purpose, a unipolar 11-point rating scale was used. Regarding the relative importance, the scale ranged from 0 (not important) to 10 (very important) and for the development level from 0 (insufficient) to 10 (excellent). For each assessment, the respective reasoning was collected with an open question.

In the fourth section, the BM element value creation was captured and assessed through 12 questions that correspond to the generic categories of the BM sub-elements primary and supporting activities, according to Porter (2014). First, descriptions of the sub-elements were captured before they were assessed in terms of importance and development level for the successful execution of the BM. For the assessment, the same scales as for resources were used. Here too, the respective reasoning for the assessment was collected through an open question. In order to consider that activities can also be completely or partially outsourced to third parties, an additional question was included in this regard. The fifth section was dedicated to capturing and assessing the BM element value proposition through seven questions. In this respect respondents were asked to list the most relevant value factors from a customer perspective (e.g., price, durability, ease of use, expandability, recyclability etc.) when making use of an offer of the start-up or its competitors considering the buying process

and the respective life-cycle. Based on the identified factors, respondents were asked to assess the performance of their offering regarding the single factors in relation to competition. For this purpose, a bipolar 11-point rating scale was used. The endpoints ranged from -5 (much worse) to +5 (much better), with the centre of the scale labelled 0 (about the same). The sixth section of the questionnaire covered the BM element profit equation, which was captured through three questions for each of its sub-elements, revenues and costs. The assessment of the profit equation focused on the structure and mechanisms of revenues and costs with respect to their respective development level on a bipolar 11-point rating scale from 0 (insufficient) to 10 (excellent).

The seventh section was dedicated to capturing and assessing the corporate environment. In this regard, three questions captured the micro-environment focusing on the current situation on the sales and procurement market as well as the competitive situation and their respective future development. Six questions related to the macro-environment captured political, economic, technological, social, legal and environmental factors, which have an impact on the organisation's industry. Building up on the captured factors, these were assessed in another question regarding their potential impact on the successful execution of the BM. To ensure consistency, again an 11-point bipolar rating scale ranging from -5 (very negative) to 5 (very positive) was used. In addition to the questions related to the analysis of the start-ups' BMs and environment, the eighth section of the questionnaire focused on capturing the start-ups' knowledge with regard to BMs and their practical experience regarding BMD on a 4-point bipolar scale ranging from poor to excellent as well as. Furthermore, BMD methodologies and tools known to the start-ups and applied by them were captured through one open question each.

Evaluation of survey results

Based on the survey results, the existing BM was analysed regarding strengths and weaknesses. For identifying these related to the start-ups' *resources and internal value chain*, the results of the respective assessments were visualised in a two-dimensional portfolio. Here, the assessment related to relative importance was plotted on the x-axis and the assessment of the relative development level was plotted on the y-axis (**Error! Reference source not found.**).

Figure 3: Resource and activity portfolio

Combining these two dimensions results in four quadrants, from which four general standard interpretations can be derived for the analysed factors:

- *Stabilise*: Factors in this quadrant are highly relevant and sufficiently developed for executing an existing BM successfully. They thus represent strengths and should therefore be stabilised.

- *Develop*: Factors in this quadrant are also highly relevant, but not sufficiently developed. Accordingly, these factors represent weaknesses that should be eliminated.
- *Analyse*: Factors in this quadrant show a low relevance and are not sufficiently developed. Thus, they are currently not critical. If their importance increases though, they represent weaknesses. Therefore, it is important to monitor them.
- *No need for action*: Factors in this quadrant show a low relevance and are sufficiently developed. These factors, therefore, do not indicate an urgent need for action, but should be observed regarding changes in their importance.

The identification of strengths and weaknesses with regard to the start-ups' *value proposition* was carried out by applying the approach of Kim and Mauborgne (2015). For this purpose, the start-ups' offerings were illustrated in form of a value curve, in which relevant factors of an offering from the customer's point of view were illustrated on the x-axis and the assessments of the respective factors in relation to competition were plotted on the y-axis. This form of representation provides an overview of those value factors that should be considered when developing the value proposition. For the analysis of a company's offering the following standard interpretations, derived from relevant literature (Kim and Mauborgne 2015; Magretta 2012; Porter 1998), were applied:

- *Strength through differentiation*: An offering is potentially competitive if it has a clearly differentiated value curve compared to offerings of competitors. According to Porter (1998), this corresponds to the strategy of differentiation, which is expressed by the fact that the company's value curve is significantly different in terms of focused value factors and can essentially be communicated to customers via a concise slogan (Kim and Mauborgne 2015).
- *Strength through cost leadership*: In addition, a service can also be competitive if it has a similarly designed value curve compared to the offerings of competitors at low costs relative to competition. According to Porter (1998), this corresponds to a cost leadership strategy.
- *Weakness due to equality*: If an offering has the same characteristics in terms of factors and price compared to competition, it is not suitable for ensuring competitiveness in the long term. According to Porter (1998), a company with such offerings has no strategy. Customers experience a benefit through the offerings, but no decisive advantage.
- *Weakness due to inferiority*: If an offering is inferior to competition in terms of value factors and/or price, it is not suitable for ensuring competitiveness at all. There is no reason for customers to take advantage of this offering.

The evaluation of the BM element *profit equation* allows direct statements about the strength or weakness of a BM as a whole. This is due to the fact that financial figures, especially in comparison to competition, directly reflect the financial competitiveness of a BM. For identifying strengths and weaknesses regarding the profit equation, the results of the assessment related to the cost structure, cost mechanisms, revenue streams and revenue mechanisms were analysed using the following two standard interpretations:

- *Strengths*: Factors with a development level above 5 are sufficient for executing the current BM. These factors thus represent strengths that need to be stabilized.
- *Weaknesses*: Factors with a development level below 5 are insufficient for executing the current BM. These factors thus represent weaknesses that need to be eliminated.

In addition, the environment was analysed to identify threats and opportunities. For this purpose, the captured macro-environmental factors and their assessment were used to identify opportunities and threats using the following two standard interpretations (Weihrich 1982):

- *Opportunities*: Factors with a potential positive impact on the successful execution of the BM represent opportunities. These should be developed by leveraging strengths and minimizing weaknesses.
- *Threats*: Factors with a potential negative impact on the successful execution of the BM represent threats. These should be minimized by leveraging strengths and minimizing weaknesses.

Based on these interpretations, the respective assessment of the factors as well as the captured reasoning for the assessment, each start-up was provided with a detailed textual description of its status in terms of the environment.

The overall results of the initiation phase are identified strengths and weaknesses of the existing BMs as well as opportunities and threats in the environments, which built the basis for the subsequent development phase.

3.3.2 Development phase

The objective of the development phase was to generate options for the further development of the start-ups' BMs that hold the greatest success potential in terms of achieving their objectives. For this purpose, the catalogue and taxonomy of BM patterns developed by Steinhöfel (Forthcoming 2021) were applied. In the relevant literature, BM patterns are generally understood as design options for the configurations of a BM that have proven successful in practice and represent solutions to recurring problems (Gassmann et al. 2021; Abdelkafi et al. 2013; Gausemeier and Amshoff 2014). For developing promising options, weaknesses and strengths were used as a starting point to identify suitable BM patterns. For this purpose, the 370 patterns were filtered according to the relevant characteristics of the 13 dimensions of the taxonomy (1st filtering). In subsequence, the identified patterns were categorised into patterns that are generally relevant and those that are not (2nd filtering). If at this point, there were still too many potential patterns available, a further prioritisation was carried out, whereby patterns were evaluated in terms of relevance on a scale from 1 (not relevant at all) to 5 (very relevant) (3rd filtering). Those patterns with the highest relevance were subsequently used to formulate specific development options and included in the BMD reports.

4. Results

The results of BMD in the frame of SpaceUp are BMD reports provided to the start-ups, the start-ups' perception of BMD within SpaceUp and procedural insights regarding BMD in the project.

4.1 BMD reports

The BMD reports based on the information and assessments provided by the start-ups represent the main result of BMD in the frame of the SpaceUp project (**Figure 4**).

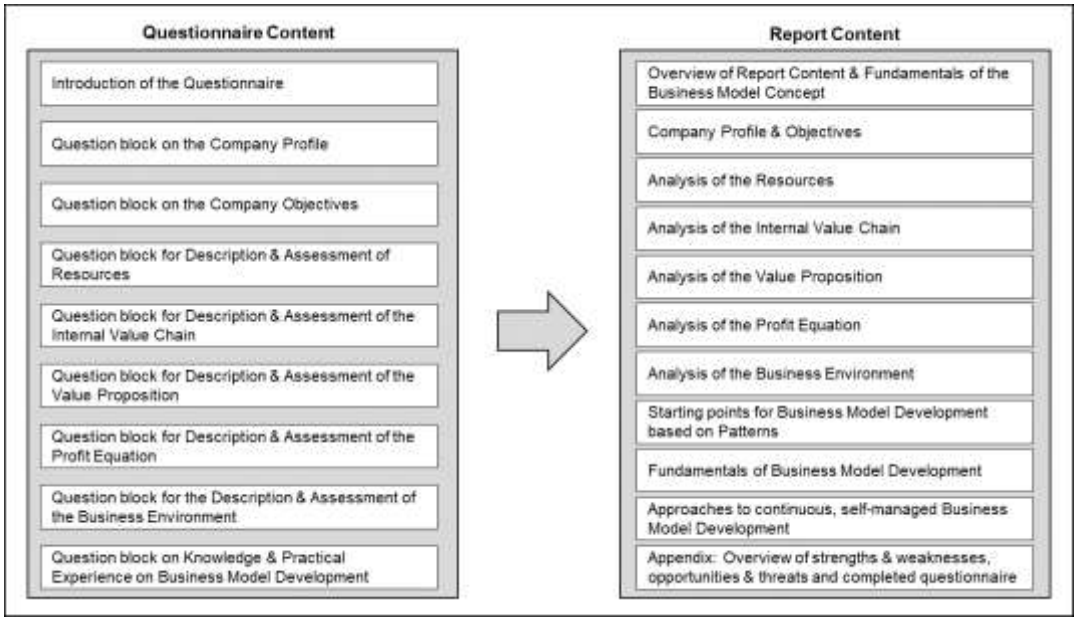

Figure 4: Questionnaire and report content in SpaceUp

In addition to basic information on the concept of BMs and BMD as well as the company profile and the company goals, the reports included the following contents:

In the frame of the analysis regarding resources and value creation, a consolidated portfolio was provided. It allowed the categorisation of the resource types and value creation activities into strengths and weaknesses and summarises them in an overview. Using this overview in combination with the reasons for the assessments, provided the companies with the possibility to prioritise starting points for optimizing their BM and to formulate specific, profound measures in this regard.

The analysis of the value proposition was provided by means of a value curve that allowed the differentiation of the factors into strengths and weaknesses. Based on the value curve and further investigation of relevant factors based on purchasing process and the lifecycle of the offerings the start-ups were enabled to adopt their current or develop a novel value proposition.

The analysis of the profit equation was carried out based on the captured description and the assessment of the cost structure, the cost mechanisms, the revenue streams and the revenue mechanisms. This differentiation allowed the start-ups to identify specific discrepancies related to the profit equation and derive measures for its optimization.

The analysis of the environment was based on the captured factors and their assessment. Accordingly, factors could be divided into opportunities with a potential positive impact and risks with a potential negative impact. In combination with the identified strengths and weaknesses these enabled the start-ups to derive different measures for coping with the environment.

Furthermore, based on the identified strengths and weaknesses, on average 19 options for optimising the existing BM or innovating new BMs were provided using BM patterns in combination with the related taxonomy. The start-up specific options provided them with concrete starting-points for further BMD, whereas single options or combinations of multiple options enabled them to change their existing BM or develop completely new ones.

The final content of the report comprised instructions and information to enable the start-ups to pursue BMD independently and continuously as well as on how to simplify the process.

4.2 Perception of BMD

The contents of the BMD reports as well as related questions were discussed with the start-ups in individual interviews during the Space Academies. The qualitative results confirmed the usefulness of the reports and showed that the creation of an overview of the entire BM and the concrete options for improvement were perceived as particularly useful. Moreover, according to the start-ups, the suggested pattern-based options for BMD partly coincided with recently planned measures, which can be interpreted as an indicator for the relevance of the pattern-based options provided.

Furthermore, following each Space Academy, a quantitative survey among the participants was conducted in order to identify positive aspects and potential for improvement. The quantitative survey of the start-ups regarding the relevance and usefulness of the report content for the six advisory cycles led to consistently positive results. Overall, from 44 responses, 34% of the start-ups assessed the content as highly relevant, 25% as very relevant, 34% as relevant and only 5% as less relevant and 2% as not relevant at all. Regarding the usefulness of the reports in creating a deeper understanding about BMD and deriving new ideas, 90% of the companies surveyed agreed completely and mostly, while 10% agreed partially.

4.3 Procedural insights

The application of BMD in the course of SpaceUp was subject to certain restrictions. These included, the time and location-related constraints. Accordingly, in the timeframe of about 1.5 months, 10 start-ups from all over Europe had to be provided with support regarding BMD simultaneously in each of the six consulting cycles. Against this background, the application of the method by Steinhöfel (Forthcoming 2021) through workshops was not an option.

In the course of the questionnaire-based implementation of the method in SpaceUp, iterative changes were made demand-oriented after each consulting cycle, if necessary. These included the refinement of the questionnaire introduction to achieve a better understanding on the part of the start-ups regarding the procedure in general as well as specifically for answering the questions contained in the questionnaire. Similarly, individual questions were supplemented with concrete examples of potential answers in order to simplify the answering process. Furthermore, the questions regarding the environment were removed as it became apparent that the start-ups were only able to answer these questions partly, and, accordingly, only made statements to a limited extent in this regard, which did not allow a thorough analysis.

Regarding the generation of BMD reports, it was found that the process could be standardized to a large extent. Thus, a guideline for the generation of BMD reports was created, which ensured an efficient generation of reports. In this way, the time and effort required for the development of a single report could be almost halved.

5. Conclusion

The objective of this paper was to present the BMD method applied in 60 start-ups in the frame of SpaceUp project and to illustrate the results of its application.

The BMD method presented in this paper provided the start-ups with a comprehensive analysis of their existing BM in terms of strengths and weaknesses and options for further development in the form of BM options. Furthermore, the BMD reports provided the start-ups with information and instructions to pursue BMD independently and continuously as well as on how to simplify the process.

The qualitative results confirmed the usefulness of the reports and showed that the creation of an overview of the entire BM and the concrete options for improvement were perceived as particularly useful. This was also in line with the quantitative survey results, showing that the majority of participants assessed the report from relevant to highly relevant as well as useful. In conclusion, it can be stated that the project succeeded in making the increasingly important and mostly abstract topic of BMD accessible to start-ups in the form of a practicable procedure. The application of the presented method can thus promote the performance of start-ups with regard to BMD. In this context, however, the application of the method for BMD also showed limitations as the application of BMD in the frame of the project was subject to certain restrictions.

The qualitative feedback obtained from the start-ups showed that the questionnaires were mostly fulfilled by individual employees instead of teams. Ensuring that the questionnaires are completed jointly by teams would possibly ensure that the information provided in the questionnaire represents a more accurate reality.

Due to the high relevance of BMD, the field shows high potential for further research. In this context, researchers could analyse the BMs of aerospace start-ups to identify BM patterns in this industry. These BM patterns would in turn be of high value for Academia to expand existing BM pattern collections, and would also complement continuous BMD in aerospace start-ups.

Moreover, the SpaceUp project showed that start-ups need more support in the analysis of their business environment. Further research can thus further elaborate the implementation of analysis of the external environment in the frame of BMD. Finally, the guideline developed in the project can be used to develop a tool or platform that creates BMD reports in an automated manner. In this context, the self-assessment and provided reasoning for the self-assessment could be used to create the graphs and description of the current BM. In this way, practitioners would benefit from a faster and simplified access to results of such analysis, which in turn would support continuous development efforts in particular.

References

Abdelkafi, N.; Makhotion, S.; Posselt, T. (2013) Business Model Innovations for Electric Mobility. What Can Be Learned from Existing Business Model Patterns? In: International Journal of Innovation Management 17 (01), 1340003.

Becker, W. (Ed.) (2011) Geschäftsmodelle im Mittelstand. Unter Mitarbeit von W. Becker, P. Ulrich, R. Ebner, R. Holzmann, J. Krämer, M. Staffel et al. Deloitte Mittelstandsinstitut an der Universität Bamberg. Bamberg (Bamberger Betriebswirtschaftliche Beiträge, 175).

Bouwman, H.; Molina-Castillo, F.-J.; Reuver, M. de (2016) Business Model Innovation in European SMEs. Some Preliminary Findings. In: Versendaal, J.; Kittl, C.; Pucihar, A.; M. K. Borstnar (Hg.): Proceedings of the 29th Bled eConference. Bled, Slovenia, 19.06.2016–22.06.2016, pp. 527–538.

Brasseur, T.-M.; Mladenow, A.; Strauss, C. (2017) Open Business Bodel Innovation. Literature Review and Agenda for Future Research. In: Business Informatics 4 (42), pp. 7–16.

Bucherer, E. (2010) Business Model Innovation. Guidelines for a Structured Approach. Dissertation Universität St. Gallen 2010. Aachen: Shaker Verlag (Berichte aus der Betriebswirtschaft).

Bucherer, E.; Eisert, U.; Gassmann, O. (2012) Towards Systematic Business Model Innovation. Lessons from Product Innovation Management. In: Creativity and Innovation Management 21 (2), pp. 183–198.

Buliga, O. (2014) Measures for Innovating Business Models. An Empirical Study of German SMEs. Wiesbaden: Springer Gabler (BestMasters).

Chesbrough, H. (2010) Business Model Innovation. Opportunities and Barriers. In: Long Range Planning 43 (2-3), pp. 354–363.

Foss, N. J.; Saebi, T. (2017) Fifteen Years of Research on Business Model Innovation. In: Journal of Management 43 (1), pp. 200–227.

Gassmann, O.; Frankenberger, K.; Choudury, M. (2021) Geschäftsmodelle entwickeln. 55+ innovative Konzepte mit dem St. Galler Business Model Navigator. 3., überarbeitete und erweiterte Auflage. München: Hanser.

Gausemeier, J.; Amshoff, B. (2014) Diskursive Geschäftsmodellentwicklung. Erfolgreiche Positionierung in der Wettbewerbsarena durch integrative Entwicklung von Marktleistung und Geschäftsmodell. In: Zeitschrift für wirtschaftlichen Fabrikbetrieb 109 (6), pp. 428–434.

Gimenez-Fernandez, E. M.; Sandulli, F. D.; Bogers, M. (2020) Unpacking Liabilities of Newness and Smallness in Innovative Start-Ups. Investigating the Differences in Innovation Performance Between New and Older Small Firms. In: Research Policy 49 (10), 104049.

Halecker, B.; Hölzle, K.; Sittner, M. (2014) Business Development und Geschäftsmodellinnovation. Status quo und zukünftige Entwicklungen. Ergebnisbericht zur Studie. Hg. v. Universität Potsdam.

Heikkilä, M.; Bouwman, H. (2018) Business Model Innovation in European SMEs. Descriptive Analysis of Quantitative Survey and Case Survey Data. In: Pucihar, A.; Kljajič, M.; Ravesteijn, P.; Seit, J.; Bons, R. (Ed.): Proceedings of the 31st Bled eConference. Bled, Slovenia, 17.06.2018–20.06.2018, pp. 543–560.

Heikkilä, M.; Bouwman, H.; Heikkilä, J.; Haaker, T.; Lopez-Nicolas, C.; Riedl, A. (2016) Business Model Innovation Paths and Tools. In: Versendaal, J.; Kittl, C.; Pucihar, A.; M. K. Borstnar (Ed.): Proceedings of the 29th Bled eConference. Bled, Slovenia, 19.06.2016–22.06.2016, pp. 571–587.

IBM Institute for Business Value (IBV) (Hg.) (2021) Find Your Essential. How to Thrive in a Post-Pandemic Reality. The 2021 CEO Study (C-Suite Series). URL: https://www.ibm.com/downloads/cas/WVPWGPYE [Last access: 04.05.2021].

Kim, W. C.; Mauborgne, R. (2015) Blue Ocean Strategy. How to Create Uncontested Market Space and Make the Competition Irrelevant. Erweiterte Auflage. Boston: Harvard Business Review Press.

Lindgardt, Z.; Reeves, M.; Stalk, G.; Deimler, M. (2009) Business Model Innovation. When the Game Gets Tough, Change the Game. Hg. v. Boston Consulting Group.

Lindgren, P. (2012) Business Model Innovation Leadership. How Do SME's Strategically Lead Business Model Innovation? In: International Journal of Business and Management 7 (14), pp. 53–66.

Magretta, J. (2012) Understanding Michael Porter. The Essential Guide to Competition and Strategy. Boston: Harvard Business Review Press.

Marolt, M.; Lenart, G.; Maletič, D.; Borštnar, M. K.; Pucihar, A. (2016) Business Model Innovation. Insights from a Multiple Case Study of Slovenian SMEs. In: Organizacija 49 (3), pp. 161–171.

Maurya, A. (2012) Running Lean. Iterate From Plan A to a Plan That Works. 2. Auflage. Sebastopol: O'Reilly (The Lean Series).

Osterwalder, A.; Pigneur, Y. (2011) A Handbook for Visionaries, Game Changers, and Challengers. Frankfurt am Main: Campus.

Pohle, G.; Chapman, M. (2006) IBM's Global CEO Report 2006. Business Model Innovation Matters. In: Strategy & Leadership 34 (5), pp. 34–40.

Porter, M. E. (1998) Competitive Advantage. Creating and Sustaining Superior Performance. New York: Free Press.

Porter, M. E. (2014) Wettbewerbsvorteile. Spitzenleistungen erreichen und behaupten. 8. Auflage. Frankfurt Main: Campus.

Rieger, V.; Bodenbenner, P.; Wagner, T.; Tilly, R.; Schoder, D.; Seltitz, A. (2015) Geschäftsmodellinnovationen. Neue Wege für nachhaltigen Erfolg. Studie. DETECON Consulting. URL: https://www.detecon.com/sites/default/files/Detecon%20Studie_Gesch%C3%A4ftsmodellinnovation.pdf [Last access: 21.10.2017].

Schallmo, D. R.A. (2018) Geschäftsmodelle erfolgreich entwickeln und implementieren. Mit Aufgaben, Kontrollfragen und Templates. 2., überarbeitete und erweiterte Auflage. Berlin: Springer Gabler (Lehrbuch).

Steinhöfel, E. (Forthcoming 2021) Geschäftsmodellentwicklung in KMU. Eine ressourcen- und implementierungsorientierte Methode zur kontinuierlichen Anpassung und Innovation von Geschäftsmodellen. Dissertation Technische Universität Berlin. Stuttgart: Fraunhofer Verlag (Berichte aus dem Produktionstechnischen Zentrum Berlin).

Stern, T.; Jaberg, H. (2010) Erfolgreiches Innovationsmanagement. Erfolgsfaktoren, Grundmuster, Fallbeispiele. 4., überarbeitete Auflage. Wiesbaden: Gabler.

Terziovski, M. (2010) Innovation Practice and Its Performance Implications in Small and Medium Enterprises (SMEs) in the Manufacturing Sector. A Resource-Based View. In: Strategic Management Journal 31 (8), pp. 892–902.

von den Eichen, S. F.; Matzler, K.; Freiling, J.; Füller, J. (2014) Woran Geschäftsmodellinnovationen scheitern. In: Granig, P.; Hartlieb, E.; Lercher, H. (Ed..): Innovationsstrategien. Von Produkten und Dienstleistungen zu Geschäftsmodellinnovationen. Wiesbaden: Springer Gabler, pp. 147–159.

Wagner, T.; Tilly, R.; Bodenbenner, P.; Seltitz, A.; Schoder, D. (2015) Geschäftsmodellinnovation in der Praxis. Ergebnisse einer Expertenbefragung zu Business Model Canvas und Co. In: Thomas, O.; Teuteberg, F. (Ed.): Tagungsband 12. Internationale Tagung Wirtschaftsinformatik (WI 2015). Osnabrück, 04.03.2015–06.03.2015, p. 1298–1312.

Weihrich, H. (1982) The TOWS Matrix. A Tool for Situational Analysis. In: Long Range Planning 15 (2), pp. 54–66.

Wirtz, B. W. (2021) Business Model Management. Design, Instrumente, Erfolgsfaktoren von Geschäftsmodellen. 5., aktualisierte und erweiterte Auflage. Wiesbaden: Springer Gabler.

Third Mission Internationalization in Times of Travel Restrictions Through Digital Transformation: The Role of Dynamic Capabilities and Effectual Practices

Audrey Stolze[1], Gudrun Socher[2], Patricia Arnold[3] Anke van Kempen[4] and Nicole Brandstetter[5]
[1]Strategic Advancement Office, HM Hochschule München University of Applied Sciences and Strascheg Center for Entrepreneurship, Munich, Germany
[2]Department of Computer Science and Mathematics, HM Hochschule München University of Applied Sciences, Munich, Germany
[3]Department of Applied Social Sciences, HM Hochschule München University of Applied Sciences, Munich, Germany
[4]Department Building Services Engineering, Paper and Packaging Technology and Print and Media Technology, HM Hochschule München University of Applied Sciences, Munich, Germany
[4]Department of General and Interdisciplinary Studies, HM Hochschule München University of Applied Sciences, Munich, Germany
audrey.stolze@sce.de
gudrun.socher@hm.edu
patricia.arnold@hm.edu
anke.van-kempen@hm.edu
nicole.brandstetter@hm.edu
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Abstract: Higher education institutions (HEIs) nowadays shall generate human, knowledge and entrepreneurial capital; hence, incorporating a third mission and becoming more entrepreneurial. The process of developing a third mission requires HEIs to pursue governance, education and ecosystem entrepreneurial pathways by applying dynamic capabilities to sense, seize and transform themselves through leadership and establishment of shared vision. Key drivers for the future development of entrepreneurial HEIs are internationalization, digitalization and co-creation with ecosystem actors. However, the ongoing world pandemic and the extensive restrictions on mobility affect HEIs' internationalization strategy development and implementation. At the same time, it ignites a chase for novel digital formats that shall deliver HEIs' three missions effectively and sustainably. The present case study illustrates how the adoption of dynamic capabilities and effectual principles enabled the timely transformation of a traditional student mobility project into a novel digital format. The new format was co-created through quadruple-helix interactions (i.e. university, industry, government and civil society interactions) to provide bachelor students with a unique action-learning experience and partner institutions with a low-barrier open innovation industry-university collaboration format. Public and non-governmental organizations provided innovation challenges that were tackled by international interdisciplinary student teams, in a virtual module that is part of their regular curriculum. These teams were supported by a multi-disciplinary team of educators and external partners from industry. The results from the first pilot, which included forty-one students from eight countries and three partner organizations, demonstrate that the original goal of the project – to internationalize the HEI's third mission – was effectively achieved, as all stakeholders involved perceived added value through their engagement. Furthermore, the teaching provided promoted students' entrepreneurial mindset and global citizenship. Thus, this case exemplifies how the application of current theories and frameworks on third mission advancement supports HEIs' management practice, demonstrating the importance of employing dynamic capabilities and effectual practices.

Keywords: higher education, internationalization, third mission, digital transformation, innovation, covid-19

1. Introduction

Many countries have conducted reforms in their higher educational system, making significant changes regarding higher education institutions' (HEIs') autonomy, public financing, mission, and accountability (Audretsch and Keilbach, 2004; Gibb and Hannon, 2006). Nowadays, as a response to technological, economic, and social demands of knowledge societies, HEIs have been given a third mission, in addition to teaching and research: to be catalysts for regional economic and social development. HEIs that effectively develop this third mission are considered to be entrepreneurial, for producing concomitantly human, knowledge, and

entrepreneurship capital that drives innovations, increases regional competitiveness, and consequently positively influences economic growth (Guerrero, Cunningham and Urbano, 2015).

The transformation process of HEIs' into more entrepreneurial institutions requires the employment of 'dynamic capabilities' to sense, seize and transform (Siegel and Leih, 2018; Teece, 2018). This process is composed of a series of pilot experiments following an iterative, non-linear path in which HEIs must sense the exogenous and endogenous forces that are constantly influencing them in order to seize opportunities (Stolze, 2021). This is an 'endless transition', based on 'nonlinear innovation models' that include external stakeholders, as government and industry, in triple-helix interactions (Etzkowitz and Leydesdorff, 2000).

Stolze (2021) proposes there are three core entrepreneurial pathways to enable this transformation, based on ecosystem actions, education initiatives and governance re-structuring. Entrepreneurial pathways refer to the strategic choices taken by HEIs (i.e. its leaders) to demonstrate commitment and involvement with innovative entrepreneurship initiatives emerging inside the institution (Klofsten et al., 2019). For the future development of HEIs' third mission, in a foresight study conducted prior to the Covid-19 pandemic, Stolze and Sailer (2020) identified internationalization, digital transformation and co-creation processes as key-drivers for this process.

The Covid-19 pandemic is an unforeseen exogenous force that directly affected HEIs' governance, their students, their staff, and their relations to external stakeholders (Brammer and Clark, 2020), hence affecting HEIs' ability to deliver on all of its three missions. The travel restrictions imposed around the world to control the emerging pandemic placed HEIs' internationalization initiatives on hold, while at the same time accelerated its digital transformation. This scenario opened new opportunities for the development of virtual international exchange formats.

Against the background presented, our research question is what learnings can be systematically derived from the transformation of a traditional international mobility project into a digital format during the Covid-19 Pandemic?

Project X [name omitted] is a 2-year project, spanning from October 2019 and September 2021, funded through the scheme "HAW international" from the German Academic Exchange Service (DAAD). This funding line aims to foster German universities of applied sciences' internationalization and ProjectX's specific objective is to promote the internationalization of our university's third mission initiatives. The initial scope of ProjectX included 2-week and 4-week students' international exchange with our four key strategic partners universities in Austria, Switzerland, Finland and the United States. However, the unforeseen pandemic of 2020 directly affected international mobilities. In March 2020, our university was days away from receiving the first American incoming exchange students when all measures were forcibly cancelled. In a matter of 2 months, a new virtual format was developed and the program's advisory board and the DAAD approved all changes as new measures. Recently, a key person from our American partner affirmed in an internal communication, "I believe [university name omitted] has really set the bar for what a high-impact and meaningful virtual international program can look like so [sic.] I am very excited to be part of this program's launch!" The intriguing question is how was this possible?

2. Methodology

We conducted a retrospective qualitative case study (Yin, 2003) of a specific project, 'ProjectX' [name omitted], that was successfully iterated from an international mobility program into a virtual collaboration. This case was selected for epitomizing within our university the challenges posed by Covid-19 in teaching and transfer activities and for being acknowledged by internal and external stakeholders as a success case in virtual international collaboration. In this sense, we aimed to conduct a deep "study of the particularity and complexity of a single case, [in order to] coming to understand its activity within important circumstances" (Stake, 1995, p. xi). Furthermore, to improve confidence in the data validity we adopted two triangulation strategies suggested by Stake (1995), namely data source triangulation and investigator triangulation. Hence, different co-authors were involved in data collection instruments design, collection and analysis. The data collection occurred between December 2020 and February 2021 and combined secondary sources, as project management reports and management meeting minutes with primary data from internal and external stakeholders' testimonials, students' evaluation surveys, self-reflection exercises, and in-depth interviews with two members of the project's management team, who lead the transformation process.

3. Case study context

The project's initial scope included 2-week and 4-week students' international exchanges with our four key strategic partner universities in Austria, Switzerland, Finland and the United States. The collaboration format was on the basis that our university and our American partner host cloud innovation centres, supported by the same American technology conglomerate. These centres promote public sector and non-governmental organizations' digitalization through university-industry relations and hence, ProjectX should start internationalizing such relations.

The unforeseen pandemic caused all ProjectX's measures to be cancelled. In a matter of 2 months, a new virtual format was developed and ProjectX's advisory board and the DAAD approved all changes as new measures. The new main virtual collaboration format provides bachelor students of any degree with a unique 10-week action-learning experience awarding five ECTS (European Credit Transfer System) and is based on an existing entrepreneurship seminar named "Real Projects" offered by our university's entrepreneurship center and already approved as an elective in several Bachelor programs in diverse departments.

In the developed 'international virtual innovation challenge' course, public governmental and non-governmental organizations propose innovation challenges that transcend national boundaries and can be solved through digital technologies. Participating students are divided into international interdisciplinary teams and follow an extended design thinking based innovation process developed at our university's entrepreneurship center to tackle the proposed challenges and prototype digital solutions using either Figma, GlideAPP or Bubble.io. The pilot edition also benefits from a two-part workshop (four hours in total), offered by a representative of the technology conglomerate that supports our university's and our American university partner's cloud innovation centres. The workshop focused on ideation and production of artefacts to demonstrate the idea, based on the internal innovation process of the technology conglomerate.

The action-learning course applies a flipped-classroom didactic, offering on its management learning system pre-recorded video lectures for content input, that are combined with dynamic weekly live sessions with a computer sciences professor and an entrepreneurship lecturer for tutoring and coaching. Additionally, the students had systemic team-coaching sessions with an external expert to support them in the challenges of project management while collaborating in remote international teams.

The pilot edition of the 10-week action-learning collaboration ran between October and December 2020 and had innovation challenges proposed by three partner organizations that were tackled by ten international interdisciplinary student teams (table 1). Forty-one students from eight countries participated in the pilot edition. Most of the students study computer sciences, information systems or within the field of engineering (63%), 7% are undertaking a management related degree and the remaining students (30%) were from other degrees (among others, anthropology, political sciences, physics, agriculture and biomedicine). Furthermore, 44% were female students.

Table 1: Innovation challenges and prototyped solutions

Partner Organization	Innovation Challenge Proposed	Student Team Solutions
Municipal Labour Department	How can municipalities, through digital solutions, motivate local companies towards climate protection, in times of crisis?	4 Teams worked on the challenge. The first team prototyped a user-friendly mobile and desktop carbon footprint calculator that allows companies to easily visualize their CO2 consumption, compare their CO2 consumption with other companies of their size and sector, and receive recommendations for how to reduce their CO2 emissions. The second team prototyped a website that provides businesses with information and resources to build green walls in office spaces. The third team prototyped a user-friendly carbon tracker that generates graphs of the business' progress in CO2 reductions. Based on their progress to carbon neutrality, businesses receive different 'Ecolabels'. The last team prototyped a ranking system of small businesses according to their reduction of CO2 emissions, giving consumers a way to shop at businesses that are working to be more eco-friendly.

Partner Organization	Innovation Challenge Proposed	Student Team Solutions
National Ski Federation	How could we digitally connect/engage ski enthusiasts in a way that adds value to all stakeholders and leads to an active/interconnected ski community?	Three teams worked on this challenge. The first team prototyped an app that connects winter sport enthusiasts in a competitive and fun way with the opportunities to win prizes via a fantasy winter sports league. The second team prototyped an app that enables people to purchase any kind of ticket related to snow activities – from making a reservation in a restaurant to ski rental reservations. The last team prototyped an app that enables ski enthusiasts to find and connect with other skiers who have common interests and be part of a community to exchange information and advice.
Municipal Branch of a Youth Association	The future of youth participation: How to empower the youngsters?	Three teams worked on this challenge. The first team prototyped an app that allows the youth association members to exchange information via chat and vote in decision-making processes. The second team inspired by the usability of the dating app 'tinder' prototyped an app that allows young people to find their perfect event or activity, fitting to their needs and wants, by swiping through offers from different associations/clubs in their city. The last team prototyped an app for global young citizens to connect across borders, engaging in online discussion forums, polls, virtual workshops and events related to societal and environmental causes they care.

4. Case study results

The analysis of the case follows a stakeholder management theory approach (cf. Frooman, 1999; Freeman and McVea, 2001) to understand the complex relationships among internal and external actors of ProjectX. First, we will explore how the governance structure of the project and the flexibility enabled by our HEI's leaders and project steering committee enabled the agile transformation. Next, we will describe the actions taken by the project management team to illustrate how entrepreneurial mindset and practices were applied in the process. Last, we summarize the results of the pilot edition, based on each stakeholder group perceptions.

5. Project governance

The project governance structure and stakeholder relationship management are relative complex, as a number of internal and external stakeholders are involved (Figure 1). The project has a core management team formed by a program manager and 1-4 professors from different departments, supported by a project administrative coordinator. The core team meets bi-weekly to align actions, though during the hype of the transformation process the meetings were weekly. Initially the team had two professors, one from the computer sciences department with expertise in digitalization and software development and another from the tourism department with expertise in digital business. In mid-2020, one of the professors left the project and the remaining team members scanned the university's different departments and identified three professors with complementary fields of expertise from different departments that could add value to project. The project's steering committee approved all three professors' nomination and they joined the team in the winter semester. These professors added expertise in the fields of education digitalization, intercultural issues and digitalization of workplace and business communication.

The program manager and the project coordinator respond directly to the university's vice-president for research and internationalization in monthly meetings, and are allocated at the university's strategic advancement office, having weekly meetings with the university's chief strategy officer (CSO), who has a systemic view of the institution, its stakeholders and ongoing projects. The project's steering committee is responsible for overseeing the project execution and approving changes to the planned measures. The management team of ProjectX, the CSO, all three of our university's vice-presidents, the head of the international office and the manager of the cloud innovation center, constitute the committee.

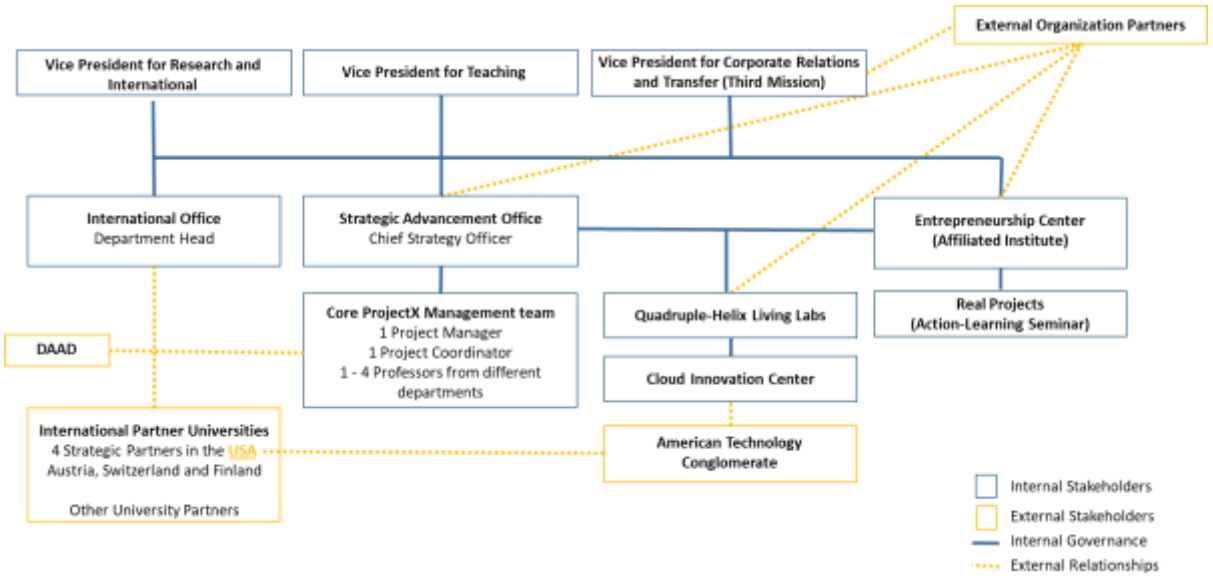

Figure 1: ProjectX's stakeholder mapping and governance structure

6. ProjectX agile transformation process

Once our university was confronted with the travel restrictions imposed in March 2020 and the need to quickly iterate ProjectX into a new virtual collaboration format that would enable reaching the project's goal of internationalization its third-mission, dynamic capabilities were effectively employed. Dynamic capabilities are defined as an organization's (or institution's) ability to integrate, build, and reconfigure internal and external competencies to address rapidly changing environments (Teece, Pisano and Shuen, 1997; Leih and Teece, 2016). In other words, the institution was able to sense the influence of this unexpected exogenous force, seize the emerging digitalization opportunities, and effectively mitigate risks to reconfigure and agile transform ProjectX.

In practice, the management team of ProjectX started with their own means. This is the "Bird at Hand Principle" in effectuation theory (Sarasvathy, 2001). The project team reflected about who they were, what they knew, what could they do and whom they knew, in order to brainstorm possible transformation pathways that would enable synergies among existing international initiatives within our university's departments and institutes. At this point, many possibilities were discussed and the chosen path was based on the assumption that in a moment of crises, students would focus on the core of their studies and hence enabling ECTS would be key. The fact that an inter-departmental action-learning seminar for entrepreneurship existed was quickly identified, as the ProjectX program manager had previously worked on the university's entrepreneurship center and taught this seminar. The curriculum was co-created by the program manager and the computer sciences professor to combine the existing entrepreneurship learning-goals with the requirements of the project and the need to place further focus on digital prototyping and agile project management, following the guidelines provided by Turgut-dao *et al.* (2015).

In this transformation process, the management team focused on the downside risks to leverage contingencies, which means that instead of developing many "what-if" scenarios to try anticipating worst-case situations, the project team interpreted all emerging adversities as insights, making timely decisions on the best possible way forward. In practice, they focused exclusively on activities within their control in order to achieve the desired outcomes, as they "truly believe that the future is not found or predicted, but rather created!" as pointed out by the project manager. By doing so, in hindsight it clearly limited the risks of the transformation process, as they were applying another key effectuation principle, managing their "affordable losses" (Sarasvathy, 2001) at each step of the process, instead of developing an all-or-nothing new virtual format for the project.

According to the program manager "a very important factor in this whole process is that we placed great effort to form new partnerships with internal and external stakeholders that were before not foreseen in the project to co-create with these a new way forward that would add-value to all parts through synergies of resources and capabilities". In practice, besides the early involvement from the entrepreneurship center in the transformation, the team leveraged the university's Quadruple-Helix living-labs network, which has extensive relationships with

key external stakeholders. In addition, the team seeked to include the representative of the American conglomerate in the co-creation process. One downside of the agile transformation was the fact that the ProjectX could not enable the co-creation with the partner universities, who were themselves managing the impact of the pandemic on their core activities and focusing on their own agile digitalization processes.

7. Stakeholders perceptions on pilot edition

Overall, ProjectX pilot was a success and to understand the value created, table 2 summarizes the perceptions of the main stakeholder-groups regarding their participation on the pilot.

Table 2: Summary of stakeholder's perceptions

Stakeholder Group	Summary of stakeholders' perceptions of the pilot (Retrospective)
Students	Students evaluated the course positively. The most valued aspect was the learning provided through the virtual teamwork experience. Students increased their network and improved their intercultural communication skills. The main difficulties faced by students were due to time differences, most teams faced up to 10 time zones apart among members. Only 4 students reported team conflicts, which caused them worries during the course, through these did not negatively impact on grading; The challenges provide students with a real-life meaningful experience, in which they felt to contribute towards something that could actually be implemented in the future, by the partner organization; The students reported to have improved their skills as they experienced working with a variety of tools and resources introduced during the course as either part of the agile project management, or the innovation process.
Partner Organizations	Partner organizations expressed appreciation for the opportunity to take part on ProjectX, expressing they received relevant insights to foster internal discussions in their organisations; They demonstrated engagement and enjoyment for having the opportunity to engage with young adults from different nationalities during three virtual live sessions. One organisation's representative regarded it as "refreshing". Overall, partner organisations were positively impressed by the professionalism showed by the students in their interactions; All three partners after the conclusion of the pilot received a case report published open access sharing the team's prototyped solutions; All three partners took internal actions based on ProjectX results. The Municipality aims to integrate one of the team's solutions to improve networking and data visualization of an ongoing sustainability program for small and medium sized local companies. Another organization is currently discussing with potential contractors the development of a mobile application merging functionalities of two of the prototyped solutions. The last partner organization is currently looking for funding opportunities to finance the development of a mobile application inspired by the teams' prototypes; One partner organization has joined the 2nd edition of ProjectX, which has a topic-focus on sustainability issues in the sports industry, with a new innovation challenge that should support the development of their sustainability strategy.
International Partner Universities	Partner universities representatives recognized ProjectX team's efforts to enable international collaboration among the students in a time of travel restrictions. The finish partner university motivated by this effort, also enabled our universities to join one of their summer programs remotely; The course quality and action-learning format were acknowledged, with a representative of the American partner affirming: "I believe MUAS has really set the bar for what a high-impact and meaningful virtual international program can look like so [sic.] I am very excited to be part of this program's launch!"
University Leadership (Vice-presidents and Chief Strategy Officer)	The pandemic meant most staff had to focus on "core activities". The fact that the project team did not wait to iterate ProjectX, taking immediate action was positively evaluated; University leadership was particularly interested and satisfied with the pilot's results, emphasizing the value delivered by the synergies promote among different initiatives of the university to enable agile transformation. The agile transformation and timely approval of the new measures by the steering committee and the DAAD meant ProjectX returned less than 10% of the 2020 budget allowance to DAAD, which is an average return rate even in 'normal times'; The resources developed by ProjectX are re-usable and can be adapted for online action-learning seminars in different contexts, as international project management, innovation

Stakeholder Group	Summary of stakeholders' perceptions of the pilot (Retrospective)
	and entrepreneurship, and mobile application. All content-videos produced are hosted on the university streaming server and accessible to all professors and lecturers who would like to integrate them on their courses (e.g. embedding it on Moodle courses); ProjectX is seen by the university leadership as a "success case story" with lessons-learned to be shared internally. The team was invited to present the case in an internal board meeting and at an event for international partner universities. Lessons-learned reported provided insights for the development of the university's new third mission internationalization and all members of ProjectX's management team were invited to contribute to a strategy co-creation workshop; The sustainability of ProjectX's outputs and lessons-learned beyond the funding period are a key aspect to be addressed by the team after the pilot. The synergies created with other projects and formats could improve the chances of the project sustainable continuation post-funding.

8. Discussion and implications

Reflecting on the transformation process, the program manager of ProjectX concluded "our team's entrepreneurial mindset enabled us to manage the chaos and the collegiality, respect and trust existing among the team members definitely made things a bit lighter and running the pilot was a fun experience". This entrepreneurial mindset is clearly justified by the fact the team following effectual thinking principles, transferring insights and lessons-learned from past initiatives, building upon existing resources and capabilities in the meso-level and generating synergies among pre-existing formats across the university.

Currently, all higher education institutions are facing challenges due to governments' and society's demands and expectations placed on them. They are "facing both new challenges and old ones with new levels of urgency. Survival and future development will depend on how well universities adapt to unpredictable environments that are becoming global, instead of isolationist; international, instead of domestic; and competitive, instead of regulated" (Klofsten et al., 2019, p.150).

Within the sector, there is a global call for new models and practices, requiring us to develop new formats that contribute to economic, technological and societal developments in our regions. In this sense, "understanding how universities become more successful thus requires an examination of how campus leaders make the right decisions and put the right processes in place to undergird the organizational capabilities that sustain competitiveness" (Leih and Teece, 2016). Hence, regardless of crises, we must habitually monitor and acknowledge the influencing exogenous and endogenous forces influencing our university, and employ dynamic capabilities in our management processes to enable reconfiguration processes.

New schemes must be agile developed in a series of pilot experiments following an iterative, non-linear path (Stolze, 2021). And in such endeavours, the starting point for any transformation is for HEIs' leaders and managers to develop an entrepreneurial mindset and apply dynamic capabilities, as these lead to third-mission advancement (Stolze and Sailer, 2021). By timely identifying opportunities and risks associated with each project, iterating and agile developing new formats – online and blended – leveraging the fast-paced digitalization, taking place at our institutions.

In the case of ProjectX, the new virtual format enables the formation of international interdisciplinary teams that tackle innovation challenges proposed by public organisations and prototype solutions for these real-life problems. This format adds value to the partner organizations who receive valuable insights, and to students that build skills and competences necessary for the 21st century. After all, ultimately, the purpose of HEIs, in the context of 'entrepreneurial societies', is to ensure that its citizens thrive in their endeavours (Audretsch, 2014). Thus, the transformation of ProjectX and its new virtual format also adds value to our institutions, as we strengthen our relationship with strategic partners in our local ecosystem as well as with international partners – advancing our internationalization. And the starting point for this transformation: the team's entrepreneurial mindset and a question: How might we…?

9. Conclusion

The case of ProjectX exemplifies how entrepreneurial mindset and practices are applied in practice by project management teams in higher education. It highlights the important role of HEIs' leaders in the process of enabling project teams to leverage dynamic capabilities for developing and internationalizing third mission

initiatives. It might also pave the way for a more open discussion on the policy and institutional levels about the necessary governance structures, management practices and entrepreneurial mindsets required to manage HEIs in the 21st century.

References

Audretsch, D. B. (2014) 'From the entrepreneurial university to the university for the entrepreneurial society', *Journal of Technology Transfer*, 39(3), pp. 313–321. doi: 10.1007/s10961-012-9288-1.

Audretsch, D. B. and Keilbach, M. (2004) 'Does Entrepreneurship Capital Matter?', *Entrepreneurship and Regional Development*, 28(5), pp. 419–430.

Brammer, S. and Clark, T. (2020) 'COVID-19 and Management Education: Reflections on Challenges, Opportunities, and Potential Futures', *British Journal of Management*, 31(3), pp. 453–456. doi: 10.1111/1467-8551.12425.

Etzkowitz, H. and Leydesdorff, L. (2000) 'The dynamics of innovation : from National Systems and "Mode 2" to a Triple Helix of university – industry – government relations', *Research Policy*, 29, pp. 109–123.

Freeman, R. E. and McVea, J. (2001) *A Stakeholder Approach to Strategic Management*, *SSRN*. doi: http://dx.doi.org/10.2139/ssrn.263511.

Frooman, J. (1999) 'Stakeholder Influence Strategies', *Academy of Management*, 24(2), pp. 191–205.

Gibb, A. and Hannon, P. (2006) 'Towards the Entrepreneurial University?', *International Journal of Entrepreneurship Education*, 4(1), pp. 73–110.

Guerrero, M., Cunningham, J. A. and Urbano, D. (2015) 'Economic impact of entrepreneurial universities' activities: An exploratory study of the United Kingdom', *Research Policy*. Elsevier B.V., 44(3), pp. 748–764. doi: 10.1016/j.respol.2014.10.008.

Klofsten, M. *et al.* (2019) 'The entrepreneurial university as driver for economic growth and social change - Key strategic challenges', *Technological Forecasting & Social Change*. Elsevier, 141(April), pp. 149–158. doi: 10.1016/j.techfore.2018.12.004.

Leih, S. and Teece, D. (2016) 'Campus leadership and the entrepreneurial university: a dynamic capabilities perspective', *Academy of management Perspectives*, 30(2), pp. 182–210.

Sarasvathy, S. (2001) 'Causation and effectuation: toward a theoretical shift from economic inevitability to entrepreneurial contingengy', *Academy of Management Review*, 26(2), pp. 243–263.

Stake, R. E. (1995) *The art of case study research*. Thousand Oaks: SAGE Publications.

Stolze, A. (2021) 'A meta-ethnography on higher education institutions' transformation into more entrepreneurial institutions: Towards an action-framework proposition', *Industry and Higher Education*, 35(1), pp. 14–27. doi: 10.1177/0950422220922677.

Stolze, A. and Sailer, K. (2020) 'An international foresight reflection on entrepreneurial pathways for HEIs', *Industry and Higher Education*, pp. 1–13. doi: 10.1177/0950422220981814.

Stolze, A. and Sailer, K. (2021) 'Advancing HEIs ' third -mission through dynamic capabilities : the role of leadership and agreement on vision and goals', *The Journal of Technology Transfer*. Springer US, pp. 1–25. doi: 10.1007/s10961-021-09850-9.

Teece, D. J., Pisano, G. and Shuen, A. (1997) 'Dynamic Capabilities and Strategic Management', *Strategic Management Journal*, 18(7), pp. 509–533.

Turgut-dao, E. *et al.* (2015) 'Embedding Experiential Learning in Cross-Faculty Entrepreneurship Education', in *Proceedings of the 3th 3E Conference - ECSB Entrepreneurship Education*.

Yin, R. K. (2003) *Case Study Reserach - Design and Methods*. 2nd Editio. Thousand Oaks, London, New Delhi: SAGE Publications.

Innovation in the Absence of Financial Capital: A Lesson From Informal Clothing Manufacturing Micro Entrepreneurs

Mariette Strydom
Department of Life and Consumer Sciences, College of Agriculture and Environmental Sciences, University of South Africa, Johannesburg, South Africa
strydm1@unisa.ac.za
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Abstract: The decline in the South African apparel industry has led to an increase in informal clothing manufacturing micro-enterprises (CMMEs). These informal enterprises provide employment and generate an income for many people who are unable to find formal employment and, in this way, contribute to poverty alleviation. The labour-intensive nature of clothing production and the consequent job-creation potential of the apparel industry have resulted in the government's interest in the sector, but support programmes only focus on the formal sector. Limited information about informal clothing manufacturing entrepreneurs necessitated a study to explore the operations of informal CMMEs. A qualitative case study research design was applied within a pragmatist paradigm. A purposive and convenience sampling strategy was used to select 13 informal CMME owners at a business incubation hub to participate in this study. Face-to-face interviews, using an interview schedule, and direct observations, using an observation schedule, as well as documents of the informal CMMEs were used to collect the relevant data. Content analysis, following Bourdieu's (1986) habitus theory, was used to analyse the interview transcripts and the field notes. The findings revealed how the informal CMMEs, although survivalists, operate on the principles of ubuntu. A lack of financial capital leads to them making use of cultural and social capital to sustain their businesses. Survival of these businesses is important for empowerment and the alleviation of poverty, not only for the participants individually, but also for the larger community. The use of cultural and social capital to obtain skills, resources and experience was evident in the findings. The participating CMME owners demonstrated innovation and creativity to provide customers with garments that were not available for purchase in mainstream clothing retail stores. The study contributes to the body of knowledge about informal enterprises, in particular, clothing manufacturing enterprises. As such, it serves as a useful framework for the formal and non-formal education of apparel entrepreneurs and future research.

Keywords: social capital, cultural capital, entrepreneurship, custom-made apparel, clothing manufacturing

1. Introduction

The market demand for apparel in South Africa was expected to grow by 14,7% for the 2012-2016 period (PWC 2012). However, as a result of reduced production and employment in the apparel manufacturing industry in South Africa (Vlok 2006), foreign apparel manufacturers, rather than South African apparel manufacturers, are supplying 90% of apparel sold in South Africa (Textiles Intelligence 2014). Despite the drastic decline in employment in the apparel industry since 2002 (Vlok 2006), the apparel industry is still one of South Africa's top ten sources of employment (PWC 2012). Clothing production itself is a labour-intensive industry that can contribute to job creation (Hamdulay 2017). Therefore, supporting the apparel industry and, in particular, clothing manufacturing, could partly address the high level of unemployment in South Africa, which currently stands at 32,5% (StatsSA 2021).

Entrepreneurship resulting in a microbusiness was not always recognised for the impact, growth and possibilities it can offer the South African economy (Fal et al, 2010). However, economic growth is becoming more dependent on small companies (Cant 2017; Irene 2017). These businesses tend to be the greatest creators of jobs and, collectively, the greatest creators of wealth in emerging economies (Fal et al, 2010). Furthermore, small, medium and micro-enterprises (SMMEs), in general, have shown and continue to show a remarkable capacity to innovate (Phaho 2008). According to MacDonald et al (2007), SMMEs have to be innovative to survive, and being innovative is what the fashion industry is known for (Buckley 2016; Malem 2008). But innovation, and particularly innovation in informal CMMEs, is complex (MacDonald et al, 2007).

The significance of this study lies in the contribution it can make to the body of knowledge about informal and micro-enterprises in an emerging market. Informal CMMEs provide employment to at least the owner of the business. They contribute to income generation and thus alleviate poverty in the township community, which can further be enhanced by the job-creation potential of each informal CMME that survives. Therefore, these survivalist enterprises should not be overlooked because of their minute size, but it is important to ensure that they do survive in the long run. The aim of this article is to explore how informal CMMEs apply different forms of capital and operate to ensure economic survival of their businesses.

2. Literature review

Informal businesses are unregistered, unregulated and untaxed businesses that are often run from pavements or homes or according to other informal arrangements (Horn 2011). Furthermore, 90% of entrepreneurs in disadvantaged urban communities are informal entrepreneurs and they create 44% of jobs in privately-owned firms in South African townships, while 20% of informal entrepreneurs employ two or more people (Herrington et al, 2010). Employment in the informal sector of the South African clothing industry grew by 1,2% per annum from 2003 to 2012 (Textiles Intelligence 2014). As formal, large-scale apparel manufacturing businesses are downscaling, informal CMMEs have an important role to play in job creation in South Africa, considering the labour-intensive nature of clothing manufacturing. In South Africa, micro-enterprises, like CMMEs, employ fewer than five people (Mahembe 2011) and are likely to operate in the informal sector.

Customers, who order custom-made garments, are often motivated by the desire for high-quality, unique apparel (Makopo et al, 2016), the production of which requires knowledgeable, highly skilled and experienced designers or dressmakers, as well as creativity and innovativeness. By providing personalised garments to customers, informal CMMEs fill a gap in the apparel market, especially because they do this within the customer's limited budget and with limited resources. They provide customers with what would be classified as "haute couture" in developed countries, but at an affordable price. It is a one-of-a-kind garment produced within the limits of the customer's budget.

2.1 Knowledge, skills and experience of the informal CMME owner

Knowledge is one of the most important inputs in the innovation process (Thornhill, cited in Maes & Sels 2014). Knowledge is information acquired through sensory input and refers to familiarity with factual information and theoretical concepts, while skills refer to the ability to apply knowledge to specific situations (Boulet 2015). A designer's lack of knowledge regarding manufacturing processes and alternatives can result in non-saleable designs (Regan et al, 1998). In terms of knowledge and skills, custom garment manufacturing is more demanding than traditional tailoring (Apunda et al, 2017) or mass production, because garment types, designs/styles, materials/fabrics, construction, finishing, customers' body shapes and sizes, and fit preferences vary with each customer's individual order (Brown & Rice 2014). Knowledge of design enables creativity and innovation and is therefore necessary for creating marketable and saleable garments (Burke 2011). Design knowledge includes understanding and applying design principles, which are cognitive and therefore cannot be acquired through experiential learning alone (Kimle 1994). However, according to Hardaker and Fozzard (1997), successful apparel design comes only with experience. The heuristic knowledge of fabric performance, pattern development, and the ability to visualise the flat pattern in three-dimensional terms are important parts of the apparel designer's skills base.

Knowledge of and skills for the day-to-day running of the business or managerial competence (Mamabolo et al, 2017), are also necessary to ensure the survival and success of the informal CMME. These micro-businesses are not scaled-down versions of large enterprises and viewing them as such results in not fully understanding the complexity of the small enterprise (Ha-Brookshire 2009). Starting any business requires tenacity, endurance and dedication. Setting up a fashion business is even more challenging, because it is a hyper-competitive and very complex industry, even at the smallest of scales (Amed 2007). A study by Mills (2011) found that running a fashion design business presents unique challenges, because it requires the owner-designer to marry the creative design process with business practices, which she termed the "creativity-business tension". These two dimensions require quite different skills and ways of thinking. Apparel design and manufacturing are an iterative, intuitive and experimental process that does not lend itself easily to a planned, systematic approach. Business development, in contrast, can be approached strategically with a logic that lends itself to a planned, systematic approach. Furthermore, these informal CMMEs are very diverse, from being simply survivalist to growing rapidly; some are start-ups, while others are well established and stable; and some business owners have a very low level of skills, while others are experienced and highly sophisticated (Ha-Brookshire 2009).

2.2 The role of innovation in the informal CMME

The core feature of innovation is the new value it creates and offers to consumers (Ma et al, 2012). Innovation is also associated with introducing new technology in a product or its manufacturing process (Baglieri 2003, cited in Rampino 2011). However, access to finance is one of the major constraints facing entrepreneurs in South Africa (Rolfe et al, 2010), resulting in the inability to acquire the latest technology in terms of sewing machines

(FPM Seta 2012), pattern design software, or fabrics. MacDonald et al (2007) conclude that the real obstacles to SMME innovation is that SMME managers lack resources, especially the time and energy to do more than just survive. Liao et al (2009) also state that the innovative potential of SMMEs is hampered by the scarcity of internal resources such as financial resources, manpower, and so on. Then again, Leadbeater (2014) states that innovation is how we arrange the resources we have to get better results from them; it is about finding the method to combine and recombine the resources available to us in new and more effective ways. As creativity provides for innovation, it is essential for both apparel designers and the marketplace (Malem 2008). Moeran (2015) views creativity and innovation as collaborative engagements and this view may be the most appropriate for informal CMMEs. He states that creativity and innovation occur between agents (customers), institutions (informal CMMEs), materials, tools and technologies, together with their associated ideals and budgets. The informal CMME has to turn the individual customer's vision or idea into an actual garment. Combining innovation and creativity with new materials and processes is a way for designers (CMMEs) to create products that are a pleasure to the senses, meet the functional requirements needed in a changing world, are economical and environmentally friendly in production, and enhance emotional and intellectual pleasure (Kavanagh 2004). Innovation originates from different sources and design-driven innovation incorporates customer needs and requirements (Rampino 2011). Creativity and, by implication, innovation result from thinking and making (Sennett 2008). Therefore, the informal CMME owner has to rely on her/his skills, knowledge, experience and understanding of the customer's needs and expectations to use existing machines, methods and available fabrics in an innovative and creative way to produce the custom-made garment. Where apparel is concerned, an appropriate product, which is innovative, well designed and well executed, is crucial for the success of an apparel-manufacturing company (Senanayake & Little 2001), as it contributes to a competitive advantage and to satisfied, loyal customers who return to the business for more purchases. Producing a custom-made garment is very much a hands-on process due to the limited technology used by the informal CMME. However, Bye and Sohn (2010) state that a unique kind of thinking goes on during a hands-on activity, which supports creative and critical thinking.

2.3 Bourdieu's theory of practice

The basic components of Bourdieu's theory of practice are habitus, field and practice. Practices are understood as "the result of an indefinite, unconscious, double relationship between habitus and the field" (Bourdieu 2003). Bourdieu constructed the following model to convey the relationship:

$$[(\text{Habitus})(\text{capital})] + \text{Field} = \text{Practice}$$

Maton (2008) explains that the model shows how practice is influenced by the relationship of the individual's habitus and their position within the social field. Position depends on the amount and structure of their capital (Maton 2008). Fields are defined as structured spaces of positions, which the subject occupies according to the principles of differentiation and distribution of resources or capital (Bourdieu 2000). The amount and type of capital that individuals possess determine the closeness of the positions within the fields (Bourdieu 1992) and determine their positions and capabilities in the various fields (Bourdieu 1992; Siisiainen 2000).

Capital represents the system of social relationships and dependencies that are inherent in all the "social universes". Bourdieu broadens the concept of capital by constructing other forms of capital, such as cultural, social and symbolic capital (Chauviré & Fontaine 2003; O'Brien & O'Fathaigh 2005). *Cultural capital* is made up of meaningful symbolic resources such as education, knowledge, skills and family background (Chauviré & Fontaine 2003). *Cultural capital* can exist in three forms, including the incorporated form, which is internalised characteristics objectified in the form of goods (works of art, books, paintings, etc.), and the institutionalised state, in the form of educational credentials (Bourdieu, 1994; Moore, 2008). Bourdieu (1994) goes on to define *social capital* as a network of beneficial, productive and maintained social relationships that are linked to integration into a group. Finally, *symbolic capital* refers to the noticeable meaning conveyed by symbols (all kinds of languages) used by the people who lend value to it (Bourdieu 1994). Furthermore, Bourdieu claims that every kind of capital (economic, cultural, social) may function as symbolic capital if it is in fact recognised expressly (Bourdieu 2002). Symbolic capital recognises the idea that interests are not always necessarily narrowly economic (Bourdieu 1986; Bourdieu 1992).

3. Methodology

This study followed a pragmatist philosophical worldview and assumed a qualitative case study research design to facilitate a holistic understanding of how informal clothing manufacturing micro-entrepreneurs apply different forms of capital and operate to ensure economic survival of their businesses. In the absence of a database listing informal businesses, a purposeful and convenient sample included 13 informal CMME owners from a business incubation hub located in the Johannesburg metropolitan area, in the Gauteng province of South Africa.

3.1 Data collection

The case study design allowed for the use of various sources of data collection, which included personal interviews, direct observations, artefacts, documents and archival records (Yin 2018). Personal interviews were guided by a semi-structured interview schedule, using open-ended questions to allow for the topic to be explored in depth from the participants' point of view. Direct observation was done at the workshops of the participating CMMEs, to allow the researcher to see things that participants did not verbalise in the interview (Saldaňa 2011). Furthermore, a garment analysis checklist was used to evaluate physical garments against relevant standards, to confirm CMME owners' technical and production skills in terms of garment construction. Additionally, documents and archival records contributed to an in-depth and holistic understanding of the context in which informal CMMEs operate. The use of different sources of data contributed to triangulation, which enhanced the truthfulness and trustworthiness of the data (Creswell & Creswell 2018).

3.2 Data analysis

Thematic analysis through content analysis was done to identify patterns in the data (Wahyuni 2012; Saldaňa 2011). As suggested by Thorne et al (1997), the interview transcripts and the fieldnotes were organised according to themes that were predetermined by theory. An exploratory method of coding was applied, where provisional coding begins with researcher-generated codes which suggest what might appear in the data (Saldaňa 2016), based on Bourdieu's theory of practice. Descriptive coding, using descriptive concepts from the literature, was used to code and interpret the data in each theme.

4. Findings and discussion

The 13 participants were in the fortunate position to be part of a business incubator and, therefore, had access to support concerning the running of their businesses. They were obtaining knowledge and skills to run their businesses through coaching, which is a hands-on approach for acquiring the relevant knowledge regarding the running of a business. The scarcity of financial resources has been pointed out by Hodges et al (2017), Grant (2013), and Mahembe (2011). This is confirmed by one owner expressing her frustration after three failed funding applications, *"Banks judge the personal profile of the owner, not the potential of the business."* Another participant mentioned, *"... next week, industrial overlocker, I lay-byed it*." The fact that the CMME owner had to buy the overlocker through a lay-by agreement further serves to confirm the financial difficulties that these CMMEs face.

The findings are organised according to the main themes, namely cultural, social and symbolic capital. Verbatim responses from the participants are included to support the discussion and interpretation of the findings.

4.1 Cultural capital

Cultural capital exists in three forms (Bourdieu 1994). Incorporated cultural capital suggests self-improvement, acquiring knowledge and skills through an investment of time, and includes domestic education (Bourdieu 1986). Informal training takes place when the individual interacts with family members, friends or colleagues, or other resources from the environment such as libraries and mass media, including social media (UNESCO-UNEVOC 2010). Statements such as, *"Sewing, I can say that it's my talent" and "I've never gone to school for it ... I just do it in my own way", or "I learn at home. From my mom and my aunt"*, while another participant said, *"I learned this from home* (sic) *... from my grandmother ... She was doing this sewing thing ... she's the one who taught me how to sew"*, show the participants' desire for self-improvement and acquiring skills. Learning from an aunt or a mother illustrates the hereditary transmission of incorporated culture (Bourdieu 1986).

Non-formal training links with community groups and refers to training offered outside the formal education system, which often focuses on development goals and does not lead to a formal qualification (UNESCO-UNEVOC 2010). Some participants received non-formal training in specific skills from various organisations, with a participant stating, *"I was also attending the sewing programme at Saint Mungo's for one year*", (Saint Mungo's is an outreach programme). Subsequently, these participants learnt how to sew from family and community members. The participants also indicated that they gained or improved their sewing skills by figuring it out on their own and are, therefore, self-taught. The knowledge and skills gained through non-formal and informal training indicate incorporated cultural capital as explained in Bourdieu's theory of practice.

Formal training implies courses and programmes with structured plans, whereby a student, led by a teacher or trainer, follows a planned curriculum and receives some form of formal recognition upon completion, such as a certificate, diploma or degree (UNESCO-UNEVOC 2010). Only two of the 13 participants studied at formal training institutions in a clothing- or fashion-related field after finishing secondary school. Participant 5, who had formal training, stated, *"I went to school … tertiary* [sewing training] *… in Lesotho … an advanced certificate."* Participant 11 mentioned, *"I studied at UJ* [University of Johannesburg], *I got a diploma in fashion design."* According to Bourdieu's habitus theory, academic qualifications such as a fashion design certificate or diploma suggest institutionalised cultural capital, which confers on its holder a conventional, constant and legally guaranteed value (Bourdieu 1986). As a formal qualification presupposes and recognises knowledge, a certain competence can be expected from these two participants.

Objectified cultural capital can be found in the actual garments that the informal CMMEs create. Garments made during the observation period revealed Western influence combined with traditional style and/or fabric, to create a novel custom-made garment. These unique garments represent objectified cultural capital. Innovation and creativity are found in providing the customer with a garment that is not available for purchase in mainstream clothing retailers. Simultaneously, the knowledge of traditional dress suggests incorporated cultural capital, because incorporated cultural capital can be acquired unconsciously and is subject to hereditary transmission; it represents the properties that an individual adds to his heritage (Bourdieu 1986).

4.2 Social capital

The use of social relationships is clearly demonstrated by the CMME owners in their efforts to obtain the required equipment and labour to complete orders. The participants displayed resourcefulness, which is a valuable part of problem-solving through creative means (DeLong 2010), by borrowing machines when necessary. This is indicated by the following statements from the participants: *"Now I don't have a machine … I always used* a *borrowed machine"* and *"I don't have a machine*; *I borrow some machine."* This resourcefulness confirms the use of social networks and social capital, as discussed by Bourdieu (1986) and Grant (2013).

From the data, it was also evident that help from friends and/or family was called for, as and when needed, as these explanations illustrate: *"At home also I got my friend … When I have the order, I go to her, we make it"* and *"If I have a lot of job, I ask my daughters to help me."* Friends are also called on for marketing purposes, as mentioned in these statements: *"Because at home I got rep* [representative], *eh-eh my next-door neighbour … she, I gave her my stuff, then she show* (sic) *the people ... Then they place the order"* and *"She also take her things to Venda* [a district in the Limpopo province] *… for her mom to sell for her."* Observations also revealed how one owner assisted another to complete an order on time. This finding confirms what Grant (2013) calls social capital, where businesses would rely on friends, family or neighbours, or collaborate with other businesses in a cooperative to fill large orders. Social capital also features in Bourdieu's habitus theory (Bourdieu 1986).

Due to the seasonal nature of custom-made orders, it is problematic for the CMME to employ seamstresses on a permanent basis. Discussions with an advisor from the incubation hub revealed that all staff contracts were verbal agreements only, confirming that employment in the participants' businesses was of a flexible nature and often happened on good faith. This points to the dependencies mentioned by Bourdieu (1994) as part of social capital, indicating the trust that exists within the social network. The use of social capital by CMMEs relate closely to the concept of ubuntu, an African philosophy that explains a way of life that sustains the wellbeing of people, a community, or a society (Letseka 2013). It states that the survival of a human being or, in this case, the survival of an informal CMME, is dependent on other people or a community (Khomba & Vermaak 2012).

4.3 Symbolic capital

Succeeding with their businesses and contributing to their communities was valued by the participating CMME owners. Their individual motivations are illustrated by these statements: *"I see many more opportunities"*; *"I want to start a business to reduce poverty in the community"* and *"I want to sew different things so I can make more money to support my family."*. These statements not only confirm the need for survival but encompass a much broader approach of empowerment and upliftment of not only the participants themselves, but also of their families and communities, which can be viewed as symbolic capital.

5. Conclusion

This study set out to explore how informal CMMEs apply different forms of capital and operate to ensure economic survival of their businesses. All the participants had some experience of informally running a business, and earning a living was an important motivation for starting a business. The participants also had considerable sewing experience, which relates to why they are operating a CMME. The participants recognised the value of training and in joining the incubator they demonstrated that they were eager to learn new skills. These skills can be regarded as important for empowerment and the alleviation of poverty, not only for the participants, but also for their larger community. Specific areas of and needs for training were identified from the study.

The use of limited resources by these participants, in the form of basic technology or the limited budget of customers, reveals characteristics of frugal innovation, as explained by Leadbeater (2014). His view, that frugal innovators excel at do-it-together (DIT), as opposed to do-it-yourself (DIY), corresponds with Grant's (2013) view of social capital and could clearly be seen in the way that the participants shared resources in their businesses and in the community; for example, by borrowing sewing machines and helping each other to complete orders on time, which correlates with the principles of ubuntu. Frugal innovators do not confine themselves to technologies, products and services, but rather mobilise resources and ideas in new ways. The use of cultural and social capital to obtain skills, resources and experience became evident during discussions with the participants. The participants sometimes had to withhold their own creativity and innovative ideas in favour of the customer's idea, because the main concern for the informal CMME is to generate an income and, therefore, fulfilling the customer's requirements will take precedence over their creativity and innovation. Innovation and creativity are displayed through product renewal to provide a one-of-a-kind garment for each customer.

The importance of micro-businesses in the informal sector has traditionally been overlooked, because they are survivalist business ventures and it is assumed that they will fail. As a result, their operations have seldom been investigated, especially in the case of manufacturing micro-businesses such as informal CMMEs. Despite these assumptions, informal CMMEs are important in terms of the role they play in an emerging economy. At a personal level, they provide a sense of dignity to unemployed people, which adds to their quality of life and well-being. At a national level, they contribute to job creation for both the owner and their part-time or permanent employees. If these informal CMMEs could be assisted to be sustainable, they could contribute to the economy in a more formal capacity. It is recommended that future research investigates CMMEs' attitude towards financial capital as well as the total amount of financial capital needed to run a clothing manufacturing enterprise efficiently.

This study contributes to literature about the operations of informal apparel enterprises. These informal CMMEs fill a gap in the clothing market by providing personalised garments that are, very importantly, affordable for their specific customer base. These survivalist entrepreneurs work on the principles of ubuntu and, in the absence of financial capital, they make use of cultural, social and symbolic capital to survive. Cultural, social and symbolic capital are used, firstly, to solve a socio-economic problem and, secondly, to provide an apparel product. Subsequently, the study also contributes to literature about survivalist enterprises in an emerging economy and, specifically, the informal economy.

References

Amed, I. (2007) "The basics. Part 1 - Setting up your own fashion business: What do I need to know first?", [online], https://www.businessoffashion.com/articles/basics/the-business-of-fashion-basics-1-setting-up-your-own-fashion-business-what-do-i-need-to-know-first.

Apunda, E.A., De Klerk, H.M. and Ogina, T. (2017) "Technical knowledge and skills development in the informal sector in Kenya: the case of custom tailors", *International Review of Education,* Vol.63, No. 3, pp 341-361.

Boulet, G. (2015) "The difference between knowledge and skills: knowing does not make you skilled", [online], https://elearningindustry.com/difference-between-knowledge-and-skills-knowing-not-make-skilled.

Bourdieu, P. (1986) The forms of capital. In J.G. Richardson (Ed.). *Handbook of theory and research for the sociology of education,* New York, Greenwood Press.

Bourdieu, P. (1992) *Microcosms,* Athens, Delfini.

Bourdieu, P. (1994) *Texts of Sociology,* Athens, Delfini.

Bourdieu, P. (2000) *Practical discourses for the theory of action,* Athens, Plethron.

Bourdieu, P. (2002) "Symbolic capital", *Sygxrona Themata*, Vol. 80, pp 18-21.

Bourdieu, P. (2003) *Distinction,* Athens, Patakis.

Brown, P. and Rice, J. (2014) *Ready-to-wear apparel analysis*, 4th edition. Boston, MA, Pearson.

Buckley, C. (2016) Entrepreneurial or not? Asymmetrical business models of UK fashion micro-enterprises. In A. Vecchi and C. Buckley (Eds). *Handbook of research on global fashion management and merchandising,* chap. 5. Hershey, PH, Business Science Reference.

Burke, S. (2011) *Fashion designer: concept to collection*. London, Burke Publishing.

Bye, E. and Sohn, M. (2010) "Technology, tradition, and creativity in apparel designers: a study of designers in three US companies", *Fashion Practice: The Journal of Design, Creative Process & the Fashion Industry*, Vol. 2, No. 2, pp 199-222.

Cant, M.C. (2017) "Do small, medium and micro enterprises have the capacity and will to employ more people: solution to unemployment or just a pipe dream?", *International Review of Management and Marketing,* Vol. 7, No.3, pp 366-372.

Chauviré, C. and Fontaine, O. (2003) *Le vocabulaire de Bourdieu,* Paris, Ellipses.

Creswell, J.W. and Creswell, J.D. (2018) *Research design: qualitative, quantitative and mixed methods approaches,* 5th edition, Thousand Oaks, CA, Sage.

DeLong, M. (2010) "Immersed in the creative process: Robert Hillestad is interviewed by Marilyn DeLong", *Fashion Practice: The Journal of Design, Creative Process and the Fashion Industry*, Vol. 2, No. 2, pp 249-257.

Fal, M., Sefolo, T., Williams, A., Herrington, M., Goldberg, J. and Klaasen, M. (Eds). (2010) *The entrepreneurial dialogues: state of entrepreneurship in South Africa*, First National Bank.

FPM SETA. (2012) "Fibre-Processing and Manufacturing Sector Education and Training Authority", [online], http://www.fpmseta.org.za/userfiles/file/fpm_seta_2013-2014_SSP_annual_update_submission_October_2012.pdf.

Grant, R. (2013) "Gendered spaces of informal entrepreneurship in Soweto, South Africa", *Urban Geography,* Vol. 34, No. 1, pp 86-108.

Ha-Brookshire, J.E. (2009) "Does the firm size matter on firm entrepreneurship and performance? US apparel import intermediary case", *Journal of Small Business and Enterprise Development*, Vol. 16, No. 1, pp 132-146.

Hamdulay, F. (2017) "The great textile turnaround", [online], https://www.fin24.com/Opinion/the-great-textile-turnaround-20171011.

Hardaker, C.H.M. and Fozzard, G.J.W. (1997) "The bra design process – a study of professional practice", *International Journal of Clothing Science and Technology,* Vol. 9, No. 4, pp 311-325.

Herrington, M., Kew, J. and Kew, P. (2010) *Tracking entrepreneurship in South Africa: a GEM perspective*, Cape Town, UCT Graduate School of Business.

Hodges, N., Watchravesringkan, K., Yurchisin, J., Karpova, E., Marcketti, S., Hegland, J., Yan, R.-N. and Childs, M. (2015) "Women and apparel entrepreneurship: an exploration of small business challenges and strategies in three countries", *International Journal of Gender and Entrepreneurship,* Vol. 7, No. 2, pp 191-213.

Horn, A. (2011) "Who's who out there? A profile of informal traders in four South African city central business districts", *Town and Regional Planning*, Vol. 59, No. December:1-6.

Irene, B.N.O. (2017) "Women entrepreneurship in South Africa: Understanding the role of competencies in business success", *The Southern African Journal of Entrepreneurship and Small Business Management,* Vol. 9, No. 1, pp a121.

Khomba, J.K. and Vermaak, F.N.S. (2012) "Business ethics and corporate governance: an African socio-cultural framework", *African Journal of Business Management,* Vol. 6, No. 9, pp 3510-3518.

Kimle, P.A. (1994) "Design education and the creative experience: a conceptual framework", [online], https://c.ymcdn.com/sites/itaaonline.org/resource/resmgr/imported/SpecialPub7-pt%201.pdf.

Kavanagh, T. (2004) "Designers managing technology", *Journal of Textile and Apparel, Technology and Management*, Vol. 4, No. 1, pp 1-7.

Leadbeater, C. (2014) *The frugal innovator: creating change on a shoestring budget*, New York, Palgrave Macmillan.

Letseka, M.M. (2013) "Understanding of African philosophy through philosophy for children (P4C)", *Mediterranean Journal of Social Sciences,* Vol. 4, No. 14, pp 745-753.

Liao, S.-H., Wu, C.-C., Hu, D.C. and Tsuei, G.A. (2009) "Knowledge acquisition, absorptive capacity, and innovation capability: an empirical study of Taiwan's knowledge-intensive industries", [online] https://pdfs.semanticscholar.org/28de/f8d67b00c76ff0095fbce60049afd7cca39e.pdf?_ga=2.158352762.1949507071.1547259285-432638491.1547259285.

Ma, F., Shi, H., Chen, L. and Luo, Y. (2012) "A theory of fashion consumption", *Journal of Management and Strategy*, Vol. 3, No. 4, pp 84-92.

MacDonald, S., Assimakopoulos, D. and Anderson, P. (2007) "Education and training for innovation in SMEs: a tale of exploitation", *International Small Business Journal*, Vol. 25, No. 1, pp 77-95.

Maes, J. and Sels, L. (2014) "SMEs' radical product innovation: The role of internally and externally orientated knowledge capabilities", *Journal of Small Business Management*, Vol. 52, No. 1, pp 141-163.

Mahembe, E. (2011) *Literature review on small and medium enterprises' access to credit and support in South Africa.* Prepared for National Credit Regulator, by Underhill Corporate Solutions, Pretoria.

Makopo, M.M., De Klerk, H.M. and Donoghue, S. (2016) "Customer satisfaction and complaint behaviour: The case of small custom-made clothing businesses", *Southern African Business Review,* Vol. 20, No. 1, pp 183-207.

Malem, W. (2008) "Fashion designers as business: London", *Journal of Fashion Marketing and Management*, Vol. 12, No. 3, pp 398-414.

Mamabolo, M.A., Kerrin, M. and Kele, T. (2017) "Entrepreneurship management skills requirements in an emerging economy: a South African outlook", *The Southern African Journal of Entrepreneurship and Small Business Management,* Vol. 9, No. 1, pp 1-10.

Maton, K. (2008) Habitus. In M. Grenfell (Ed.), *Pierre Bourdieu key concepts* (pp. 49–65), Stocksfield, UK, Acumen.

Mills, C. (2011) "Enterprise orientations: a framework for making sense of fashion sector start-up", *International Journal of Entrepreneurial Behaviour and Research*, Vol. 17, No. 3, pp 245-271.

Moeran, B. (2015) "Opinions: all about creativity and innovation. A prolegomenon", *Journal of Business Anthropology,* Vol. 4, Np. 2, pp 228-235.

Moore, R. (2008) Capital. In M. Grenfell (Ed.), *Pierre Bourdieu Key Concepts* (pp101-117), Stocksfield, UK, Acumen.

O'Brien, S and O'Fathaigh, M. (2005) "Bringing in Bourdieu's theory of social capital: renewing learning partnership approaches to social inclusion," [online], http://docstoc.com/docs/2220018/Bringing-in-Bourdieu%EF%BF%BDs-Theory-of-Social-Capital-Renewing-Learning.

PWC. (2012) South African retail and consumer products outlook: 2012-2016, [online], http://www.pwc.co.za/en/publications/retail-and-consumer-outlook.jhtml.

Phaho, D. (2008) "SMME competitiveness through technology diffusion from higher educational institutions: a South African perspective", *International Journal of Technology Intelligence and Planning,* Vol. 4, No. 1, pp 55-67.

Rampino, L. (2011) "The innovation pyramid: a categorization of the innovation phenomenon in the product-design field", *International Journal of Design*, Vol. 5, No. 1, pp 3-16.

Regan, C.L., Kincade, D.H. and Sheldon, G. (1998) "Applicability of the engineering design process theory in the apparel design process", *Clothing and Textiles Research Journal,* Vol. 16, No. 1, pp 36-46.

Rolfe, R., Woodward, D., Ligthelm, A. and Guimarães, P. (2010) "The viability of informal micro-enterprise in South Africa", Paper presented at the Conference on Entrepreneurship in Africa, Whitman School of Management, Syracuse University, Syracuse, New York, 1-3 April 2010.

Saldaña, J. (2011) *Fundamentals of qualitative research*, New York, Oxford University Press.

Saldaña, J. (2016) *The coding manual for qualitative researchers*, 3rd edition, London, Sage.

Senanayake, M.M. and Little, T.J. (2001) "Measures' for new product development", *Journal of Textile and Apparel, Technology and Management,* Vol. 1, No. 3, pp 1-14.

Sennett, R. (2008) *The craftsman,* New Haven, CT, Yale University Press.

Siisiainen, N. (2000) "Two concepts of social capital: Bourdieu vs Putnam", [online], http://dlc.dlib.indiana.edu/dlc/bitstream/handle/10535/7661/siisiainen.pdf.

StatsSA. (2021) "Quarterly Labour Force Survey (QLFS), 4th Quarter 2020", [online], http://www.statssa.gov.za/?page_id=1854&PPN=P0211&SCH=72942.

Textiles Intelligence. (2014) "South Africa's textile and clothing industry has benefited the least from growth in the clothing retail sector", [online], http://www.textilesintelligence.com/til/press.cfm?prid=485.

Thorne, S., Kirkham, S.R. and MacDonald-Emes, J. (1997) "Interpretive description: a noncategorical qualitative alternative for developing nursing knowledge", *Research in Nursing & Health,* Vol. 20, No. 2, pp169-177.

UNESCO-UNEVOC. (2010) "Promoting learning for the world of work", [online], https://unevoc.unesco.org/go.php?q=Definition%20of%20Formal,%20Informal,%20and%20Nonformal%20learning.

Vlok, E. (2006) The textile and clothing industry in South Africa. In H. Jauch and R. Traub-merz (Eds). (2006). *The future of the textile and clothing industry in Sub-Saharan Africa*. Bonn: Friedrich-Ebert-Stiftung: 227-246.

Wahyuni, D. (2012) "The research design maze: understanding paradigms, cases, methods and methodologies", *JAMAR – Journal of Applied Management Accounting Research*, Vol,10, No. 1, pp 69-80.

Yin, R.K. (2018) *Case study research and applications: design and methods*, 6th edition, Los Angeles, Sage.

The Effect of Entrepreneurial Role Models in Social Networking Sites on Student's Entrepreneurial Intention

Sebastian Stuempfle[1] and Marius Deilen[2]
[1]University of Liechtenstein, Liechtenstein
[2]Technical University of Dortmund, Chair of Digital Transformation, Dortmund, Germany
sebastian.stuempfle@sf-vertrieb.com
marius.deilen@tu-dortmund.de
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Abstract: Entrepreneurial role models are commonly discussed as drivers to enhance the entrepreneurial intention of individuals. The trend of using social media among entrepreneurs to promote their products or network with other founder is omnipresent, resulting in an increased importance of social media for student entrepreneurship; however, research lacks scientific evidence about the influence of social media use on students' entrepreneurial intention. Although scholars constantly highlight the importance of entrepreneurial role models in enhancing entrepreneurial intention, the occurrence of entrepreneurial role models in social networking sites has not yet been investigated. This study takes a first step towards filling this gap by applying quantitative research in the field of entrepreneurial intention using theory of planned behaviour. The study is based on 246 completed questionnaires from students and young academics from Germany, Austria, Switzerland, and Liechtenstein to investigate as to what extent entrepreneurial role models in social networking sites impact entrepreneurial intention. Analysis of the responses showed that the occurrence of entrepreneurial role models in someone's profile in social networking sites affects their entrepreneurial intention. In addition, the study examines the importance of entrepreneurial role models in an individual's general environment by empirically showing a positive effect in increasing entrepreneurial intention. Further, the study reveals that the intensity with which social networking sites are used does not affect entrepreneurial intention. Our findings strengthen the understanding of entrepreneurial role models and contribute to research in the field of entrepreneurship and social media.

Keywords: entrepreneurship, entrepreneurial intention, entrepreneurial role models, social media, entrepreneurial development

1. Introduction

Entrepreneurial role models (ERMs) are commonly discussed as drivers to enhance the entrepreneurial intention (EI) of individuals (Bosma et al., 2012; Fellnhofer and Mueller, 2018). Research reveals that ERMs are particularly relevant to a great share of entrepreneurs. Furthermore, role models are getting more recognized as being part of the career choice of individuals (Bosma et al., 2012). The positive effect of exposure to ERMs on EI has been proven in various scientific studies (e.g., Laviolette et al., 2012; Nowiński and Haddoud, 2019). In recent years, the internet, and especially social media, has increasingly become a significant influence on people's lives (Chaffey, 2020). Moreover, the trend of using social media more extensively is also evident among entrepreneurs as they can use the platforms to promote their products or network with other founders (Olanrewaju et al., 2020). Besides, previous research has already shown that an increasing amount of entrepreneurial content gets shared on social networking sites (SNS) like Facebook or LinkedIn (Toker and Baturay, 2019). However, previous work failed to examine the effect of the presence of ERMs in someone's profile in social media on EI. SNS are defined as a services, which allow users to connect in a bounded system by creating personal information profiles, connecting with others, sharing information in various formats, and seeing the information shared by others (Boyd and Ellison2007).

To fill this research gap, this study aims to give a structured overview of ERMs and their connection to EI by empirically investigating the relationship between ERMs in SNS and EI in order to answer the research question *"Does exposure to Entrepreneurial Role Models in Social Networking Sites impact Entrepreneurial Intention, and if yes, how?"*. Thereby, our study focuses on ERMs in the first instance and on SNS and EI in the second instance.

To do this, we carried out an online survey among students and young academics in Germany, Austria, Switzerland, and Liechtenstein. The contributions of our study are manifold. First, our study contributes to the ERM literature by providing evidence that the occurrence of entrepreneurial role models in someone's profile in SNS affect individuals' EI (BarNir et al., 2011). Second, our study reveals that SNS are nowadays an inevitable part of the formation of EI, however the intensity with which SNS are used does not correlate with the intensity of the individual's EI. This valuable insight leads to interesting future research strands in the field of

entrepreneurial education, social media and entrepreneurial role models. Lastly, we contribute to entrepreneurial education literature by empirically revealing that the individual use of SNS foster entrepreneurial intentions and behaviour (e.g., Block et al., 2013). Policy makers and educators can potentially benefit from our empirical findings to effectively enhance EI by ERMs through the use of SNS and thereby enhance entrepreneurial activities as critical economic driver of innovation and growth.

The remainder of this academic paper is structured as follows: In Section 2, we discuss the theory of planned behaviour as the theoretical foundation for the formulation of our hypotheses. In Section 3, we reveal the development of hypotheses that summarize our conceptual proposal. Section 4 explains the data collection and the variables to be used in the statistical analyses conducted to test our hypotheses. In the following Section 5 we provide the analysis of our empirical data and provide the key results of our analyses. In the last section, we discuss and conclude our empirical findings.

2. Theoretical background

Ajzen's (1985) theory of planned behaviour has become the primarily relevant theory for explaining EI (Aragon-Sanchez et al., 2017; Schlaegel and Koenig, 2014). Central to the theory of planned behaviour is the intention to perform a given behaviour. Intentions indicate someone's willingness to try and the effort someone is planning to exert to perform a behaviour. The general rule behind the theory of planned behaviour states that the higher the intention to execute a behaviour, the higher the probability that the behaviour's execution will occur. The theory states that only three variables directly affect intentions, namely, perceived behavioural control, subjective norms regarding a given behaviour, and attitudes towards a specific behaviour as Figure 1 illustrates (Ajzen, 1991).

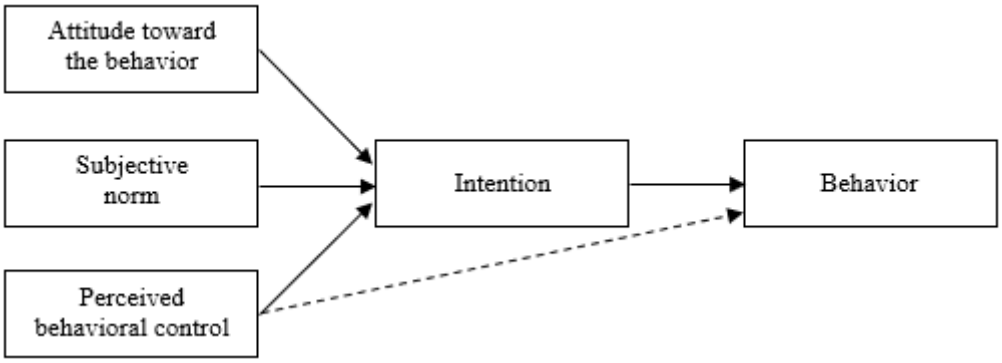

Figure 1: Mediated relationship between the variables of the theory of planned behaviour (Adapted from Ajzen, 1991, p. 182)

Not only intentions but also perceived behavioural control can directly predict behaviour. In broad terms, perceived behavioural control can be seen as a combination of the perceived resources and opportunities an individual believes to control and the perceived barriers an individual face (Ajzen, 1991). Generally, it is assumed that the more resources and opportunities an individual believes to possess, and the fewer obstacles it believes are needed to be overcome, the higher will be the perceived behavioural control. Thus, it can be seen that the higher the perceived behavioural control, the higher the effort, and therefore the probability of occurrence. This leads to the fact that besides its influence on intention, perceived behavioural control also influences behaviour directly (Ajzen, 1991).

While perceived behavioural control affects intention and behaviour directly, attitudes and subjective norms only influence intentions directly (Fishbein and Ajzen, 1975). Moreover, Ajzen (1991) uses the term attitude toward behaviour to refer to the subjective evaluation of cost, outcome, or some other attribute associated with a given behaviour. Individuals prefer a behaviour that has predominantly positive consequences compared to a behaviour that has primarily negative consequences. This evaluation results in an attitude towards the behaviour (Ajzen, 1991).

Lastly, subjective norms are defined as the beliefs someone has regarding the assessment of a behaviour by certain individuals or groups. The underlying beliefs are concerned with the probability that a behaviour gets approved or disapproved by a particular individual or group. If such an individual or group, for example, thinks

a person should perform a specific behaviour, the person might feel social pressure to do so, and vice versa (Ajzen, 1991)

Several studies have confirmed the relation between attitude toward behaviour (e.g., Botsaris and Vamvaka, 2016), subjective norm toward behaviour (e.g., Awang et al., 2016), perceived behavioural control (e.g., Yang, 2013) and EI according to the theory of planned behaviour (Ajzen, 1985). Moreover, there remain several other variables discussed in the current research which are associated with EI. In fact, those other variables affect the underlying variables of the theory of planned behaviour and hence make it possible to further develop EI.

Existing scientific research of entrepreneurship education suggests that entrepreneurship education positively influences the EI of individuals (e.g., Zhang et al., 2014). The occurrence of ERMs in entrepreneurship courses has further shown to positively contribute to the development of EI (Fellnhofer, 2017). Moreover, research has shown that perceived entrepreneurship-friendly universities enhance students' EI levels (Saeed et al., 2015). In fact, entrepreneurship education and the resulting entrepreneurial intention is particularly relevant in higher education (Maritz, 2017).

Besides the occurrence of entrepreneurship-enhancing programs in universities, EI can be fostered through informal institutional variables such as parental experiences (Engle et al., 2011). Parental ERMs have been proven to raise the EI levels of their offspring (e.g., Chlosta et al., 2012). Moreover, there is a considerable amount of research showing that ERMs generally raise the EI level of observers (Fellnhofer and Mueller, 2018; Nowiński and Haddoud, 2019). However, studies analyzing the occurrence of ERMs in different contexts are rather fragmented. Authors have raised the question of how iconic ERMs enhance EI (Abbasianchavari and Moritz, 2020).

In today's media, ERMs are strongly anchored, especially for young target groups, for example through professional and social networks as well as via TV shows such as Dragons' Den (UK) or Shark Tank (USA). The occurrence of ERMs in a multimedia context has recently been proven to positively affect EI (Fellnhofer, 2018, 2017). In addition, social media and particularly SNS have greatly increased their popularity and continue to do so (Poleshova, 2020). Similarly, this trend can be observed among entrepreneurs (Olanrewaju et al., 2020). This raises the question if an increasing amount of entrepreneurial content shared online might also be seen as some sort of entrepreneurship education.

3. Hypotheses development

ERMs present an important reason for many to start their own companies. They can occur in the close environment of an individual and might be parents, former employers, or work colleagues (Bosma et al., 2012). Moreover, ERMs can also be famous people, which the observer does not know personally (Abbasianchavari and Moritz, 2020). Individuals can learn from ERMs by observing their behaviour or interacting with them (Zozimo et al., 2017). Studies have shown that the presence of ERMs positively influences EI (Bosma et al., 2012). With regard to the presence of ERMs and its effect on entrepreneurial intention, the first hypothesis is proposed:

> ***H1:*** *The higher the general presence of ERMs in someone's life, the greater is their entrepreneurial intention.*

The strength of ties has shown to influence the relationship an individual conducts with an ERM. Those ties are particularly influenced by the intensity of contact between role model and observer. In this sense, role models who spend much time with an individual can be classified as strongly-tied ERMs, whereas role models maintaining only infrequent contact can be seen as weakly-tied role models. Particularly, strong ties between individual and ERM have shown to be relevant for the start-up process of a new venture (Starr and MacMillan, 1990).

Moreover, high usage of social networking sites could indicate that users come across content shared by entrepreneurs, even if they do not actively follow them. The content could potentially occur through advertisements or through posts by friends, which reshare the content of entrepreneurs. Besides that, individuals who are already following ERMs would certainly come along with more content shared by entrepreneurs if they use the platforms more extensively. Therefore, it can be expected that higher usage of social networking sites strengthens the ties between observer and ERM and hence increase entrepreneurial intention. Previous work has begun to examine the relationship between social media usage and entrepreneurial intention. The findings indicate that social media usage has a positive effect on EI. However, the characteristics

of the relation between social media usage and EI are not well understood yet (Huang and Zhang, 2020). The current study focuses on social networking sites, a subcategory of social media, to gain more practical insights. With this in mind, the second hypothesis asserts:

H2: *The higher someone's usage of social networking sites, the greater is their EI.*

Besides more entertaining content shared, entrepreneurial content is also becoming more popular on social networking sites. Entrepreneurs use the platforms, for instance, to promote their products or to network with other founders (Olanrewaju et al., 2020). Moreover, users of social networking sites also pursue a close connection with their core network via the platforms (Hampton et al., 2011). Thus, the connection via social networking sites with ERMs of the close environment of an individual can be seen as additional contact between the parties. Furthermore, users can also connect with entrepreneurs, which an individual does not know personally.

Besides different ERMs an individual can connect with, there are also different kinds of social networking sites an individual can use. In particular, there are personal social networking sites, such as Facebook or Instagram, and professional social networking sites, such as Xing or LinkedIn. The type of platforms differs in respect of the purpose for which they are used. While personal social networking sites are primarily used for community and group interaction, professional social networking sites are mainly used for professional networking, self-promotion, and job affairs (Baker et al., 2013).

Previous work has failed to analyze the relationship between the presence of ERMs in someone's profile in social networking sites and EI. The presence of ERMs in someone's profile is defined as posts, pictures or videos of ERMs an individual sees while using a social networking site. Thus, hypotheses 3a and 3b postulate the effect of the presence of ERMs in social networking sites on the EI of the users.

H3a: *The higher the presence of ERMs in someone's profile in personal social networking sites, the greater their EI.*

H3b: *The higher the presence of ERMs in someone's profile in professional social networking sites, the greater their EI.*

4. Research methodology

4.1 Data collection and sample description

We conducted a survey of students and young academics from Germany, Austria, Switzerland, and Liechtenstein to test our hypotheses. The survey relies on self-reported data from people who mostly plan to or who already have received a university degree. A total of 336 participants were recruited for this survey. Before analyzing the data, several criteria were scrutinized to exclude participants who did not seriously participate in the survey or were not part of the target group.

Moreover, only participants within the age group 25-34 would be considered, and anyone older than 34 was excluded. The reason for this is that previous studies analyzing EI mainly focused on young people, especially students (e.g., Liñán et al., 2010; Nowiński and Haddoud, 2019). After excluded a total of 90 responses, 246 completed responses were admitted for analysis.

All instruments were only available in English, thus requiring a translation into German because of the study's geographical focus. The data collection took place via an online survey between the 22nd of October 2020 and the 8th of November 2020. LimeSurvey was chosen as the survey tool.

To asses content validity, we furthermore conducted a pretest as suggested by Saris and Gallhofer (2014) with a sample of 19 test participants, recruited from the author's personal network. After adaption of some wording, the translation was considered to have been carried out properly to ensure that our items were interpreted unambiguously.

4.2 Measurement variables and model

All constructs were correlated with EI, presenting the dependent variable of the current analysis. An overview of the constructs used, their scaling, and their source can be seen in Table 1.

Moreover, the survey employed the following control variables: the highest level of education, the field of studies, entrepreneurial experience, the probability of founding a company in the future, the number of contacts participants have on the different SNS, the gender, the age and the country of origin.

Table 1: Item constructs

Construct	Scaling Type	Source
EI	Ordinal, 7-point Likert (total disagreement – total agreement)	Liñán and Chen (2009, p. 613)
Presence ERMs in general		Adapted from Nauta and Kokaly (2001, p. 91)
SNS Intensity		Xanidis and Brignell (2016, p. 123)
Presence ERMs in SNS		New construct

5. Data analysis and results

In testing the fundamental relationship in the model, the presence of ERMs in general and EI were correlated as hypotheses H1 postulates. Thereby, a highly significant relationship was found (r_S = .60***), supporting hypotheses H1.

Further examination of the research model required an exploration of the relationship between the SNS intensity and EI as hypotheses H2 postulates. However, no correlation could be found (r_S = .00). Thus, H2 is rejected.

In the third step, the correlation between the presence of ERMs in personal SNS and private SNS was individually correlated with EI. H3a postulates a positive impact of ERMs in personal social networking sites on the EI, whereby hypotheses H3b postulates a positive impact of the presence of ERMs in someone's profile in professional social networking sites on their EI. Our findings support both hypotheses H3a and H3b with highly significant correlations (H3a: r_S = .43***; H3b: r_S = .37***). Consequently, H3a and H3b are supported as Table 2 illustrates.

Table 2: Means, standard deviations, and correlations between variables and EI

Variable	*M*	*SD*	r_S
EI	3.82	1.68	
Presence ERMs in general	4.00	1.54	.60***
SNS Intensity	3.51	1.13	.00
Presence of ERMs in Personal SNS	3.52	1.76	.43***
Presence of ERMs in Professional SNS	4.90	1.74	.37***

Note. M and *SD* indicate mean and standard deviation, respectively. *p<.05; **p<.01; ***p<.001 (1-tailed)

6. Discussion

The findings of the current study provide new insights into the effect ERMs trigger on EI. Furthermore, they contribute to the literature related to social media and particularly SNS. In the following, the obtained results are discussed.

Several empirical studies revealed that there is a positive relationship between the general presence of ERMs and EI (e.g., Ahmed et al., 2019). Consistent with previous research as well as the expectations of the author, the current study confirms this effect. Thus, the current work helps to further generalize the importance of ERMs in enhancing the EI of their observer.

Moreover, the study also offered an unexpected finding regarding the intensity with which SNS are used. We empirically demonstrate that the intensity with which SNS are used does not correlate with EI. That result is particularly unexpected, drawing to the role of ties. The strength of ties is particularly influenced by the amount of time the ERM and observer spend with each other (Granovetter, 1973). In fact, research has shown that ERMs conducting strong ties with an individual have a greater effect on the EI of the observer than ERMs who are only weakly tied to an individual (Bosma et al., 2012). Moreover, research has shown that conducting strong ties with ERMs is particularly relevant for the start-up process of a company (Starr and MacMillan, 1990).

High usage of SNS could indicate that users come across content shared by entrepreneurs, even if they do not actively follow them. The content could potentially occur through advertisements or through posts by friends, which reshare the content of entrepreneurs. Besides that, individuals who are already following ERMs would certainly get more exposed to the content shared by their ERMs if they use the platforms more extensively. Therefore, it can be expected that higher usage of SNS strengthens the ties between observer and ERM and hence increases EI. Therefore, a logical assumption would be that a high intensity of SNS usage goes along with high levels of EI. However, the current study does not support this view and does not evidence any connection between EI and the intensity with which SNS are used.

In addition, current studies combining social media usage and EI are rather superficial and do not particularly analyze the intensity with which networks were used (e.g., Huang and Zhang, 2020). Moreover, studies analyzing the effect the mass media has on EI are at an early stage (Laguía and Moriano, 2019). Hence, it is not possible to conclude an explanation for the non-present relationship between the SNS intensity and EI from other publications' findings.

6.1 Limitations and future research strands

Inevitably, all research is subject to limitations. The first limitation is that the current sample mainly consists of students or young academics. Although this sampling method is a common practice among scholars in the field of EI research (Liñán et al., 2010; Nowiński and Haddoud, 2019), it might not be possible to generalize the obtained results to other groups of people. Future studies should focus on diverse groups of study participants to further enhance the understanding of EI in SNS. Second, the mentioned limitation also applies to the geographic constraint of the study participants. While our study focused on young academics in the DACH region, further studies should be conducted in other geographic areas to assess the transferability of the study findings.

With or without a broader sample, future research should investigate the link between EI and the intensity of exposure to ERMs instead of the intensity with which SNS are used in general. Results could offer more insights into the underlying mechanism through which ERMs enhance EI and clarify whether the assumptions made in this discussion are correct.

To sum up, the current work has taken the first step to explaining the effect between ERMs in SNS and EI by using correlation analysis. To add to the improvements in study design mentioned above, further research should apply more complex multi-regression models, which could potentially explain a higher degree of variance.

6.2 Theoretical and practical implications

Based on the empirical results of this study, several theoretical and practical implications arise. In terms of the scientific perspective, it was found that exposure to ERMs in SNS positively correlates with each individual's EI level. Moreover, the research has also shown that the intensity with which SNS are used does not correlate with EI. These insights contribute to the current understanding of ERMs and open up a new avenue of research. Scholars should build upon this work and further analyze how ERMs in different social media platforms occur and to what extent they enhance users EI level. Besides contributing to research in the field of EI, the current work also extends the knowledge about social media by investigating the role of ERMs on the platforms.

Concerning practice, implications for the deployment of the gained knowledge can be derived. In particular, educators teaching entrepreneurship should use the opportunity to make students aware of ERMs in SNS. As previous research has already shown, ERMs can positively contribute to the EI of students when they are present in entrepreneurship education courses (Fellnhofer, 2017). Through actively including ERMs in their courses, educators should make students aware of the people behind a start-up company and make them curious about entrepreneurs. Since the usage of SNS is currently more prevalent than ever before, it can be assumed that interested students will follow these potential ERMs on SNS and thus increase their EI levels. Furthermore, policymakers should be aware that a good tool to promote entrepreneurship might simply be to encourage entrepreneurs to create or extend their SNS profiles and share their stories via SNS.

7. Conclusion

To conclude, this academic paper reveals interesting findings in the field of ERMs, EI and SNS and provides a promising starting point to further investigate the occurrence of ERMs in social media with EI. The increasing usage of social media and the interest in understanding the underlying reasons why people undertake entrepreneurial activity clearly represent the significance of this research strand. Future research should investigate the role of intensity of contact between the ERM and the observer in social networks. This would help to further generalize the current findings and increase the knowledge about the strength of ties. In detail, it would help to show if there is a difference between the role ties play in online and offline environments.

References

Abbasianchavari, A., Moritz, A., 2020. The impact of role models on entrepreneurial intentions and behaviour: a review of the literature. Management Review Quarterly 19, 543–583. https://doi.org/10.1007/s11301-019-00179-0

Ahmed, E.R., Abdul Rahim, N.F., Yousif Alabdullah, T.T., Thottoli, M.M., 2019. An Examination of Social Media Role in Entrepreneurial Intention among Accounting Students: A SEM Study. JMAA 15, 577–589. https://doi.org/10.17265/1548-6583/2019.12.003

Ajzen, I., 1991. The theory of planned behaviour. Organizational Behaviour and Human Decision Processes 50, 179–211. https://doi.org/10.1016/0749-5978(91)90020-T

Ajzen, I., 1985. From Intentions to Actions: A Theory of Planned Behaviour, in: Kuhl, J., Beckmann, J. (Eds.), Action Control. Springer, Berlin, Heidelberg, pp. 11–39. https://doi.org/10.1007/978-3-642-69746-3_2

Aragon-Sanchez, A., Baixauli-Soler, S., Carrasco-Hernandez, A.J., 2017. A missing link: the behavioural mediators between resources and entrepreneurial intentions. IJEBR 23, 752–768. https://doi.org/10.1108/IJEBR-06-2016-0172

Awang, A., Amran, S., Niza Md Nor, M., Ibrahim, I.I., Mohd Razali, M.F., 2016. Individual Entrepreneurial Orientation Impact on Entrepreneurial Intention: Intervening Effect of PBC and Subjective Norm. Journal of Entrepreneurship, Business and Economics 4, 94–129.

Baker, P.M.A., Bricout, J.C., Moon, N.W., Coughlan, B., Pater, J., 2013. Communities of participation: A comparison of disability and aging identified groups on Facebook and LinkedIn. Telematics and Informatics 30, 22–34. https://doi.org/10.1016/j.tele.2012.03.004

BarNir, A., Watson, W.E., Hutchins, H.M., 2011. Mediation and Moderated Mediation in the Relationship Among Role Models, Self-Efficacy, Entrepreneurial Career Intention, and Gender. Journal of Applied Social Psychology 41, 270–297. https://doi.org/10.1111/j.1559-1816.2010.00713.x

Block, J.H., Thurik, R., Zhou, H., 2013. What turns knowledge into innovative products? The role of entrepreneurship and knowledge spillovers. J Evol Econ 23, 693–718. https://doi.org/10.1007/s00191-012-0265-5

Bosma, N., Hessels, J., Schutjens, V., Praag, M.V., Verheul, I., 2012. Entrepreneurship and role models. Journal of Economic Psychology 33, 410–424. https://doi.org/10.1016/j.joep.2011.03.004

Botsaris, C., Vamvaka, V., 2016. Attitude Toward Entrepreneurship: Structure, Prediction from Behavioural Beliefs, and Relation to Entrepreneurial Intention. J Knowl Econ 7, 433–460. https://doi.org/10.1007/s13132-014-0227-2

Boyd, D.M., Ellison, N.B., 2007. Social Network Sites: Definition, History, and Scholarship. Journal of Computer-Mediated Communication 13, 210–230. https://doi.org/10.1111/j.1083-6101.2007.00393.x

Chaffey, D., 2020. Global social media research summary August 2020 [WWW Document]. Smart Insights. URL https://www.smartinsights.com/social-media-marketing/social-media-strategy/new-global-social-media-research (accessed 10.30.20).

Chlosta, S., Patzelt, H., Klein, S.B., Dormann, C., 2012. Parental role models and the decision to become self-employed: The moderating effect of personality. Small Bus Econ 38, 121–138. https://doi.org/10.1007/s11187-010-9270-y

Engle, R.L., Schlaegel, C., Dimitriadi, N., 2011. Institutions and entrepreneurial intent: A cross-country study. J. Dev. Entrepreneurship 16, 227–250. https://doi.org/10.1142/S1084946711001811

Fellnhofer, K., 2018. Narratives boost entrepreneurial attitudes: Making an entrepreneurial career attractive? Eur J Educ 53, 218–237. https://doi.org/10.1111/ejed.12274

Fellnhofer, K., 2017. The Power of Passion in Entrepreneurship Education: Entrepreneurial Role Models Encourage Passion? Journal of Entrepreneurship Education 20, 58–87.

Fellnhofer, K., Mueller, S., 2018. "I Want to Be Like You!": The Influence of Role Models on Entrepreneurial Intention. J. Enterprising Culture 26, 113–153. https://doi.org/10.1142/S021849581850005X

Fishbein, M., Ajzen, I., 1975. Belief, attitude, intention, and behaviour: an introduction to theory and research, Addison-Wesley series in social psychology. Addison-Wesley Pub. Co, Reading, Mass.

Granovetter, M.S., 1973. The Strength of Weak Ties. The American Journal of Sociology 78, 1360–1380.

Hampton, K., Goulet, L.S., Purcell, K., 2011. Part 3: Social networking site users have more friends and more close friends [WWW Document]. URL https://www.pewresearch.org/internet/2011/06/16/part-3-social-networking-site-users-have-more-friends-and-more-close-friends

Huang, Y., Zhang, J., 2020. Social media use and entrepreneurial intention: The mediating role of self-efficacy. Social Behaviour and Personality 48, 1–8. https://doi.org/10.2224/sbp.9451

Laguía, A., Moriano, J.A., 2019. Perceived representation of entrepreneurship in the mass media and entrepreneurial intention. Int Entrep Manag J 50, 1–21. https://doi.org/10.1007/s11365-019-00609-1

Laviolette, E.M., Radu Lefebvre, M., Brunel, O., 2012. The impact of story bound entrepreneurial role models on self-efficacy and entrepreneurial intention. Int Jrnl of Ent Behav & Res 18, 720–742. https://doi.org/10.1108/13552551211268148

Liñán, F., Chen, Y.-W., 2009. Development and Cross-Cultural Application of a Specific Instrument to Measure Entrepreneurial Intentions. Entrepreneurship Theory and Practice 33, 593–617. https://doi.org/10.1111/j.1540-6520.2009.00318.x

Liñán, F., Rodríguez-Cohard, J.C., Rueda-Cantuche, J.M., 2010. Factors affecting entrepreneurial intention levels: a role for education. Int Entrep Manag J 7, 195–218. https://doi.org/10.1007/s11365-010-0154-z

Maritz, A., 2017. Illuminating the black box of entrepreneurship education programmes: Part 2. Education + Training 59, 471–482. https://doi.org/10.1108/ET-02-2017-0018

Nauta, M.M., Kokaly, M.L., 2001. Assessing Role Model Influences on Students' Academic and Vocational Decisions. Journal of Career Assessment 9, 81–99. https://doi.org/10.1177/106907270100900106

Nowiński, W., Haddoud, M.Y., 2019. The role of inspiring role models in enhancing entrepreneurial intention. Journal of Business Research 96, 183–193. https://doi.org/10.1016/j.jbusres.2018.11.005

Olanrewaju, A.-S.T., Hossain, M.A., Whiteside, N., Mercieca, P., 2020. Social media and entrepreneurship research: A literature review. International Journal of Information Management 50, 90–110. https://doi.org/10.1016/j.ijinfomgt.2019.05.011

Poleshova, A., 2020. Anzahl der monatlich aktiven Facebook Nutzer weltweit vom 1. Quartal 2009 bis zum 3. Quartal 2020 [WWW Document]. Statista. URL https://de.statista.com/statistik/daten/studie/37545/umfrage/anzahl-der-aktiven-nutzer-von-facebook/ (accessed 5.12.20).

Saeed, S., Yousafzai, S.Y., Yani-De-Soriano, M., Muffatto, M., 2015. The Role of Perceived University Support in the Formation of Students' Entrepreneurial Intention. Journal of Small Business Management 53, 1127–1145. https://doi.org/10.1111/jsbm.12090

Saris, W.E., Gallhofer, I.N., 2014. Design, evaluation, and analysis of questionnaires for survey research, 2nd ed. ed. John Wiley & Sons, Hoboken, New Jersey.

Schlaegel, C., Koenig, M., 2014. Determinants of Entrepreneurial Intent: A Meta-Analytic Test and Integration of Competing Models. Entrepreneurship Theory and Practice 38, 291–332. https://doi.org/10.1111/etap.12087

Starr, J.A., MacMillan, I.C., 1990. Resource Cooptation Via Social Contracting: Resource Acquisition Strategies for New Ventures. Strategic Management Journal 11, 79–92.

Toker, S., Baturay, M.H., 2019. What foresees college students' tendency to use facebook for diverse educational purposes? Int J Educ Technol High Educ 16, 1–20. https://doi.org/10.1186/s41239-019-0139-0

Xanidis, N., Brignell, C.M., 2016. The association between the use of social network sites, sleep quality and cognitive function during the day. Computers in Human Behaviour 55, 121–126. https://doi.org/10.1016/j.chb.2015.09.004

Yang, J., 2013. The Theory of Planned Behaviour and Prediction of Entrepreneurial Intention Among Chinese Undergraduates. soc behav pers 41, 367–376. https://doi.org/10.2224/sbp.2013.41.3.367

Zhang, Y., Duysters, G., Cloodt, M., 2014. The role of entrepreneurship education as a predictor of university students' entrepreneurial intention. Int Entrep Manag J 10, 623–641. https://doi.org/10.1007/s11365-012-0246-z

Zozimo, R., Jack, S., Hamilton, E., 2017. Entrepreneurial learning from observing role models. Entrepreneurship & Regional Development 29, 889–911. https://doi.org/10.1080/08985626.2017.1376518

The Potential of Scientific and Educational Centers as a Tool for Sustainable Innovative Development

Galina Surovitskaya[1], Ekaterina Grosheva[1], Raushan Malayeva[2], Aizhan Omarova[3], Nurmukhan Aigerim[3] and Irina Karapetyan[4]
[1]Sub-department of applied and business informatics, Penza Cossack Institute of Technologies (branch) of K. G. Razumovsky Moscow State University of Technologies and Management (the First Cossack University), Penza, Russian Federation
[2]Kurmangazy Kazakh National Conservatory, Almaty, Republic of Kazakhstan
[3]Al-Farabi KazNU Islamic Finance Scientific and Educational Centre, Al-Farabi Kazakh National University, Almaty, Republic of Kazakhstan
[4]Sub-Department of Management and State Municipal Administration, K. G. Razumovsky Moscow State University of Technologies and Management (the First Cossack University), Moscow, Russian Federation
gvs_kachestvo@inbox.ru
grosheva.work@gmail.com
rauka.ru@mail.ru
87022707772@mail.ru
nurmukhan.aigerim@mail.ru
i.karapetyan@mgutm.ru
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Abstract: In modern conditions the processes of economic globalization have necessitated the intensification of innovation processes in almost all countries of the world community in order to achieve competitive advantages in socio-economic and political development. At the same time theories of regional economics, in particular theories of "growth points" or "development kernels", regional self-development potential, territorial agglomeration, etc. are being developed and applied. The experience in the implementation of innovation strategies in recent years has shown a clear lack of administrative resources and investment injections into individual programs and centres. The innovation economy requires the formation of a development basis in the unity of productive forces and production relations. At present the processes of development of innovative economy are restrained both by the existing problems of financing of science, modernisation of scientific laboratories and institutes base, and by the problems of training of innovation-active personnel of specialists. Undoubtedly, the lag in scientific and technical support of educational process, interaction with production, availability of necessary practice base, insufficient innovative activity of business in this direction, its low financial opportunities have a negative impact. Thus, modern innovative production necessitates the expansion of integrative links between science, education and production not only in reproduction, but also in the territorial aspect. Integrated formations of science, education and production become the basis for innovation development of the economy, and their interaction goes beyond the boundaries of one administrative unit and extends to adjacent, cross-border territories. In this connection development of theory, methodology and recommendations for practice of spatial integration of science, education and production, formation of spatially localized innovative subsystems of transboundary territories on the basis of their innovation potential is an actual problem, which has not received proper attention in modern economic researches. This article deals with the issues of identifying points of growth of innovation ecosystems of the regions initiating the creation of world-class science and education centres, as well as a comparative assessment of their scientific and human resource potential competitiveness, using the data of the 2019 university performance monitoring. The data on the performance of research and education centres established in Russia in 2019 and 2020 were used as the information base for this study. A set of methods, including methods of theoretical analysis, comparison and generalization, was used to solve the research tasks. The scientific novelty and originality of the article is the proposed approach to ensuring sustainable development of the region based on the maximum involvement of growth factors of scientific and human resources potential of key actors of regional innovation systems with the use of mechanisms of scientific and educational integration in the form of science and education centres.

Keywords: region, innovative development, scientific and educational center, university, potential, Russia

1. Introduction

At the present stage, the development of regional innovation systems is one of the key factors in increasing the level of socio-economic development of regions. Universities are an important link in regional systems of integration of enterprises, science and education (Zaharova, 2019). In this case, the example of the project

launched in 2015 to create core universities in a number of subjects of the Russian Federation, which were to become the drivers of innovative development of the regions, is highly illustrative (Surovitskaya, 2019). In the course of the project implementation, it became clear that integration of scientific and educational potential with involvement of economic entities of the real sector of economy is one of the factors of innovative territorial clusters development (Pechatkin, 2019). The most important form of integration at the present stage is the creation of world-class scientific and educational centres.

2. Theoretical and methodological aspects of the formation and functioning of world-class research and education centres

World-class science and education centre (WSC) is an association of federal state educational institutions of higher education and (or) scientific organisations without the formation of a legal entity with organisations operating in the real sector of the economy and carrying out activities in accordance with the centre's activity programme, supported by a subject of the Russian Federation (WCREC, 2020) .

The strategic goal of creating a world-class network of research and education centres is to ensure the solution of breakthrough applied tasks required for the development of the country's innovative economy and the training of highly qualified personnel in accordance with the priorities of the Strategy for Scientific and Technological Development of the Russian Federation (Zaharova, 2020)

The key tasks between the main actors of the established research and education centres are distributed as follows:

- Scientific and educational organisations: enabling the involvement of real economy organisations in their sites;
- Industrial enterprises: investing in technologies and developments in line with needs and objectives;
- Regional authorities: investing in the creation of comfortable conditions for the development of scientific and educational centres (improvement of the urban environment, infrastructure development, grant support).

According to a number of researchers, science and education centres are a modernised projection of the "Lavrentiev Triangle" (science - human resources - production), which in the future could be transformed into digital platforms (Solodovnikov, 2021).

In modern terms, the principles of "Lavrentiev Triangle"can be summarised as follows:

- complexity of scientific centres and advanced development in all the main areas of the basic sciences;
- integration of science and education, extensive use in education of the personnel potential and material base of academic institutions, a multilevel system for the selection, training and reproduction of highly and highly qualified personnel for science, higher education and industry;
- active promotion of the realization of scientific achievements, and a variety of forms of communication with industry.

On the other hand, the world-class research and education centres created in recent years in the Russian Federation can be considered as the embodiment of H. Etzkowitz's Triple Helix Model as applied to the realities of innovative development of Russian regions. The concept of world-class scientific and educational centres develops the triple helix model by forming a theoretical and methodological basis for the creation and development of consortia of universities and research organizations under the jurisdiction of federal and regional executive authorities.

Trends in the formation of world-class research and education centres are based on the notion of three innovation production contours:

- the core of knowledge creation as the basic conditions for launching world-class science and education centres: competence centres, engineering centres, science laboratories, research groups, viral laboratories and digital platforms (Gamidullaeva, 2019);

- innovation ecosystem: technology consortia, research parks, innovation spaces and networks, technology consultants, start-up factories, technology transfer centres, accelerators and other intermediaries (Tolstykh at al, 2021);
- institutional environment and support tools: clusters and production systems, urban communities, public institutions, social infrastructures, engineering and manufacturing infrastructures (Polbitsyn at al, 2021) .

Thus, the science and education centres fully realise the prospects of the science and education core and innovation-technology belt collation with the industrial complex in order to ensure multiplicative exchange of technologies, knowledge and competences, and accelerate the processes of creating and bringing to market globally superior and competitive products and technologies in various fields (Kruglyakova at al, 2019).

3. Level of innovation development of the regions that initiated the establishment of world-class science and education centres

In order to identify points of growth of innovation ecosystems of the regions that have initiated the creation of world-class science and education centres, the comparative competitiveness of their scientific and human resource potential was assessed using the 2019 university performance monitoring data.

The information base for the study was formed by the data on the performance of the research and education centres established in Russia in 2019 and 2020:

- The world-class research and education centre "Innovative Solutions in the Agro-Industrial Complex" (2019, initiated by the Belgorod Region);
- The world-class research and education centre "Kuzbass" (2019, initiated by the Kemerovo Region);
- The world-class research and education centre "Rational Subsoil Use" (2019, initiated by the Perm Territory);
- The world-class research and education centre "TECHNOPlatform 2035". (2019, initiated by the Nizhny Novgorod region);
- West Siberian Interregional World-class Science and Education Centre (2019, initiated by Tyumen Region, Khanty-Mansi Autonomous Area – Yugra, Yamal-Nenets Autonomous Area);
- The world-class research and education centre "Engineering of the Future" (2020, initiated by the Samara Region, Penza Region, Tambov Region, Ulyanovsk Region, Republic of Mordovia);
- Urals Interregional World-class Scientific and Educational Centre "Advanced Manufacturing Technologies and Materials" (2020, initiated by the Sverdlovsk Region, Chelyabinsk Region, Kurgan Region);
- The world-class research and education centre "The Russian Arctic: new materials, technologies and research methods" (2020, initiated by the Arkhangelsk Region, Murmansk Region, Nenets Autonomous Area);
- The world-class research and education centre "TulaTECH" (2020, initiated by создания – Tula region);
- The world-class research and education centre "World-class Eurasian Science and Education Centre" (2020, initiated by the Republic of Bashkortostan).

The level of innovative development of the regions that have initiated world-class science and education centres can be assessed using the index of scientific and technological development of the constituent entities of the Russian Federation. When calculating this index, four groups of indicators are taken into account: "Human resources", "Material and technical base", "The scale of scientific and technological activities", The effectiveness of scientific and technological activities" (RIA Rating, 2020).

Figure 1 shows average values of the scientific and technological development index of the regions that initiate world-class science and education centres.

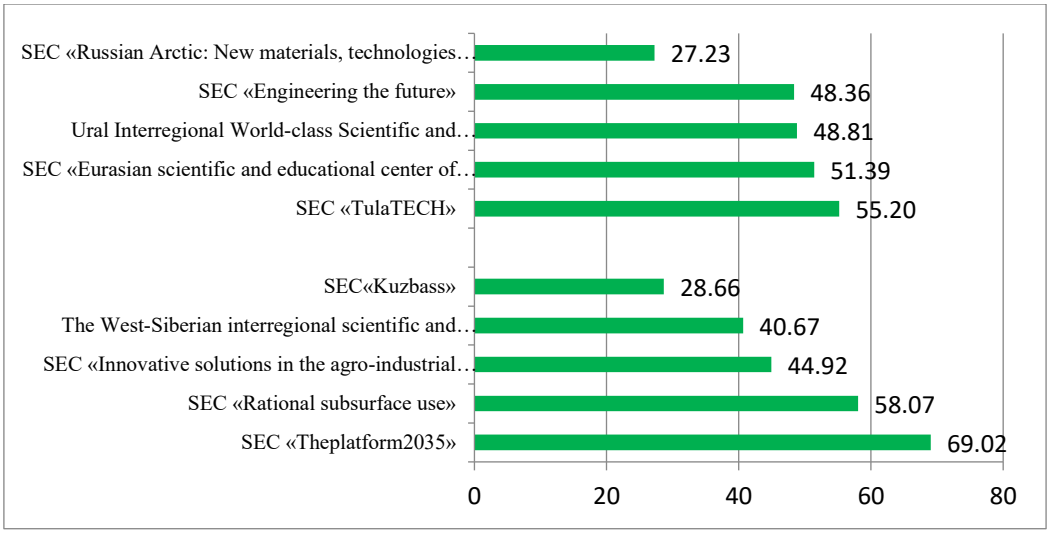

Figure 1: Average values of the scientific and technological development index of the regions initiating the establishment of world-class science and education centres

Table 1 shows the positions of the regions - initiators of world-class science and education centres, depending on the value of the Science and Technology Development Index.

Table 1: Positions of regions that have initiated the creation of world-class science and education centres, depending on the value of the scientific and technological development index

Subject of the Russian Federation	Ranking place	Meaning of the Science and Technology Development Index
World-class research and education centres that received state support in 2019		
World-class research and education centre "Innovative Solutions in the Agro-industrial Complex		
Belgorod region	25	44,92
The world-class research and education centre "Kuzbass"		
The world-class research and education centre "Kuzbass"	55	28,66
The world-class research and education centre "TECHNOPlatform 2035"		
Nizhny Novgorod region	3	69,02
The world-class research and education centre "Rational Subsoil Use"		
Perm Territory	7	58,07
West Siberian Interregional World-class Science and Education Centre		
Tyumen Region	9	56,34
Khanty-Mansi Autonomous Area – Yugra	41	35,12
Yamal-Nenets Autonomous Area	53	30,55
World-class research and education centres that are winners of the 2020 call for proposals.		
The world-class research and education centre "Engineering of the Future"		
Samara Region	6	62,13
Ulyanovsk Region	8	56,74
Republic of Mordovia	27	44,46
Penza Region	29	43,51
Tambov Region	42	34,95
Urals Interregional World-class Scientific and Educational Centre "Advanced Manufacturing Technologies and Materials"		
Sverdlovsk Region	10	55,92
Chelyabinsk Region	15	50,95
Kurgan Region	32	39,57
The world-class research and education centre "The Russian Arctic: new materials, technologies and research methods"		
Arkhangelsk Region	34	38,95
Murmansk Region	48	31,68
Nenets Autonomous Area	84	11,06
The world-class research and education centre "TulaTECH"		
Tula region	11	55,20
The world-class research and education centre "World-class Eurasian Science and Education Centre"		
Republic of Bashkortostan	14	51,39

The data presented shows that the average scientific and technological development indices of the regions that have initiated the creation of world-class scientific and technological education centres selected in 2019 and 2020 do not differ significantly. While there are clear outsiders in each group of world-class scientific and technological centres.

Thus, the level of scientific and technological development of the regions initiating the creation of world-class scientific and technological education centres does not always ensure its competitiveness. In this regard, it is necessary to carry out a comparative analysis of the competitiveness of both world-class scientific and technological centres individually and in comparison with a group of other world-class scientific and technological developmentcentres.

4. Comparative competitiveness of world-class research and education centres that have received state support

The following indicators of the model for monitoring the effectiveness of universities were used indicators of scientific and personnel potential. Table 2 shows these indicators and their average values for the world-class research and education centres selected in 2019, as well as for The world-class research and education centre "Engineering of the Future" as a whole and separately for the group of regional universities that make up it.

Table 2: Values of averaged indicators for monitoring the effectiveness of universities in the in a cross-section of world-class research and education centres

Indicator		SEC «Innovative solutions in the agro-industrial complex»	SEC«Kuzbass»	SEC «Rational subsurface use»	SEC «Theplatform2035»	The West-Siberian interregional scientific and educational centre of world level	SEC «Engineering the future»	SEC «Engineering the future» (universities on the territory of the initiator regions)
Indicator 2.4.	Number of the organization's publications indexed in the information-analytical system of scientific citation Web of Science Core Collection, per 100 scientific and pedagogical staff, units;	52,94	21,592	30,89	25,74	26,42	30,9	20,48
Indicator 2.5	Number of organisation's publications indexed in the information-analytical system of scientific citation Scopus, per 100 scientific-pedagogical employees, units;	77,02	32,854	47,69	33,68	39,44	43,79	30,08
Indicator 2.7	The total volume of research and development work, thousand rubles;	392965	79631	799165	361405	344985	51977	199716
Indicator 2.8	Proportion of research and development income to total income of the educational organisation, %;	13,78	7,21	25,26	16,63	6,67	14,07	11,05
Indicator 2.13	Proportion of scientific and pedagogical staff under 30 years of age without a scientific	17,28	13,18	25,86	18,64	14,29	14,89	13,82

Indicator		SEC «Innovative solutions in the agro-industrial complex»	SEC«Kuzbass»	SEC «Rational subsurface use»	SEC «Theplatform2035»	The West-Siberian interregional scientific and educational centre of world level	SEC «Engineering the future»	SEC «Engineering the future» (universities on the territory of the initiator regions)
	degree, candidates of science under 35 years of age, doctors of science under 40 years of age in the total number of scientific and pedagogical staff, %;							
Indicator 2.16	Number of grants received in the reporting year per 100 academic staff, units;	10,21	5,39	14,61	4,17	4,04	7,99	8,61
Indicator 27	Proportion of teaching staff under 40 years of age, %;	27,155	26,56	36,79	30,55	31,93	27,8	28,42
Indicator 28	Average salary of teaching staff (excluding external part-time employees and those working under contractual obligations), thousand rubles;	103,95	63,92	81,57	77,44	104,45	68,76	59,58
Indicator 29	Average salary of researchers (excluding external part-time workers and those working under contractual obligations), thousand rubles;	132,53	79,65	100,36	92,63	115,88	81,48	71,67
Indicator 56	Share of extrabudgetary funds in research and development income, %;	67,77	50,63	83,83	60,97	61,76	62,73	62,04

The example here is the world-class science and education centre Engineering of the Future, initiated by regions whose average scientific and technological development index is not high enough (Figure 1), which is explained by the low scientific and technological development index value of the Tambov Region (Table 1). One of the factors of competitiveness of the world-class research and education centre "Engineering of the Future" at the start of the project is the composition of the participating universities, their scientific and personnel potential.

Table 2 shows that the most competitive of the world-class science and education centres presented therein is the centre "Rational Subsoil Use", which has the highest values of six out of ten indicators presented in the table. Perm Krai, the initiator of this centre, is not a leader in terms of the scientific and technological development index (Figure 1).

In the course of this study, the values of the indicators have been adjusted to share values (the maximum value is taken as 1.00). Figure 2 shows the share values of the indicators of scientific and human resources capacity of the participating universities of the world-class science and education centres, adjusted to the best results for all centres presented in Table 1.

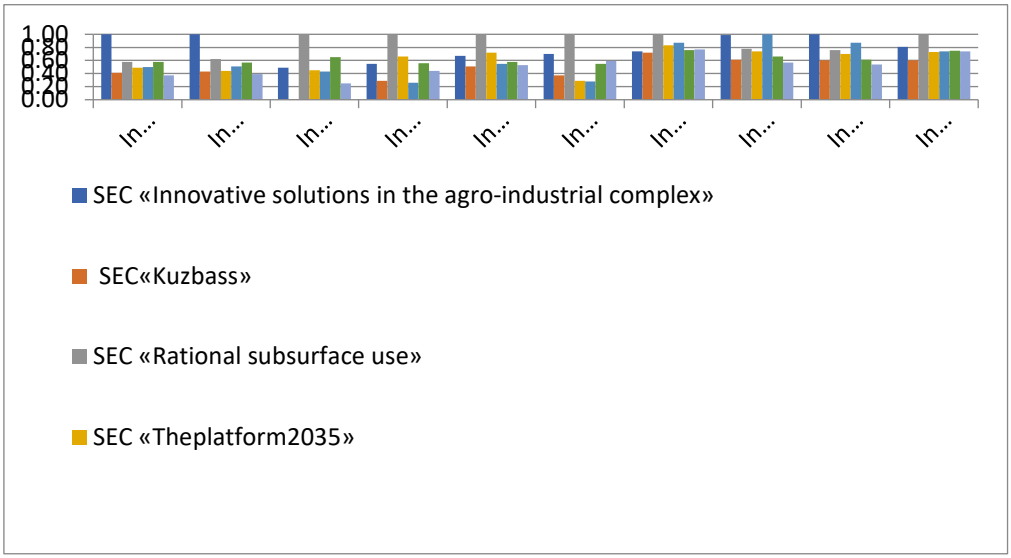

Figure 2: Indicator shares

Figure 3 shows diagrams of the share values of the indicators in question for the group of regional universities within the World-Class Research and Education Centre "Future Engineering" and the member universities of the World-Class Research and Education Centres that received state support in 2019.

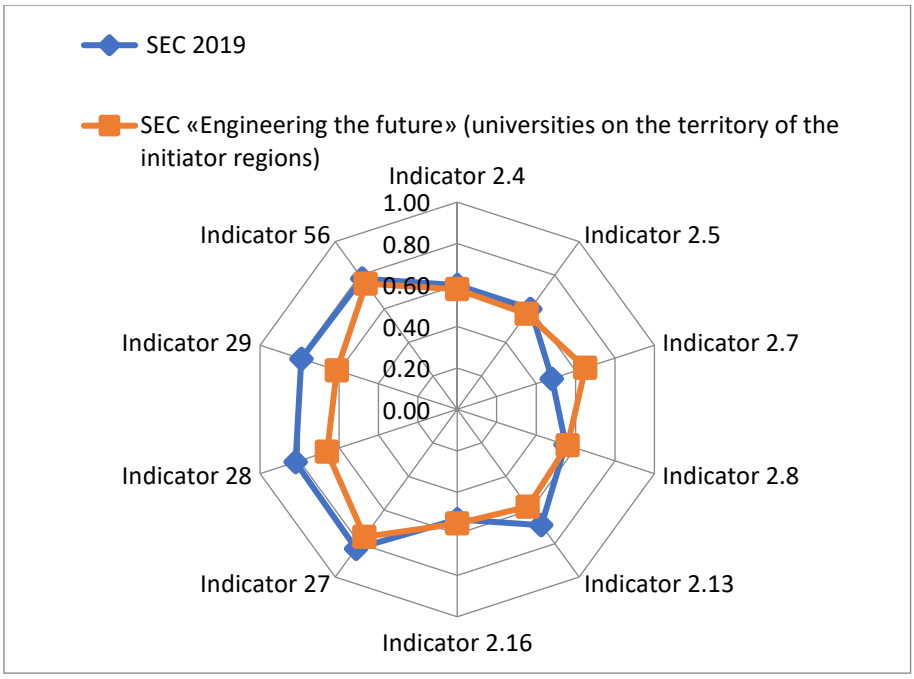

Figure 3: Shares of indicators of the World-Class Research and Education Centre "Future Engineering" and average shares of indicators of world-class science and education centres that received state support in 2019. As Figure 3 shows, the competitive advantage of the regional member universities of the World-Class Research and Education Centre "Future Engineering" is the amount of research and development work

5. Conclusion

Thus, the scientific and personnel potential of world-class science and education centres is a factor of sustainable innovative development of the regions. In turn, the competitiveness of world-class science and education centres is determined by the level of development of the scientific and personnel potential of participating universities.

The most important directions of ensuring sustainable development of regional ecosystems at the present stage are such areas of activity as the development of mechanisms for managing the activities of universities participating in world-class research and education centres and consortia, as well as the improvement of tools to support these mechanisms using end-to-end digital technologies. The implementation of national project activities, taking into account the factors identified, will ensure the use of reserves of extra-university forms of development of scientific and personnel potential of universities for the effective functioning of world-class science and education centres.

References

Gamidullaeva, L. A. (2019) "Inter-organisational network structures and knowledge diffusion through innovation intermediaries", *Global Business and Economics Review, Inderscience Enterprises Ltd, vol. 21(6),* pp 756-776, [online], https://ideas.repec.org/a/ids/gbusec/v21y2019i6p756-776.html

Kruglyakova V., Meshcheryakova M., Sereda E., Titova M. (2019) "Challenges and opportunities in breakthrough development in global markets", *Proceedings of the 33rd International Business Information Management Association Conference, IBIMA 2019: Education Excellence and Innovation Management through Vision 2020*, Granada, Spain

Pechatkin V.V. (2019) "Formation of world-class scientific and educational centers in Russian regions as a tool to improve the competitive sustainability of territories", *Journal of International Economic Affairs*, Vol 9, No. 4, pp 3075-3086

Polbitsyn, S.N., Kliuev, A.K., Bagirova, A.P., Iashin, A.A. and Kakouris, A. (2021), "Entrepreneurial Education in Russian Universities: Achievements, Reflections and Milestones", *Universities and Entrepreneurship: Meeting the Educational and Social Challenges* (*Contemporary Issues in Entrepreneurship Research, Vol. 11*), Emerald Publishing Limited, Bingley, pp. 33-48. https://doi.org/10.1108/S2040-724620210000011003

RIA Rating (2020) "Indeks nauchno-tekhnologicheskogo razvitiya sub"ektov RF – itogi 2019 goda" (Index of scientific and technological development of the constituent entities of the Russian Federation - results of 2019), [online], www.riarating.ru/regions/20201019/630184542.html

Surovitskaya, G.V., Gamidullaeva, L. A. and Palatkin I. V. (2019) "Modernization of Russian flagship universities in the context of regional sustainable development", *IOP Conference Series: Earth and Environmental Science*, Vol 274, Issue 1, [online], https://iopscience.iop.org/article/10.1088/1755-1315/274/1/012120

Solodovnikov D. A. (2021) "Cifrovaya transformaciya nauki" (Digital transformation of science), *Meeting of the Coordinating Council for the field of education "Engineering, technology and technical sciences"*, [online], www.fgosvo.ru/changefgos/52/52/2

Tolstykh, T.; Gamidullaeva, L ; Shmeleva, N. (2021) "Universities as Knowledge Integrators and Cross-Industry *Ecosystems: Self-Organizational Perspective. SAGE OPEN.* Vol. 11, Issue 1, [online], https://journals.sagepub.com/doi/full/10.1177/2158244020988704

World-class research and educational centers (2020), [online], www.ноц.рф

Zaharova V. V. (2019) "Vliyanie nauchno-obrazovatel'nogo centra na uskorenie industrial'nogo razvitiya ekonomiki regiona" (The influence of the scientific and educational center on the acceleration of the industrial development of the region's economy), *Science and Business: Ways of Development,* No. 8(98), pp 116-119.

Zakharova V.V. (2020) "Research and educational center as a tool for the development of neo-industrial specialization of Russian regions", *Journal of Creative Economy*, Vol 14, No.5, pp. 5763-774.

Design Thinking for Competency-Based Entrepreneurship Education: The ToolBoard Methodology

Jaume Teodoro
Escola Superior Politecnica Tecnocampus (UPF – Barcelona), Spain
jteodoro@tecnocampus.cat
DOI: 10.34190/EIE.21.192

Abstract: This paper presents a competency-oriented methodology for entrepreneurship training based on the use of Design Thinking. To design this methodology (*ToolBoard*) a framework of competencies on which to work has been determined. The methodological approach is based on the method of learning by doing that starts from an entrepreneurial challenge and ends up delivering a potentially invertible project. The entrepreneurial process runs parallel to the training process, causing a feedback between the two. The results of the pilot test with students from Spain and Latin America are presented.

Keywords: entrepreneurial education, entrepreneurship competences, entrepreneurial alertness, creativity, entrepreneurial self-efficacy, design thinking, innovation

1. Introduction

Entrepreneurship is commonly considered a motor of economic growth. Being aware of it the formulation of policies and programs that aim to stimulate the creation of companies is an objective of the public administration of roughly every country focused on the economic development (Estrin et al., 2013; Kuratko, 2005). In Europe the development of the entrepreneurial capacity of European citizens and organizations is one of the key policy objectives for the EU and Member States. Initiatives such as fostering the entrepreneurial education occupy the central stage of political agenda (Duma, 2014) and in this way the Commission identified entrepreneurship as one of the 8 key competences necessary for a knowledge-based society. In the same vein the European Commission calls for better use of human capital through innovation in the European economies. This impulse the chief role of higher education in the process of entrepreneurial training which in turn creates the fertile ground for innovation. Along with this perspective, there is a need to devise and implement ways of teaching entrepreneurship within the higher education system, which in the end brings with it an increase in entrepreneurial activity and in the quality of ventures.

This work tries to contribute to the entrepreneurship education subject and is organized as follows. In the first section there is a theoretical discussion and literature review. In the second section the framework of competencies in entrepreneurship is located. In the following section a design thinking competency-oriented teaching method is presented. Finally results and conclusions illustrate this approach and open next research questions to advance.

2. Literature review and theoretical discussion

First of all, it is good to clarify the very concept of entrepreneurship that is discuss here. Entrepreneurship has different meanings in different economies. In the developing countries, entrepreneurship is frequently a means to achieve economic independence and thus is considered as a "necessity entrepreneurship". Necessity entrepreneurs set up their businesses in order to gain money for living (Naudé, 2009; Naudé et al., 2014; van der Sluis, 2005). In contrast, in efficiency-driven economies and innovation-driven economies (Porter, 1990) entrepreneurship comes as a result of opportunities provided by economic development. In this sense the chief difference between self-employed and entrepreneurs is the opportunity pursuit among the latter as compared to income pursuit among the first. On the other hand entrepreneurship understood in the simplest terms is an occupational choice mostly measured through self-employment of individuals (Blanchflower, 2000). However, it also may be the attitude of a worker in front of an innovation within an existing organization. In fact, creating a new added value through innovation within an existing organization is a kind of entrepreneurship that has been described as intrapreneurship (Martiarena, 2013; Parker, 2011). Intrapreneurs, otherwise called corporate entrepreneurs, are thought to be necessary for the growth of organizations (Kuratko and Audretsch, 2013) as they have been proven crucial for company's competitivity (Ireland et al., 2009). This work is based on a broad concept of Entrepreneurship where the entrepreneur is an agent of change in an economic environment based on innovation.

Next stage of the discussion is occupied by the question whether entrepreneurship can be taught and how to measure the results of educational action. The entrepreneurial education research (Guiso et al., 2021; Haase and Lautenschläger, 2011; Martin et al., 2013; von Graevenitz et al., 2010; von Graevenitz and Weber, 2011) seeks validation of entrepreneurial training. Although it is true that entrepreneurs learn from multiple sources (Bae et al., 2014) and it is also true that education in entrepreneurship can have different objectives (Kakouris et al., 2020) it is clear enough that entrepreneurship education contributes to enhancing the ability to detect opportunities and give creative responses to them. Although there is no clear consensus on how to teach entrepreneurship in order to achieve most efficient outcomes some research works show, the university entrepreneurship programs and the university-business collaboration on the curricula are the necessary building blocks for the entrepreneurial education (Quintana et al., 2016). Regarding the results, the academic literature on entrepreneurship education invites to consider Entrepreneurial Intentions (EI) variable as a way to measure results. In this sense Entrepreneurship is seen as a form of intentionally planned behaviour ((Bird, 1988) and, being intentions a predictor of every planned behaviour, it predicts entrepreneurship. The theoretical basis behind this premise is found in the Theory of Planned Behavior (Ajzen, 1991) and some empirical works have been developed using this theory in the field of entrepreneurship education (Liñán, 2008; Souitaris et al., 2007; von Graevenitz et al., 2010) establishing a positive relationship between entrepreneurship education and EI. According to this theory, a person's intention depends on three attitudinal factors: perception of the desirability of an action, perception of the social norms regarding the action and perception of the degree of behavioural control the person has in undertaking the action. From the above-mention three elements, perceived control is directly related with personal skills, which highlights the validity of competency-oriented entrepreneurship education. This leads us to review some relevant aspects in the theory of entrepreneurial competencies.

Competencies are distinct from knowledge, skills, and abilities in that they are not only individual attributes but also depend on situation and social definition (Boyatzis, 2008; Cheng et al., 2003). It is known that the defining characteristic of competence is that it is contextual and situational. For this reason, the term competence can be formulated from a function that combines issues such as knowledge, skills, personal traits and attitude. In this way, some competencies are basically associated with skills and knowledge, whereas others are associated with personal traits. As the case may be, some will be easier to learn through training, while others linked to personal traits remain less variables. Entrepreneurship competencies are mostly learnable and are enhanced with practice and picking up Bird's (Bird, 2019) words "competency education expands the horizons for intervention in terms of teaching of entrepreneurship".

Starting from this premise and situated in the context of formal undergraduate learning, it seems appropriate to develop competency-based learning methods in entrepreneurship education.

3. Entrepreneurial competencies

Scholars researching in entrepreneurial competencies usually distinguish between managerial competencies and entrepreneurial competencies. Some suggest that entrepreneurial competencies are needed to start a venture, whereas managerial skills are needed to make it grow (Chandler and Hanks, 1994; Mitchelmore and Rowley, 2010; Robert Baum et al., 2001). In the context of this work, on entrepreneurship education for undergraduate students, the focus is placed on the latter. So what are the competencies of entrepreneurship? A review of the academic literature gives us some answers.

In the Schumpeterian economy (Schumpeter's 1950 seminal work on "creative destruction"), the new value is created through a "creative destruction" where the entrepreneur plays a key role thanks to his/her creativity. In his view individuals embark on entrepreneurial action given the opportunities of the interplay of demand and supply forces in the market that create a fertile ground for opportunity recognition. On the other hand, the neoclassical economic theory posits that markets are in equilibrium and any shock to this equilibrium is being instantaneously corrected by market forces. In this view, entrepreneurs appear not so much as equilibrium-destroying agents but rather as equilibrium-seeking agents (Kirzner, 2009, 1999, 1973), who by recognizing opportunities arising from economic shocks seek to create value on their basis (Gaglio, 2001; Pittaway, 2005; Pittaway and Cope, 2007) . Kirzner was the first to propose alertness to new opportunities to be the key entrepreneurial characteristic that individuals must have in order to succeed in setting up of new ventures. The work of Tang (Tang et al., 2012) extends the previous theories on what could be called entrepreneurial skills and propose alertness along with creativity to form the basic entrepreneurial skills setup. Accordingly, the ability to recognize an opportunity and respond to it in a creative way would seem paramount for entrepreneurship.

But entrepreneurship means taking action and it brings us to the entrepreneur as an individual who exploits opportunities mobilizing resources with initiative and assuming risk (McMullen and Shepherd, 2006). This characteristic of entrepreneurship as an action leads to explore self-efficacy as relevant individual characteristic in terms of entrepreneurship.

Self-efficacy (Bandura, 2010, 1982) is a concept very close to the *perceived control* cited above regarding the Theory of Planned Behaviour and, as such, it is a variable that explains the entrepreneurial intention. According to Bandura (Bandura, 1982)self-efficacy is "the belief in one's capabilities to organize and execute the courses of action required to manage prospective situations." Since Bandura published his seminal 1977 paper, "Self-Efficacy: Toward a Unifying Theory of Behavioural Change," the subject has become widely studied in the field of entrepreneurship. Researchers in this case are interested not in global self-efficacy but in self-efficacy to perform ventures. Entrepreneurship self-efficacy in this sense refers to people's judgments regarding their ability to develop intrinsic tasks about starting a venture. Zhao, Seibert, & Hills (Zhao et al., 2005) provide evidence that individuals choose to become entrepreneurs most directly because they are high in entrepreneurial self-efficacy. Self-efficacy is presented as a construct in which behaviour, skills and environment dynamically influence each other, allowing individuals to form beliefs about their ability to start a venture. As it cannot be otherwise, the discussion on entrepreneurship self-efficacy is also faced at the intrapreneurship level. The work of Douglas (Douglas and Fitzsimmons, 2013) finds that intrapreneurs tend to differ from conventional entrepreneurs in their cognitive makeup, having lesser entrepreneurial self-efficacy and greater risk aversion.

As a result of the previous literary review, alertness, creativity and self-efficacy are presented as significant characteristics to explain entrepreneurial performance. In this sense, the following table shows a hypothetical form of combination of these variables that give rise to different occupational profiles.

Table 1: Alertness, creativity and self-efficacy and occupational profiles

Alertness		**Creativity**		**Self-efficacy**	
(Opportunity domain)		(Solution domain)		(Action domain)	
+ Necessity driven	0	0	Production	0	Worker
	0	0		1	Self-employed
	0	1	Innovation	0	Craftsman
	0	1		1	Businessman
	1	0	Speculation	0	Opportunist
	1	0		1	Investor
	1	1	Disruption	0	Intrapreneur
+ Opportunity driven	1	1		1	Entrepreneur

To compile the above table, it is assumed that the variables in play can be transformed into dichotomous variables (0 for a level below a certain threshold and 1 above).

From the reasoning presented so far, which highlights three characteristics inherent to the act of undertaking, we can define the entrepreneur as one who detects the opportunity (highly alert), creates an original solution (with high creativity) and mobilizes the necessary resources to take action (with high self-efficacy). This leads us to consider entrepreneurship as an entrepreneur-driven process.

There are many theories that focus on entrepreneurship as a process. The alertness theory (Kirzner, 2009, 1999, 1973) presents the entrepreneur as a discoverer of opportunities thanks to his /her ability to be alert. Effectuation theory (Sarasvathy, 2001) stems from the way that entrepreneurs think about problems and how they go about solving them. The popular Lean Launchpad developed by Steve Blank can be described also as a discovery theory because entrepreneurs begin to identify problems worth solving that they ultimately validate experimentally.

This consideration of entrepreneurship as a process has a derivative in the domain of entrepreneurship competencies. This gives way to understand the entrepreneurial process in three dimensions (alertness to opportunities, creativity in solutions and self-efficacy in action) that give rise to three clusters of entrepreneurial competencies. In each one a set of entrepreneurship competencies fits.

From this way of doing, a review of the state of the art in relation to entrepreneurial competencies on which there is empirical evidence has been carried out. This has made it possible to compile the following table.

Table 2: Entrepreneurship competencies

Dimension	Scope	Related competencies	Authors
Alertness	To detect opportunities of entrepreneurship by connecting new knowledge with people's unresolved or poorly resolved problems or needs	Spotting unique opportunities	Baum (1994), Milton (1986), Kirzner (2009), Ardichvili (2003), Gaglio, C. M., & Katz, J. A. (2001).
		Strategic zoom lens	Bird & Jordan (1988)
		Observational learning	Bandura (2008)
		Empathy / Soft skills	Humphrey (2013), Baron (2008)
Creativity	To respond to the opportunity by creating an original solution that generates value for both users / customers and the organization.	Recognizing and acting on opportunity	Tang (2010), Shane & Venkataraman (2000)
		Idea generation	Lerner and Almor (2002)
		Value creation	Dyer, Gregersen & Christensen (2008)
		Utilitarian view of what's right / Focus	Milton (1986), Haynei & Shepherd (2009)
		Creative Problem-solving	Zampetakis & Moustakis (2006), Sarasvathy (2001)
Self-efficacy	To take action by taking the iniciative, assumning risks and mobilizing the necessary resources autonomously and effectively	Perseverance, Commitment with the venture	Bird (1988), Zhao et al (2005)
		Self-management mobilizing resources	Greiner (1972), Chandler & Jansen (1992), Herron & Robinson (1993), Baum (1994)
		Tolerance of uncertainty and risk	Schere (1982), Douglas &Fitzsimmons (2013), McMullen & Shepherd (2006)
		Experiential learning	Bird (1988)
		Communication & social skills	Hood & Young (1993), Forret & Dougherty (2001)

The analysis carried out so far, together with the practice of design thinking, allows us to propose a competency-oriented entrepreneurship methodology in the following section.

4. Entrepreneurial education methodology approach based in design thinking

The reference framework for entrepreneurial skills laid out in the previous section constitutes a basis upon which a skills-based educational activity can be developed. The consideration of entrepreneurship as a process guided by the action of the entrepreneur, who acquires skills as they progresses through the process and improves as they feels more competent, suggests practical models (Cope and Watts, 2000). Design Thinking offers a practical basis for this very purpose, and its use for this end, despite being new, is setting a trend (Sarooghi et al, 2019).

4.1 Design Thinking

Design Thinking is a methodology that can be applied to a wide range of disciplines. It is not a discipline in itself. Rather, it has an iterative (non-linear) process directed by action and driven by discovery. Design Thinking considers the user/client to be a participant in the creative process, making it a human-centred design (HCD) method. Design Thinking takes elements from the design to move towards the solution while generating greater knowledge about the problem. Therefore, it is suited to an environment of high uncertainty, regarding both the problem and the solution. This iterative process is made possible through the use of methods and tools, which as with the field of design, are based on a dual process of divergence and convergence. During the divergence process, the working group creates multiple options from an in-depth design research study where analysis is the priority. During the convergence process, decisions are made based on a synthesis process involving the users/clients, with creative thinking and teamwork being highly valued in this stage. Teamwork is critical in Design Thinking. This is because the creative process it is constructed upon is based on a wide range of opinions and perspectives. This allows for the formation of eclectic teams. On the other hand, the active participation of clients and other interested parties in the creative process does not mean that they will reveal the problem or tell us what the solution is. Instead, it is a design process where customer knowledge is generated from his/her point of view and individual context. It is based on the idea that a brilliant solution to the wrong problem is worse than not having any solution at all. Please note that this report on the causes of start-up failure ranks the development of solutions to non-existent problems as the number one cause for said failures (see https://www.cbinsights.com/research/startup-failure-reasons-top/).

Design Thinking is a process-based methodology which identifies a set of phases and objectives. There are multiple ways of approaching the concept based on the different approaches in phases 3-7. For the application of Design Thinking for the development of the entrepreneurial skills training process, and based on the work of the previous point, the 3-part approach is used. This 3-part structure (often referred to as Heard, Create & Delivery) is also the basis of innovation and corporate entrepreneurship in various organisations (see www.Ideo.org).

4.2 Methodology of the design thinking TOOLBOARD in entrepreneurship

TOOLBOARD is an entrepreneurship methodology based on Design Thinking, aimed at developing the entrepreneurial project while helping individuals to acquire entrepreneurial skills. The figure below depicts the workflow.

Figure 1: Entrepreneurship design process

The process is divided into three phases, as illustrated by the diagram above. There is a problem area dominated by research, a solution area dominated by ideation and a demand area dominated by the move to market action, which is often known as "validation" in entrepreneurial terms. To progress in the project while achieving the learning goals set out in the diagram above, this can be extrapolated to a new diagram in which each of the three phases is divided into three more specific scenes. This form of progressing is based on the concepts of agile methodologies, which encourage the definition of short processes with clear objectives that are susceptible to as many iterations as required. The following diagram shows this division:

Figure 2: Design Thinking Toolboard process

This nine-phase diagram (referred to as "scenes" in this methodology) offers a concrete practice of the entrepreneurial process while placing a focus on learning through specific competencies. It provides a comprehensive and easy-to-understand overview of the process, making it feasible and manageable in the eyes of the participant. Each phase is carried out over the course of 1 week. As such, the methodology can be taught alongside an academic subject. The student delves into the learning-by-doing process and develops entrepreneurial skills thanks to the use of a set of practical tools and methods. The methodology is named after this set of tools, and the initials of the nine phases described in the figure below: T.O.O.L.B.O.A.R.D. The table below sums up the main elements that comprise this methodology:

Table 3: Elements and structure of Toolboard methodology

Design Phase	Scene	Synthesis Tool	Methods	Skills
RESEARCH	Trial	Context Mind Map	Trends Analysis. Experts Reports. Survey. Benchmarking. PEST. SWOT. 5-Forces. Media Scan	Spotting unique opportunities. Strategic zoom lens. Observational learning. Empathy / Soft skills
	Observations	Observations Wall	Ethnography. In-depth Interview. Shadowing. 5 whys. Focus Group. Stakeholders Identification	
	Opportunity	Empathy Insights Map	Customer Insights Generation. Persona. Empathy map. Journey Map. PoV	
IDEATION	Lead Ideas	Idea Funnel	Brainstorming. Brainwriting. Edge storming. How-might-we. Scamper. Value preposition	Recognizing and acting on opportunity. Idea generation. Creative Problem-solving. Value creation. Utilitarian view of what's right / Focus.
	Business Idea	Canvas Business Model	Canvas Workshop	
	Offer	Service Blueprint	Decision Matrix. User Experience Analysis. Persona. Unique Value Proposition	
VALIDATION	Affirmations	Lean Test Canvas	Prototyping (cards, wireframe, storyboard, sketching). MVP. LeanStartUp	Perseverance. Commitment with the venture. Self-management mobilizing resources. Tolerance of ambiguity, uncertainly and risk. Experiential learning. Communication & social skills
	Roadmap	Financial Sheet	Metrics Analysis. P&L	
	Delivery	Canvas Pitch	Business Case. Strategic Plan	

This summary table illustrates how the process is guided by a set of tools that interact with one another. The following diagram shows how each of the tools fit together:

Figure 3: Tools in ToolBoard

The detection and analysis of opportunities is surely the main objective of the entrepreneurial operation. However, in some methodological approaches, this issue is ignored, and a greater focus is placed on the solution. The central main focus of this methodology is the idea, rather than the beginning of the process, as shown in the figure above. With this method, the process can be interpreted as a puzzle where the result is valid because all of the parts fit together. The beauty of this method lies in its ability to offer a holistic end-to-end approach.

5. Results and conclusions

The methodology being presented is the result of a design process that has been carried out over the last 5 years in entrepreneurship classes for undergraduate students. A first test was piloted during the 2020. This pilot test involved a total number of 165 undergraduate students: 125 in Spain and 40 in an international entrepreneurial programme that was held at the *Universidad de Piura (Peru)* in which students from various Latin American countries were enrolled. The course was taught via the MIRO platform (www.miro.com), which integrated online the nine different tools. This platform, which serves as a virtual whiteboard with pre-designed templates, is ideal for group projects undertaken remotely, and represents an alternative to traditional work with post-its and whiteboards. Various methods were used to analyse the results of the pilot test, such as an end-of-course assessment survey, participant focus groups, active observations and in-depth interviews on the MIRO platform during the course. Based on the above some conclusions have been reached.

Most of the participants felt that the methodology was understandable and accessible, based on their previous training. They felt that the course managed to improve their curriculum. They considered entrepreneurial skills to be general, transversal skills that can be applied to multiple roles. Both European students and Latin American students felt the same way. With regards to the students in Spain, where data exists on the quality of teaching over the last five years, an increase in the perception of the suitability/usefulness of the course within the curriculum was noted. It is felt that the inclusion of local and international examples and entrepreneurs helped to make the course more attractive. References from former students were particularly striking for both sets of students. The students were highly receptive to the Design Thinking-based format. They essentially associated it with a creative process. In some cases, they also associated it with a process of discovery. This has been extensively verified in the observations on teaching time, where the greatest difficulties were found in the generation of customer insights. The students in Spain did not express a particular tendency to view entrepreneurship as an action driven by a set of established social norms. For the Latin American students, however, this connection was more significant, and they generally expressed a conviction that was closer to issues related to what is expected of them. In general, Latin American students were found to be more enthusiastic about the prospect of being entrepreneurs. This could be due to a different perception of entrepreneurship between students of developed countries and those of developing countries. The participants showed a noticeable inclination towards topics of social entrepreneurship. When selecting the problem/issue that requires solving, almost one quarter focused on issues of social entrepreneurship. This trend was more pronounced in the European students than in the Latin American students.

There were various limitations to the analysis that was carried out. On one hand, the sample size of students was small. As such, it was not conducive to working with numerical methods. The qualitative study may present a bias due to the influence of the teacher-student relationship. Neither is it possible to compare the specific influence of the methodology in question with other teaching methods used during the same course. For future editions, we will seek to undertake a deeper analysis based on a broader empirical study through the use of statistical methods. A pre-test and a post-test will be developed for this purpose. This will seek not only to explain the entrepreneurial intention based on the learning of entrepreneurial skills, but to empirically establish their influence.

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References

Ajzen, I., 1991. The theory of planned behavior. Organizational Behavior and Human Decision Processes 50, 179–211. https://doi.org/10.1016/0749-5978(91)90020-T

Bae, T.J., Qian, S., Miao, C., Fiet, J.O., 2014. The Relationship Between Entrepreneurship Education and Entrepreneurial Intentions: A Meta-Analytic Review. Entrepreneurship Theory and Practice 38, 217–254.

Bandura, A., 2010. Self-Efficacy. The Corsini Encyclopedia of Psychology, Major Reference Works. https://doi.org/https://doi.org/10.1002/9780470479216.corpsy0836

Bandura, A., 1982. Self-efficacy mechanism in human agency. American Psychologist 37, 122–147. https://doi.org/10.1037/0003-066X.37.2.122

Bird, B., 2019. Toward a theory of entrepreneurial competency, in: Advances in Entrepreneurship, Firm Emergence and Growth. Emerald Group Publishing Ltd., pp. 115–131. https://doi.org/10.1108/S1074-754020190000021011

Bird, B., 1988. Implementing Entrepreneurial Ideas: The Case for Intention. Academy of Management Review 13, 442–453. https://doi.org/10.5465/amr.1988.4306970

Blanchflower, D.G., 2000. Self-employment in OECD countries. Labour economics 7, 471–505.

Boyatzis, R.E., 2008. Competencies in the 21st century. Journal of Management Development. https://doi.org/10.1108/02621710810840730

Chandler, G.N., Hanks, S.H., 1994. Founder Competence, the Environment, and Venture Performance. Entrepreneurship Theory and Practice 18, 77–89. https://doi.org/10.1177/104225879401800306

Cheng, M.I., Dainty, A.R.J., Moore, D.R., 2003. The differing faces of managerial competency in Britain and America. Journal of Management Development. https://doi.org/10.1108/02621710310478495

Douglas, E.J., Fitzsimmons, J.R., 2013. Intrapreneurial intentions versus entrepreneurial intentions: Distinct constructs with different antecedents. Small Business Economics 41, 115–132. https://doi.org/10.1007/s11187-012-9419-y

Duma, F., 2014. PROMOTING THE ENTREPRENEURSHIP EDUCATION IN EUROPE. Online Journal Modelling the New Europe 67–79.

Estrin, S., Korosteleva, J., Mickiewicz, T., 2013. Which institutions encourage entrepreneurial growth aspirations? Journal of Business Venturing 28, 564–580. https://doi.org/10.1016/j.jbusvent.2012.05.001

Gaglio, C. M., & Katz, J. A. (2001). The psychological basis of opportunity identification: Entrepreneurial alertness. Small business economics, 16(2), 95-111.

Guiso, L., Pistaferri, L., Schivardi, F., 2021. Learning entrepreneurship from other entrepreneurs? Journal of Labor Economics 39, 135–191. https://doi.org/10.1086/708445

Haase, H., Lautenschläger, A., 2011. The 'Teachability Dilemma'' of entrepreneurship.' International Entrepreneurship and Management Journal 7, 145–162. https://doi.org/10.1007/s11365-010-0150-3

Ireland, R.D., Covin, J.G., Kuratko, D.F., 2009. Conceptualizing Corporate Entrepreneurship Strategy. Entrepreneurship Theory and Practice 33, 19–46. https://doi.org/10.1111/j.1540-6520.2008.00279.x

Kakouris, A., & Liargovas, P. (2020). On the about/for/through framework of entrepreneurship education: a critical analysis. Entrepreneurship Education and Pedagogy, https://doi.org/10.1177/2515127420916740

Kirzner, I., 2009. The alert and creative entrepreneur: a clarification. Small Business Economics 32, 145–152. https://doi.org/10.1007/s11187-008-9153-7

Kirzner, I., 1999. Creativity and/or Alertness: A Reconsideration of the Schumpeterian Entrepreneur. The Review of Austrian Economics 11, 5–17. https://doi.org/10.1023/a:1007719905868

Kirzner, I.M., 1973. Competition and entrepreneurship. Chicago University Press, Chicago.

Kuratko, D., Audretsch, D., 2013. Clarifying the domains of corporate entrepreneurship. International Entrepreneurship and Management Journal 9, 323–335. https://doi.org/10.1007/s11365-013-0257-4

Kuratko, D.F., 2005. The Emergence of Entrepreneurship Education: Development, Trends, and Challenges. Entrepreneurship Theory and Practice 29, 577–598. https://doi.org/10.1111/j.1540-6520.2005.00099.x

Liñán, F., 2008. Skill and value perceptions: How do they affect entrepreneurial intentions? International Entrepreneurship and Management Journal 4, 257–272. https://doi.org/10.1007/s11365-008-0093-0

Martiarena, A., 2013. What's so entrepreneurial about intrapreneurs? Small Business Economics 40, 27–39. https://doi.org/10.1007/s11187-011-9348-1

Martin, B.C., McNally, J.J., Kay, M.J., 2013. Examining the formation of human capital in entrepreneurship: A meta-analysis of entrepreneurship education outcomes. Journal of Business Venturing 28, 211–224. https://doi.org/http://dx.doi.org/10.1016/j.jbusvent.2012.03.002

McMullen, J.S., Shepherd, D.A., 2006. Entrepreneurial action and the role of uncertainty in the theory of the entrepreneur. Academy of Management Review. https://doi.org/10.5465/AMR.2006.19379628

Mitchelmore, S., Rowley, J., 2010. Entrepreneurial competencies: A literature review and development agenda. International Journal of Entrepreneurial Behaviour & Research. https://doi.org/10.1108/13552551011026995

Nabi, G., Liñán, F., Fayolle, A., Krueger, N., & Walmsley, A. (2017). The impact of entrepreneurship education in higher education: A systematic review and research agenda. Academy of Management Learning & Education, 16(2), 277-299.

Naudé, W., 2009. Entrepreneurship, developing countries, and development economics: new approaches and insights. Small Business Economics 34, 1–12. https://doi.org/10.1007/s11187-009-9198-2

Naudé, W., Amorós, J.E., Cristi, O., 2014. "Surfeiting, the appetite may sicken": entrepreneurship and happiness. Small Business Economics 42, 523–540. https://doi.org/10.1007/s11187-013-9492-x

Parker, S.C., 2011. Intrapreneurship or entrepreneurship? Journal of Business Venturing 26, 19–34.

Pittaway, L., 2005. Philosophies in entrepreneurship: a focus on economic theories. International Journal of Entrepreneurial Behavior & Research 11, 201–221. https://doi.org/doi:10.1108/13552550510598790

Pittaway, L., Cope, J., 2007. Entrepreneurship Education: A Systematic Review of the Evidence. International Small Business Journal 25, 479–510. https://doi.org/10.1177/0266242607080656

Porter, M., 1990. On Competition. Harvard Business School Press, Boston.

Robert Baum, J., Locke, E.A., Smith, K.G., 2001. A multidimensional model of venture growth. Academy of Management Journal 44, 292–303. https://doi.org/10.5465/3069456

Sarasvathy, S.D., 2001. Causation and effectuation: Toward a theoretical shift from economic inevitability to entrepreneurial contingency. Academy of Management Review 26, 243–263. https://doi.org/10.5465/AMR.2001.4378020

Souitaris, V., Zerbinati, S., Al-Laham, A., 2007. Do entrepreneurship programmes raise entrepreneurial intention of science and engineering students? The effect of learning, inspiration and resources. Journal of Business Venturing 22, 566–591. https://doi.org/10.1016/j.jbusvent.2006.05.002

Tang, J., Kacmar, K.M., Busenitz, L., 2012. Entrepreneurial alertness in the pursuit of new opportunities. Journal of Business Venturing 27, 77–94. https://doi.org/10.1016/j.jbusvent.2010.07.001

van der Sluis, J., 2005. Entrepreneurship Selection and Performance: A Meta-Analysis of the Impact of Education in Developing Economies. The World Bank Economic Review 19, 225–261. https://doi.org/10.1093/wber/lhi013

von Graevenitz, G., Harhoff, D., Weber, R., 2010. The effects of entrepreneurship education. Journal of Economic Behavior & Organization 76, 90–112. https://doi.org/10.1016/j.jebo.2010.02.015

von Graevenitz, G., Weber, R., 2011. How to Educate Entrepreneurs? Munich School of Management Discussion Papers 2011–2.

Zhao, H., Hills, G.E., Seibert, S.E., 2005. The mediating role of self-efficacy in the development of entrepreneurial intentions. Journal of Applied Psychology 90, 1265–1272. https://doi.org/10.1037/0021-9010.90.6.1265

Social Capital Mechanisms Underpinning Competitive Market Platforms

Stephen Treacy, Joseph Feller, Tadhg Nagle and Brian O'Flaherty
Cork University Business School, Cork, Ireland
stephen.treacy@ucc.ie
jfeller@ucc.ie
T.Nagle@ucc.ie
b.oflaherty@ucc.ie
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Abstract: Competitive market (CM) innovation contest platforms are growing in prominence due to their provision of a cost effective, yet far reaching method of allowing organisations to connect with a global network of innovation solvers. Conceptual and theoretical support for the relevance of social capital has begun to emerge, with one model revealing that it can be manifested in several ways, including submission quality, solver retention, solver engagement, learning, employment and understanding. Despite the growth of work establishing the role of social capital, there remains a significant lack of understanding as to how it can be promoted within these environments. We argue that to successfully manage these communities, platforms need a theoretical understanding of not only what impacts social capital can result in, but also how platform managers can ensure their delivery by designing their platforms appropriately. Our research will extend the original model by investigating the mechanisms used to promote the six constructs of social capital across its three dimensions: structural dimension (social ties), relational dimension: (trust, reciprocity, and self-identity), and cognitive dimension (shared language and shared vision). We investigate six CMs from the perspective of their experts to explore what mechanisms are in place to facilitate social capital through the lens of the original model. The experts interviewed in this study occupied managerial positions, or were involved in decisions around platform strategy, with titles including CEO's, founders, and managers. This study represents the first to explore the underlying mechanisms used to facilitate the six social capital constructs within this environment. Our findings reveal eleven distinct mechanisms providing key decision makers with a strategic understanding as to how social capital can be developed, and subsequently exploited. This research thus accentuates an existing theoretical model that identified the emergent themes and net impacts of social capital and reveals the mechanisms used by platform managers to promote these constructs. The result is an extended model that is expected to better explain actual behaviour in CM platforms than its original counterpart.

Keywords: open innovation, innovation intermediary, competitive markets, innovation contest, social capital

1. Introduction

The prevalence of companies and non-profit organisations utilizing crowd innovation contest platforms to collect innovative ideas and improve innovation processes has proliferated considerably in recent years (Özaygen and Balagué, 2018). In these contests, a company identifies specific problems or tasks, provides incentives and broadcasts an invitation to submit contributions (Füller et al., 2017). While solvers compete with their offerings to win the available prizes, they are often empowered to collaborate, form groups and work together on problem solutions (Boudreau and Lakhani, 2013). While competing, solvers interact, build social structures and relationships, establish a sense of community while establishing norms, and combine many diverse contributions into innovations that create value (Füller et al., 2014). While extant research has explored several avenues including the motivations to engage (Battistella and Nonino, 2013), investigating social structures (Bullinger et al., 2010) and the role of professionalism (Füller et al., 2017), a central tenet of crowdsourcing is the assumption that the quality of winning contributions increases with the number of participants and their interactions within the platform. To that end, these platforms can only add value to an organisation's innovation process if they are purposefully constructed to facilitate participation, engagement, and collaboration within their community (Kathan et al., 2013). We therefore seek to identify the distinct mechanisms of social capital, (defined by Nahapiet and Ghoshal (1998) as being "*the sum of the actual and potential resources embedded within, available through, and derived from the network of relationships possessed by an individual or social unit*" (p. 243)), within CM innovation contest platforms.

2. Literature review

2.1 Competitive market innovation contest platforms

Boudreau and Lakhani (2009) define CMs where "*external innovators supply variants of mix and match, substitutable components… (and) have competitive relationships among one another*" (p. 70). Within these markets, the exchange of ideas usually takes place through one-to-one interactions where external problem solvers disclose their innovation concepts to the innovator seeker via the platform, but often not to other registered solvers. Evidence has shown that these markets lack formal structures in managing their solvers, and are not involved in ownership of outcomes, or technological inputs, which raises several research gaps relating to how they fulfil their role in open innovation networks (Schepis et al., 2021). An ongoing challenge CMs face is developing collective action/encouraging cooperation (Reypens et al., 2019). To address this, these markets implement a number of activities encouraging solver participation to create value for the platform, however, they have limited impact if the innovation seekers do not recognise the potential value, and do not wish to participate in such activities (Provan and Kenis, 2008). The success of these markets therefore will be determined not by what innovations seekers are asking the crowd to achieve, but how social capital can contribute to solvers' contribution, communication, and interaction behaviour within the contest community.

2.2 Social capital

Research has highlighted the importance of social capital in accessing resources for innovation and entrepreneurship (de Fátima Ferreiro and Sousa, 2017). These processes are embedded in social structures, and thus, it is vital to take social capital into consideration. While social innovation and entrepreneurship scholars are increasingly incorporating social capital into their studies, there remains a shortage of research investigating how social entrepreneurial ventures like CMs use social capital in these processes (Bhatt and Altinay, 2013). Extant literature has been increasingly adopting multi-dimensional understanding of social capital, in particular through the lens of Nahapiet and Ghoshal (1998) that distinguishes three dimensions:

- 1. Structural dimension, linked to the structure of the social network which it is embedded, i.e., the pattern of interaction between the actors. Here, the construct of social ties is used to explore the pattern and number of indirect and direct ties between the actors and their positioning of the network (Burt, 1992). This dimension provides access to resources, information and support when solving problems (Mair and Marti, 2006).
- 2. Relational dimension, lined to the nature and quality of relationships that are forged among the actors in a network (Granovetter, 1983), with trust, reciprocity and self-identity being critical herein.
- 3. Cognitive dimension, related to the ideas and mental processes, the sharing of interpretations, representations, and systems of meaning between actors and promoted by institutional aspects such as ideology and culture. Facilitating a shared language and a shared vision among actors is vital herein as it strongly promotes the sharing of information, learning and knowledge processes.

Several researchers have explored the importance of social capital towards innovation (Camps Martin and Marquès i Gou, 2011), with existing research arguing that social capital can improve organisational well-being and innovation capability through increased knowledge sharing (Dastourian et al., 2017), resource exchange and combination (Crescenzi et al., 2013), idea generation, open communication and cooperative dynamics (Martins and Terblanche, 2003). Recent empirical studies have also shown that different forms of social capital enhance innovation (Dastourian et al., 2017, Sulistyo, 2016). In particular, Treacy et al. (2017) present a preliminary theory of social capital for CMs, presented below in Figure 1, outlining six social capital constructs across the three dimensions: structural (social ties), relational (trust, reciprocity and self-identity), and cognitive (shared language and vision). For each construct, the authors present their emergent themes and net impacts (e.g., social ties facilitate higher levels of collaboration and competition which results in increased levels of submission quality).

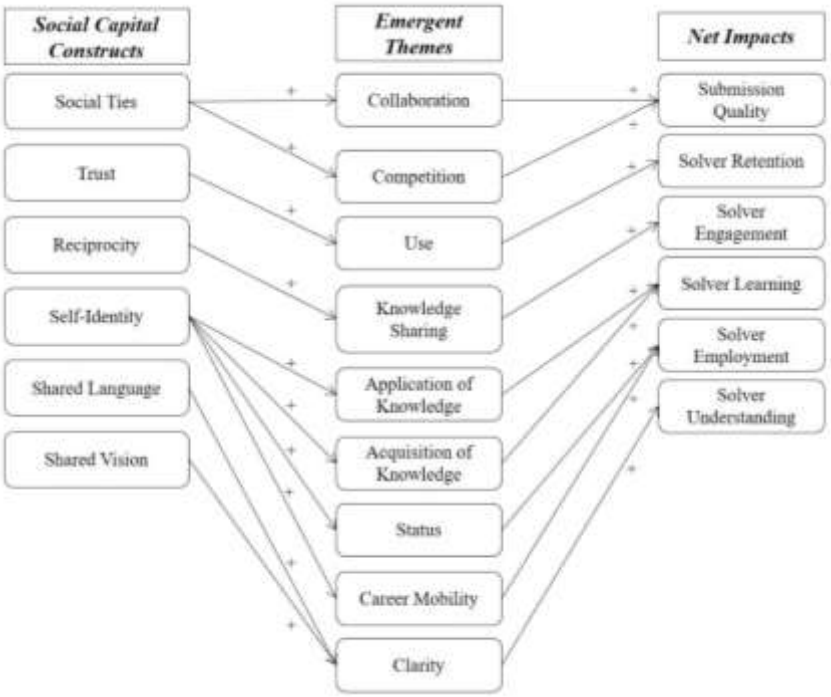

Figure 1: A preliminary theory of social capital for CMs (Treacy et al., 2017)

2.3 Research gap

A dilemma for CMs lies in the fact that firms must recognise value before being willing to openly collaborate, yet these markets cannot be realised without active engagement (Paquin and Howard-Grenville, 2013). It is imperative to further our understanding of the foundational practices which enable CMs to support these innovation processes by encouraging solver contributions, establishing legitimacy, and facilitating resource sharing (Reypens et al., 2019, Schepis et al., 2021). We argue that while there has been a prolific increase in exploring the impacts of social capital, there is yet to emerge a fundamental understanding as to how these social capital constructs may be facilitated within CMs. While the model presented in Figure 1 provides a strong theoretical lens as to the impacts associated with each construct within the CM setting, it fails to outline how these benefits might be achieved. This paper therefore seeks to extend the preliminary theory of social capital for CMs as presented by Treacy et al. (2017) and explore from a practical perspective what mechanisms are used to develop these social capital constructs within CMs. We thus state our research question as "*what are the mechanisms used in CMs to enable the development of social capital?*"

3. Research strategy

To understand the important mechanisms inherent to CMs that could develop social capital constructs, expert judgement studies were conducted via semi-structured interviews. This allowed the researcher to explore emergent topics within the interview setting as they arose, while also enabling the researcher to focus on additional lines of questioning towards identified mechanisms that the experts had evident experience of. This methodology has been employed to provide estimates on new, rare, complex or otherwise poorly understood phenomena, facilitating rich, qualitative evidence, along with testable theoretical propositions (Gregor, 2006, Sutton and Straw, 1995). Deeply embedded in empirical data, building theory from evidence gathered produces theory that is honest, accurate, testable and interesting (Eisenhardt and Graebner, 2007). For this investigation, define experts as "*persons to whom society and/or his peers attribute special knowledge about matters being elicited*" as per Garthwaite et al. (2005) (p.681). This ensured multiple objectives:

- Experts occupied roles that make them knowledgeable about issues being researched.
- Experts held managerial positions or were involved in decisions around contest strategy.
- Representative sample of markets was obtained.
- Useful variations on the mechanisms were obtained.

A range of data was therefore gathered from different sources in accordance with best practice research (Piekkari et al., 2010), with a sampling strategy of six experts from different CMs. These experts were identified through appropriate case selection methodologies in accordance with Yin (2008), with titles including CEO's, founders and managers.

The data obtained were coded and tabulated before a matrix of categories was created, with evidence placed in each matrix. Displaying the data in this manner allowed the researcher to combine, compare data, and visually report findings, while simultaneously providing initial high-level analysis. The data was then organised into meaningful clusters through the process of coding, a critical step in data reduction (O'Flaherty and Whalley, 2004). These codes, as described by Miles and Huberman (1994) became "*tags or labels for assigning units of meaning to the descriptive or inferential meaning compiled during a study*" (p. 56). Through this strategy, the researcher committed to a delimitation process where repetitive, irrelevant, or overlapping data were eliminated. Patterns and regularities, re-checking data, drawing explanations and reviewing findings amongst third persons was also included herein as per Yin (1994). Content analysis was additionally used within each interview to ensure regularity and consistency.

4. Findings

4.1 Solver profiles

Developing social ties involved the use of solver profiles which solvers use to become acquainted with one another, follow each other's work, while also having the capability of private messaging each other through the platform if it provides the opportunity. The functionality of these profiles varies depending on the technologies available however, with some markets allowing solvers to provide a brief description of themselves and offers the addition of a contact email should they solvers wish to communicate directly. Other markets provide solvers with sections to provide a summary of who they are, their education, skills, previous work etc… while also allowing solvers to communicate directly.

4.2 Moderators

Moderators were shown to develop trust, acting as project managers to the various contests being held, providing a point of contact between the group of solvers competing for the prize and the platform itself or alternatively directly to the challenging organisation. Moderators allow the platform to ensure a productive environment, free from disquiet and distractions, as outlined by InnoCentive: "*If you work with a large crowd of people there are always people who complain that they were cheated… So your role as moderator is to minimize this kind of dissent*." Moderators provides solvers with an interface to communicate with the client, while competing for a winning solution. In some instances, they can also analyse the work being presented by the solver groups and ensure it meets the required standard of what is being asked. This approach facilitates trust between the solver groups and the platforms in question as they have someone directly on hand should any problems arise that need quick resolutions.

4.3 Protection of solver IP

By protecting the IP being offered, experts believe that solvers will not only trust the platforms to a higher degree, but also respect for the platform will grow also. For example, NineSigma protects the transfer of IP by limiting the interaction between the solvers. No solver group is informed as to how many groups, or indeed what solvers are competing in the challenge to limit the contamination of IP. NineSigma evaluates the submissions entered and does not inform the community who has participated in the challenge: "*we protect them, and they respect that*". When the platform receives submissions, they also ensure there is no confidential IP being included: "*If we see that they have submitted information that is confidential, we write them back and ask them to change it*". By providing the solvers this security to their submissions, the experts agreed that it promotes increased trust among the solvers.

4.4 Discussion forums

These discussion forums allowed the solvers to post questions or opinions to the community, stimulating discussion around areas of interest, and nurtures trust and reciprocity among members. NineSigma outlined how solvers better refine their personal development strategies through these discussion forums and receive increased insight from their peers to target markets: "*When our solvers follow the topics or questions we post*

on our forums, it helps them to trust their own product development activity." Similarly, Innoget claimed their discussion forum was also a main source of trust to their community: "*Most postings that you would find in our marketplace are not available in others, they are quite unique and trusted*". CrowdANALYTIX further outlined how this mechanism enabled "*more collaboration between these folks*" increasing the levels of reciprocity. CrowdANALYTIX explained how they encourage contest winners to engage in these forums to "*create knowledge, create and write white papers, talk about their approach when they won, give them more visibility as well as hopefully get them engaged more*".

4.5 Increased transparency

There were several manifestations of increasing transparency which led to increased reciprocity within the platform. CrowdANALYTIX revealed their platform sought to open previous contests, data, and evaluation methodologies to their community. They also facilitate previous contest winners in training new solvers, outlining step by step how the problem was solved, and how it can be solved well: "*We are opening up all of our past competitions and the data around them..."* By adopting this approach, levels of engagement within the solver community increased sharply as the platform continues to pursue a culture of reciprocity. NineSigma expressed a similar vision for their platform, outlining how "*we are all the time trying to invent and try things and become open*". Some early initiatives developed include the ability for solvers to meet as part of an open innovation networking event.

4.6 Reward selection

Reward selection was also shown to impact the levels of reciprocity, the argument being that in situations where money is not the whole motivation for a successful solution, solvers would be more inclined to reciprocate with each other. Should the contest be structured towards a solution that can be applied to the open market, then the experts argued the reward should be financial. However, if the contest was directed towards a cause that brought with it a social impact, rather than a commercial one, then reciprocity would increase. InnoCentive illustrated this through challenges asking for help in solving social problems in developing countries. Regardless of the lack of reward, they do so as they want to make an impact to society. In contrast, if the same challenge was to be issued by a client with resources available, demand for a reward would be higher, with the levels of reciprocity lower. The findings also reveal that levels of reciprocity can also be affected by the reward offered to the target solver demographic. On one hand, there is a very distinct community including retired people, with InnoCentive arguing that "*to suspect these people are driven by money would be very difficult, they have enough*", and are more open to acts of reciprocity. Conversely, for the student demographic money would be more important for them, resulting in lower levels of reciprocal acts.

4.7 Solver rankings

Establishing a ranking system illustrates how solvers are performing and can be ranked through several means such as the type of challenge being entered, solver breakdown based on geographic location, all-time top scoring solvers etc... This level of self-identification provides the solvers with a sense of pride to their accomplishments should they fall short of winning the overall reward on offer. CrowdANALYTIX outlined a scenario where after submitting the best response, and beating every other score on the leader board, a solver in the U.S. wakes up the following morning to find his positioning lower due to a new entry. CrowdANALYTIX argued self-identification would immediately increase, as well as their motivation to get back to the top. In their CM, they found instances where solvers did not care about the amount of money on offer: "*Imagine, you submit your best response, it beats every other score on the leader board, you go to sleep, and when you wake up the next morning someone has beaten your score. The motivation here is to get back on the board. Who cares how much you are getting paid at this point?"*

4.8 Solver recognition

Recognising the solver community for their efforts, whether or not they were eventually chosen as winners of the challenge developed their self-identity. Presans recognise their solvers at the beginning of the process by contacting them directly via email or phone call. These solvers have been selected by the platform based on their experience so when approached, the solvers know that they have been specifically chosen for the challenge which increases their self-identity to the process: "*People, when they receive the email, they know that they are pre-selected by somebody because their needs are personalised."* Recognition can also take place within the

platforms, challenges notwithstanding. CrowdANALYTIX described how their platform is developing several gamification approaches. They believe solvers should not only be recognised for winning challenges, but also for acts undertaken within the platform that promotes the platform and the community internally: "*instead of just rewarding you for winning a competition, there should be smaller rewards for various activities you do on the platform, and that will hopefully get more people engaged and want to do more*".

4.9 Challenge definition

This challenge definition presents a clear and concise outline to the solvers as to what is expected in their submissions, along with recommendations as to how to approach the challenge, establishing shared vision with the innovation seeker. Markets apply extreme due diligence when constructing the challenge definition, exemplified through several platforms. Presans outlined that the first step is to specify everything in the beginning with the client regarding what is involved. Similarly, *InnoCentive* believed that "*first of all, you need the problem definition... I personally believe the question is more important than the crowd*." highlighting its importance. *NineSigma* also revealed they "*spend a lot of time on the formulation of the technology brief of what we want. And if you look at the needs of the contests, sometimes they are very detailed, they can even say out of which material it should be done, and what exactly it should measure*."

4.10 Targeted outreach

By pre-selecting the target solver demographic, markets can increase the likelihood of achieving a shared vision for the project. Innoget described how they break down the both the expertise sought, along with industry required down to three separate areas based on a classification of the industries and the technology area. This provides a very "*automatic process*" to reach out to the relevant solver communities. As Innoget outlined: "*We make sure that one guy who is an expert in IT does not receive something related to physics*." NineSigma on the other hand highlighted that when they open up a specific topic, they undergo a targeted outreach to somewhere between 10-15,000 solvers, using a professional search team. The solvers then write a short proposal detailing how they intend to address the challenge. After this phase, *NineSigma* shortlist candidates who are then paid to develop a prototype based on their proposal. This approach was also implemented by Presans who send their experts an email informing them of the solution being sought. The solvers then submit a short proposal, explaining briefly what approaches they would take if they were selected. Presans and the problem seeker analyse the applications submitted before selecting the solvers they feel best understand what is being asked, ensuring the shared vision between both sets of parties.

4.11 Problem deconstruction

Problem deconstruction also ensures a shared vision throughout the process. Once the challenge has been broken down, it creates a synergistic effect, making the sum of the individual challenges greater than what would be achieved had it been left as the single challenge. An example of how certain projects can be deconstructed was presented by CrowdANALYTIX, outlining a challenge one of their clients had set for them. Their client wanted to understand how to grow from one billion to three billion users in developing countries. The challenge was split further into several types of competitions. The outcome of the first competition was consolidated and shared with everyone else for the later stages where data modelling was required. *CrowdANALYTIX* reflected that they are still learning how to break their contests down in a way that their clients' abstract problems can be solved through this mechanism, highlighting that they are "*still evolving this*, *this is our biggest challenge*". Crowding similarly argued that implementation of dividing challenges up into various iterations "*works really well*" for their platform. Mirroring the previous example, various contests are broken down into several steps with the crowd being able to publish their ideas openly: "*The competitions have also some options; you can do it in many iterations*." Between each step, Crowding announces the winners, with the solvers thereafter building upon each other's ideas.

5. Discussion, conclusions, and implications

The identification of eleven mechanisms across six social capital constructs represent the main contributions of this paper, and by extending the previous model which illustrates the net impacts and emergent themes, these findings now offer a strategic blueprint for CMs to pursue and exploit these constructs from a practical perspective. Several theoretical implications can be drawn from this study. Firstly, we contribute to the innovation management literature by highlighting the importance of tangibly growing social capital within these competitive community environments. In doing so, these findings lend support to the theoretical arguments

concerning the influence of social capital on innovation capability. Secondly, we contribute to the CM innovation platform literature through demonstrating the interdependence of unique mechanisms within the market platform, so the potential value of social capital outlined previously in Figure 1 can be achieved. For example, solver profiles were shown to develop social ties. Traditionally, CMs do not place an onus on promoting this social capital construct, yet the findings herein argue a change of this mind-set. This is important as social ties has been shown to increase the overall submission quality. Trust was shown to be developed through the promotion of discussion forums and use of moderators during the challenges being hosted, which can now be developed to increase rates of solver retention. Discussion forums also develop reciprocity, along with providing solvers increased transparency, and tailoring reward selection facilitating higher solver engagement. Solver rankings and recognition develop self-identity which has been posited to increase solver learning and employment. Shared vision is promoted through deconstructing the problem, accurate challenge descriptions, and conducting targeted outreach of solvers heightening solver understanding. There were no mechanisms identified for developing shared language, representing an area for future attention, however due to the constraints involved within the scope of this research; it was beyond our achievable remit. These are original results that reveal the importance of developing social capital within not only a CM setting, but arguably innovation contest platforms in general. Considering the lack of empirical studies that seek to explore the mechanisms of social capital development, these findings make a novel contribution to the social capital and innovation literature.

Several managerial implications have also been outlined. Firstly, this research serves to reinforce the strategic value of social capital constructs for CMs, and while this literature is still in its infancy, this investigation advocates that should CMs ignore or neglect its development, they are putting themselves at a disadvantage. Secondly, our findings confirm that CMs need to do more than simply encourage social interactions. CMs should recognise the potential value created through the development of these constructs, rather than considering them to be only supporting tools in intensive innovation projects. Thirdly, by expanding an existing theoretical model, this research provides a strategic framework for social capital development to practitioners, making them capable of immediately constructing approaches to deliver on the inherent value social capital possesses.

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References

Battistella, C. and Nonino, F. (2013) 'Exploring the impact of motivations on the attraction of innovation roles in open innovation web-based platforms', *Production Planning & Control,* 24(2/3), pp. 226-245.

Bhatt, P. and Altinay, L. (2013) 'How social capital is leveraged in social innovations under resource constraints?', *Management Decision*.

Boudreau, K. J. and Lakhani, K. R. (2009) 'How to manage outside innovation', *MIT Sloan Management Review,* 50(4), pp. 69-76.

Boudreau, K. J. and Lakhani, K. R. (2013) 'Using the crowd as an innovation partner', *Harvard Business Review,* 91(4), pp. 60-69.

Bullinger, A. C., Neyer, A. K., Rass, M. and Moeslein, K. M. (2010) 'Community-based innovation contests: Where competition meets cooperation', *Creativity and Innovation Management,* 19(3), pp. 290-303.

Burt, R. S. (1992) *Structural Holes: The Social Structure of Competition.* Cambridge, MA: Harvard University Press.

Camps Martin, S. and Marquès i Gou, P. (2011) 'Social capital and innovation: exploring intra-organizational differences', *© UAM-Accenture Working Papers, 2011, núm. 07, 39 p.*

Crescenzi, R., Gagliardi, L. and Percoco, M. (2013) 'Social capital and the innovative performance of Italian provinces', *Environment and planning A,* 45(4), pp. 908-929.

Dastourian, B., Kawamorita Kesim, H., Seyyed Amiri, N. and Moradi, S. (2017) 'Women entrepreneurship: effect of social capital, innovation and market knowledge', *AD-minister,* (30), pp. 115-130.

de Fátima Ferreiro, M. and Sousa, C. 'Social innovation and Networks: Linkages and challenges'. *European Conference on Innovation and Entrepreneurship*: Academic Conferences International Limited, 217-224.

Eisenhardt, K. M. and Graebner, M. E. (2007) 'Theory building from cases: opportunities and challenges', *Academy of Management Review,* 50(1), pp. 25-32.

Füller, J., Hutter, K., Hautz, J. and Matzler, K. (2014) 'User Roles and Contributions in Innovation-Contest Communities', *Journal of management information systems,* 31(1), pp. 273-308.

Füller, J., Hutter, K., Hautz, J. and Matzler, K. (2017) 'The Role of Professionalism in Innovation Contest Communities', *Long Range Planning,* 50(2), pp. 243-259.

Garthwaite, P. H., Kadane, J. B. and O'Hagan, A. (2005) 'Statistical methods for eliciting probability distributions', *Journal of the American Statistical Association,* 100(470), pp. 680-701.

Granovetter, M. (1983) 'The strength of weak ties: A network theory revisited', *Sociological theory,* 1(1), pp. 201-233.

Gregor, S. (2006) 'The Nature of Theory in Information Systems', *MIS Quarterly,* 30(3), pp. 611 - 642

Kathan, W., Füller, J. and Hutter, K. 'Reciprocity in innovation contest communities reciprocity vs. free-riding in an environment of competition', *ACM International Conference on Advances in Social Networks Analysis and Mining (ASONAM)*: IEEE, 1282-1290.

Mair, J. and Marti, I. (2006) 'Social entrepreneurship research: A source of explanation, prediction, and delight', *Journal of world business,* 41(1), pp. 36-44.

Martins, E. and Terblanche, F. (2003) 'Building organisational culture that stimulates creativity and innovation', *European journal of innovation management,* 6(1), pp. 64-74.

Miles, M. and Huberman, M. (1994) *Qualitative Data Analysis: An expanded source book.* Thousand Oaks, CA: Sage publications.

Nahapiet, J. and Ghoshal, S. (1998) 'Social capital, intellectual capital, and the organizational advantage', *Academy of management review,* 23(2), pp. 242-266.

O'Flaherty, B. and Whalley, J. 'Qualitative Analysis Software Applied to IS Research - Developing a Coding Strategy'. *ECIS*.

Özaygen, A. and Balagué, C. (2018) 'Idea evaluation in innovation contest platforms: a network perspective', *Decision Support Systems,* 112, pp. 15-22.

Paquin, R. L. and Howard-Grenville, J. (2013) 'Blind dates and arranged marriages: Longitudinal processes of network orchestration', *Organization Studies,* 34(11), pp. 1623-1653.

Piekkari, R., Plakoyiannaki, E. and Welch, C. (2010) ''Good'case research in industrial marketing: Insights from research practice', *Industrial Marketing Management,* 39(1), pp. 109-117.

Provan, K. G. and Kenis, P. (2008) 'Modes of network governance: Structure, management, and effectiveness', *Journal of public administration research and theory,* 18(2), pp. 229-252.

Reypens, C., Lievens, A. and Blazevic, V. (2019) 'Hybrid Orchestration in Multi-stakeholder Innovation Networks: Practices of mobilizing multiple, diverse stakeholders across organizational boundaries', *Organization Studies*, pp. 0170840619868268.

Schepis, D., Purchase, S. and Butler, B. (2021) 'Facilitating open innovation processes through network orchestration mechanisms', *Industrial Marketing Management,* 93, pp. 270-280.

Sulistyo, H. (2016) 'Innovation capability of SMEs through entrepreneurship, marketing capability, relational capital and empowerment', *Asia Pacific Management Review,* 21(4), pp. 196-203.

Sutton, R. I. and Straw, B. M. (1995) 'What theory is not', *Administrative Science Quarterly,* 40(3), pp. 371-384.

Treacy, S., Feller, J., O'Flaherty, B. and Nagle, T. 'Competitive market innovation contests and social capital: diametrically opposed, or inherently linked?'. *the 25th European Conference on Information Systems (ECIS 2017)*: AIS Electronic Library (AISeL), 1695-1712.

Yin, R. (1994) *Case Study Research: Design and Methods 2nd Edition.* SAGE Publishing.

Yin, R. (2008) *Case Study Research: Design and Methods 4th Edition.* London: Sage Publisher.

How Socıal Medıa Interactıon Wıth NGOs Affects Socıal Entrepreneurshıp Intentıon Of Busıness Students

Sahika Burcin Tulukcu
Beykoz Üniversitesi, Turkey
sahikatulukcu@beykoz.edu.tr
DOI: 10.34190/EIE.21.251

Abstract: The aim of this study is to understand the relationship between familiarity with non-governmental organizations (NGOs) and social entrepreneurship intention for business students in Istanbul. In the conceptual model, social media interaction is taken into consideration as a mediator factor. The indications of the study also include which social problems students concern more, whether they are a member of any NGO, following and interacting any NGO on social media platforms. In the study, a survey was conducted and the model was tested in SEM. The study is expected to contribute to the extent literature on social entrepreneurship, NGOs on social media and social media interaction. To implement appropriate strategies on social media for NGOs, the study is expected to be useful for both academics and practitioners.

Keywords: social entrepreneurship intention, NGOs on social media, social media interaction

1. Introduction

Increasing social and environmental problems have reached such dimensions that all humanity cannot remain indifferent. Here, individuals, like institutions, have important duties in solving these problems. Business faculties' duty is to grow managers and entrepreneurs of the future, but today, does this understanding of management and entrepreneurship include the concern of creating solutions to social problems as well? This study questions exactly this and while doing so, it also takes social media in consideration, which is the indispensable part of our lives.

Thus, the study investigates the intention of business faculty students in Istanbul to become social entrepreneurs after graduation. Questions of the study also includes which social problem students care most about in Turkey, whether they are familiar with non-governmental organizations for the relevant social problem, and whether they follow these organizations on social media and interact with them.

The main problem of this study is whether the closeness and familiarity with NGOs have an effect on students' tendency to become social entrepreneurs. On the other hand, It is questioned to what extent following these NGOs in social media, being interested in their content and interacting with them mediate this relationship.

In this study, which tries to measure whether there is a relationship between students' familiarity with the NGOs related to the social problem they care about and their tendency to be social entrepreneurs, the interaction of students with NGOs on social media mediates this relationship. Considering that social media is now an indispensable part of our lives, it is thought that it can contribute to students becoming social entrepreneurs on the way to build their future. It is also thought that it will be beneficial for NGOs to create content that is worth interacting with on social media to increase familiarity and also social entrepreneurship intention.

In the study a conceptual model was developed to measure the relationships between familiarity with NGOs, social media interaction and social entrepreneurship intention for business students in Istanbul. Data was collected with a survey and the results were tested in Structural Equation Modeling (SEM). To impelement appropriate strategies on social media for NGOs, it is important to understand how they can interact with students more on social media and increase familiarity. Thus, this study is expected to be useful for both academics and practitioners.

2. Literature review - social entrepreneurship

There are many different definitions for the concept of social entrepreneurship but basically, social entrepreneurship (SE) can be described as entrepreneurial activities aimed at eliminating primary social problems without prioritizing material benefit and profit, and transforming systems (Lumpkin and Dess, 1996; Germak and Robinson, 2013; Zahra et al., 2009). Thus, many authors consider that SE requires considering the motivational attributes of the individuals or groups of individuals who take associated risks. SE intention should lead the person to build a new organization, but always keeping in the mind that it must be for behalf of society

regarding a social benefit. Therefore, they define the SE as the person who embraces the activities and processes carried to explore, describe and benefit opportunities in order to improve social welfare by creating new organizations or managing existing ones in a different way (Zahra et al., 2009; Bacq and Alt, 2018; De la Garza-Carranza et al., 2020; Galvez et al., 2019; Hassan, 2020; Nugroho et al., 2019; Comfort and Hester, 2019; Yu et al., 2020; Zhou and Pan, 2016; Linan and Chen, 2009; Mair and Noboa, 2003; Urban, 2013).

SE intention can be generally described as the intent to pursue a social mission by starting a business or launching a social venture (Elfving et al., 2017; Linan and Fayolle, 2015; Anica et al., 2021, Armstrong and Butcher, 2017).

According to the literature given, the hypothesis of the study were built as:

h1*: Familiarity has a significant and positive effect on SE intention.*

h2: *Social media interaction has a mediating effect on the relationship between familiarity and SE intention.*

Proposed model is presented in **Figure-1.**

Figure-1: Research model

3. Methodology

In this research, a pilot study and a quantitative methodology was applied to build the proposed model and hypotheses.

3.1 Sampling and data collection

In the study, as a pilot study, the students were asked what the most important social problems in Turkey were and a list was drawn up regarding the results of the focus group study (pilot study). As can be seen in Table-1, seven social problems are listed after pilot study. Then, the survey was sent to other business students and they were asked to mark the social problem they found most important. In addition, students were asked which social media platform they use more. In total, 161 valid questionnares were collected. Figure-1 shows the research model below.

3.2 Descriptive statistics

As seen in Table-1, students mostly use Instagram application. The most important social problem is the justice system, followed by violence against women. Students follow and interact with NGOs on social media that deal with the social problem they care about.

Table 1: Descriptive statistics

MOSTLY USED SOCIAL MEDIA PLATFORM	**Frequency**	**Percent**	**Valid Percent**	**Cumulative Percent**
Facebook	1	,6	,6	1,9
Instagram	**120**	**74,5**	**74,5**	**76,4**
Linkedin	1	,6	,6	77,0
Twitter	10	6,2	6,2	83,2
Youtube	27	16,8	16,8	100,0
Total	161	100,0	100,0	
MOST IMPORTANT SOCIAL ISSUE	**Frequency**	**Percent**	**Valid Percent**	**Cumulative Percent**
Justice System	**83**	**51,6**	**51,6**	**51,6**

Children Rights	3	1,9	1,9	53,4
Environmental Issues	3	1,9	1,9	55,3
Inequality in Education	6	3,7	3,7	59,0
Animal Rights	8	5,0	5,0	64,0
Violence to Women	**55**	**34,2**	**34,2**	**98,1**
Inequality in Health System	3	1,9	1,9	100,0
Total	161	100,0	100,0	

3.3 Scales

Social entrepreneurial intention scale was adopted from a three-item scale which was developed by Douglas and Shepherd (2002) and Thompson (2009) (Hockerts, 2017) Including questions like: "I expect that at some point in the future I will be involved in launching an organization that aims to solve social problems", " I have a preliminary idea for a social enterprise on which I plan to act in the future", "I do not plan to start a social enterprise".

Familiarity questions were adopted from a three-item scale that was developed and modified by Kent and Allen (1994) regarding to brand familiarity, including statements like: "very inexperienced/very experienced", "very unfamiliar/very familiar", "very unknowledgeable/very knowledgeable" (Rose, 2015).

Social media interaction questions were extracted from the scale of Schivinski et al. (2016) from the contribution dimension of the scale.

4. Results

4.1 EFA and CFA results

The table below shows the results of the EFA and CFA factor loadings of the scale items.

Table 2: EFA and CFA of factors

Scale Items	**Factor Loadings EFA**	**Factor Loadings CFA**
SE Intention 1	0,797	0,749
SE Intention 2	0,892	0,910
SE Intention 3	0,857	0,751
Familiarity 1	0,678	0,628
Familiarity 2	0,855	0,765
Familiarity 3	0,758	0,763
Social Media Interaction 1	0,612	0,752
Social Media Interaction 2	0,708	0,622
Social Media Interaction 3	0,703	0,749

4.2 Structural Equation Modeling (SEM) results

As can be seen in Table-3, in the structural equation model, the model fit measures are appropriate at the accepted values, baseline comparison values above "0.9" mean good model compatibility (Hooper et al., 2008; Byrne, 1994; Schumacker ve Lomax, 2004; Steiger, 2007; Arbuckle, 2009).

The effects of the variables on each other are explained in Table-4.

Table 3: SEM model fit summary

Baseline Comparisons					
Model	**NFI**	**RFI**	**IFI**	**TLI**	**CFI**
	Delta1	rho1	Delta2	rho2	
Default model	**0,95**	**0,906**	**0,991**	**0,982**	**0,991**
Saturated model	1		1		1
Independence model	0	0	0	0	0
Parsimony-Adjusted Measures					
NCP					
Model	NCP	LO 90	HI 90		
Default model	5,069	0	22,868		
Saturated model	0	0	0		
Independence model	537,905	463,708	619,543		
RMSEA					
Model	RMSEA	LO 90	HI 90	PCLOSE	
Default model	0,036	0	0,077	0,663	
Independence model	0,273	0,254	0,293	0	
HOELTER					
Model	HOELTER	HOELTER			
	.05	**.01**			
Default model	201	237			
Independence model	17	20			

Structural equation model and the relations between the variables are seen below.

Table 4: SEM correlations

Standardized Regression Weights			
			Regression Weight
SOCIAL MEDIA INTERACTION	<---	FAMILIARITY	0,493
SE INTENTION	<---	FAMILIARITY	0,282
SE INTENTION	<---	SOCIAL MEDIA INTERACTION	0,350

4.3 Findings

As seen in Table-4, while familiarity alone has a low effect (β=0.282) on the intention to be a social entrepreneur, it has a much higher effect (β=0.493) on social media interaction. Social media interaction, on the other hand, has a greater effect on the tendency to be a social entrepreneur than familiarity (β=0,350).

5. Discussion

According to the results, it can be said that the more NGOs become visible on social media and engage in activities to increase their level of involvement, the more they can influence the intention of students to be social entrepreneurs in the future.

Today, it is expected that initiatives such as being a member of NGOs and supporting them will increase. The power of social media and the effective activities of NGOs in these channels will undoubtedly activate the awareness and, as a result, the desire and motivation to shed light on social problems. It is important to conclude that the factors influencing intentions of social entrepreneurship is a support that can be used to stimulate the

field, and social businesses have proven in many developed countries the ability to change the course of social inequalities (Iancua et al, 2020).

While having the intention of being an entrepreneur for business students, to create a solution to social problems should be the main goal. Turning their ideas, knowledge and experience into an effort to illuminate social problems will make a greater contribution to the societal marketing understanding of the future (Hockerts, 2017). To do so, collaborating with NGOs, getting familiar to them, interact with them and even working together should help to increase the benefits of social entitites. Here in the study the role and importance of this familiarity and interaction in social media context are underlined.

Since interactivity is the primary feature of social media, it also create a closer relationship with stakeholders. The NGOs should share content to attract followers, interact with the followers to build a community, and mobilize the community to take action. The power of social media is great in drawing attention to social issues, as it is in every field. In this sense, NGOs need to use social media more efficiently with the useful and interesting content they produce in order to raise awareness in both students and other individuals in the society. Previous studies have found that attractive content such as posts like videos, pictures are more popular on social media, and can attract more followers (Zhou and Pan, 2016; de Vries et al. 2012). As the interest and interaction increases, the tendency of the person to take action also increases. In this case, the study is expected to contribute to the social entrepreneurship literature, while drawing attention to the useful use of social media platforms by NGOs in Turkey.

6. Limitations and further research

In this study, there are some limitations in terms of time, location, budget and sampling. First, convenience sampling method is used due to budget and time constraints, which creates a constraint on the generalizability of the study. In the following studies, it is recommended to use one of the random sampling methods. Although the study is conducted in Turkey, it does not represent the world. For this reason, it is recommended to run the developed model in different cultures.

The study is represented by a relatively small number of sample which are students at bachelor programmes. It is recommended to extend the study to different faculties and levels and entrepreneurs from private and public companies.

Future studies are highly suggested in light of the current limitations of the number of variables involved and may include different factors to provide additional validity.

References

Anica ,Iancu , Luminita Popescu & Virgil Popescu (2021) Factors influencing social entrepreneurship intentions in Romania, Economic Research-Ekonomska Istraživanja, 34:1, 1190-1201

Arbuckle, J. L., & Wothke, W. (2009). IBM SPSS AMOS 18. Smallwaters Corporation, Meadville PA.

Armstrong, Crystal and Butcher, Charity, "Digital Civil Society: How Nigerian NGOs Utilize Social Media Platforms" (2017). *Faculty Publications*. 4071.

Bacq, Sophie & Alt, Elisa, 2018. "Feeling capable and valued: A prosocial perspective on the link between empathy and social entrepreneurial intentions," Journal of Business Venturing, Elsevier, vol. 33(3), pages 333-350.

Byrne, B.M. (1994) Structural Equation Modelling with EQS and EQS/Windows: Basic Concepts, Applications, and Programming. Sage.

Comfort, Suzannah Evans & Hester, Joe Bob (2019) Three Dimensions of Social Media Messaging Success by Environmental NGOs, Environmental Communication, 13:3, 281-286

De la Garza-Carranza, M.T., Guzmán-Soria, E. López-Lemus, J.A., & Sierra-Martínez, A.C. (2020). Social Entrepreneurship Innovation: A study from México. Entrepreneurial Business and Economics Re- view, 8(4), 201-202.

De Vries, Kruizinga, Lisette & Gensler, Sonja & Leeflang, Peter. (2012). Popularity of Brand Posts on Brand Fan Pages: An Investigation of the Effects of Social Media Marketing. Journal of Interactive Marketing. 26. 83–91. 10.1016/j.intmar.2012.01.003.

Douglas, E. J., & Shepherd, D. A. 2002. Self-employment as a Career Choice: Attitudes, Entrepreneurial Intentions, and Utility Maximization. Entrepreneurship Theory and Practice, 26(3): 81–90.

Elfving, Jennie & Brännback, Malin & Carsrud, Alan. (2017). Motivations Matter in Entrepreneurial Behavior: Depends on the Context. 10.1007/978-3-319-45544-0_7.

Galvez, Maria Del Mar & Haro-de-Rosario, Arturo & Caba-Pérez, María. (2019). The Syrian refugee crisis: how local governments and NGOs manage their image via social media. Disasters. 43. 10.1111/disa.12351.

Germak, Andrew & Robinson, Jeffrey A.. (2013). Exploring the Motivation of Nascent Social Entrepreneurs. Journal of Social Entrepreneurship. 5. 5-21. 10.1080/19420676.2013.820781.

Hassan, H.M. Kamrul. (2020). Intention towards social entrepreneurship of university students in an emerging economy: the influence of entrepreneurial self-efficacy and entrepreneurship education. On the Horizon. ahead-of-print. 10.1108/OTH-04-2020-0012.

Hockerts, Kai. (2017). Determinants of Social Entrepreneurial Intentions. Entrepreneurship Theory and Practice. 2017. 105-130. 10.1111/etap.12171.

Hooper, D, Coughlan, J and Mullen, M (2008) Structural Equation Modelling: Guidelines for Determining Model Fit. Electronic Journal of Business Research Methods, 6(1), 53-60

Kent, R. J., & Allen, C. T. (1994). Competitive interference effects in consumer memory for advertising: The role of brand familiarity. The Journal of Marketing, 97-105.

Linán, F. & Chen, Y.W. (2009). Development and Cross-Cultural Application of a Specific Instrument to Measure Entrepreneurial Intentions. Entrepreneurship Theory and Practice, 33(3), 593-617.

Linán, F. and Fayolle, A. (2015) A Systematic Literature Review on Entrepreneurial Intentions: Citation, Thematic Analyses, and Research Agenda. Entrepreneurship and Management Journal, 11, 907-933.

Lumpkin, G.T. and Dess, G.G. (1996) Clarifying the Entrepreneurial Orientation Construct and Linking It to Performance. Academy of Management Review, 21, 135-172.

Nugroho, Danang & Purnomo, Margo & Hermanto, Bambang & Maulina, E.. (2019). SOCIAL ENTREPRENEURSHIP INTENTION: A SYSTEMATIC LITERATURE REVIEW. Russian Journal of Agricultural and Socio-Economic Sciences. 88. 86-94. 10.18551/rjoas.2019-04.12.

Mair, Johanna and Noboa, Ernesto, Social Entrepreneurship: How Intentions to Create a Social Enterprise Get Formed (September 2003). IESE Working Paper No. D/521

Rose, Jennifer Lynn, "The Effects of Brand Familiarity on Perceived Risks, Attitudes, and Purchase Intentions toward Intimate Apparel Brands: The Case of Victoria's Secret" (2015). Theses and Dissertations. 1187.

Schivinski, Bruno & Christodoulides, George & Dabrowski, Dariusz. (2016). Measuring Consumers' Engagement With Brand-Related Social-Media Content: Development and Validation of a Scale that Identifies Levels of Social-Media Engagement with Brands. Journal of Advertising Research. 56. 10.2501/JAR-2016-004.

Schumacker, R. E., & Lomax, R. G. (2004). *A beginner's guide to structural equation modeling* (2nd ed.). Lawrence Erlbaum Associates Publishers.

Steiger, James. (2007). Understanding the Limitations of Global Fit Assessment in Structural Equation Modeling. Personality and Individual Differences - PERS INDIV DIFFER. 42. 893-898. 10.1016/j.paid.2006.09.017.

Thompson, E. R. 2009. Individual entrepreneurial intent: Construct clarification and development of an internationally reliable metric. Entrepreneurship: Theory and Practice, 33(3): 669–694.

Urban Boris, 2013. "Social Entrepreneurship in an Emerging Economy: A Focus on the Institutional Environment and Social Entrepreneurial Self-Efficacy," Managing Global Transitions, University of Primorska, Faculty of Management Koper, vol. 11(1 (Spring), pages 3-25.

Urban, Boris. (2020). Entrepreneurial alertness, self-efficacy and social entrepreneurship intentions. Journal of Small Business and Enterprise Development. ahead-of-print. 10.1108/JSBED-08-2019-0285.

Yu, Chuanpeng & Ye, Baosheng & Ma, Shenghui. (2020). Creating for others: linking prosocial motivation and social entrepreneurship intentions. Management Decision. ahead-of-print. 10.1108/MD-06-2019-0815.

Zahra, Shaker & Gedajlovic, Eric & Neubaum, Donald & Shulman, Joel. (2009). A Typology of Social Entrepreneurs: Motives, Search Processes and Ethical Challenges. Journal of Business Venturing. 24. 519-532. 10.1016/j.jbusvent.2008.04.007.

Zhou, Huiquan & Pan, Quanxiao. (2016). Information, Community, and Action on Sina-Weibo: How Chinese Philanthropic NGOs Use Social Media. VOLUNTAS: International Journal of Voluntary and Nonprofit Organizations. 27. 10.1007/s11266-016-9685-4.

Scaling Social Value: A Case Study on Social Entrepreneurship in Healthcare Delivery

Marcia Villasana, Juan José Cabrera-Lazarini and María José Núñez
Tecnologico de Monterrey, Mexico
marciavillasana@tec.mx
jcabrera@tec.mx
mariajosenmdev@gmail.com
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Abstract: Regardless of the form it takes, social value creation is a condition of social entrepreneurship. Sustaining and scaling that social value would depend not only on the capabilities of the social entrepreneur, but also on those of the organization. To achieve this, social entrepreneurship ventures may adopt different types of business models with distinct features to those of for-profit ventures. The driving question of this case study is what are the characteristics of business models for scaling social value in a sustainable manner? To answer this question, we conducted an overview of the relevant literature on business models to create social value at the Bottom of the Pyramid (BoP). The purpose was to identify the diversity of approaches to social entrepreneurship business models. We then conducted a case study analysis of the YOU Foundation, reporting on how this social venture looks for long-term sustainable solutions in healthcare affordability for Nepalese cancer patients at the BoP. Healthcare delivery at the BoP is of particular interest, as it is not widely analyzed in the social entrepreneurship literature, and there is still a gap in the extant literature on the business model logic of how social ventures create value for stakeholders in this sector of society.

Keywords: social entrepreneurship, business models, social business models, bottom of the pyramid, BoP

1. Introduction

Nowadays, the spectrum of social entrepreneurship is characterized by a diversity of perspectives and paths through which social value can be created (Helmsing, 2016). Of particular interest in this paper is social value creation at the Bottom of the Pyramid (BoP), a concept introduced by C. Prahalad and S. Hart in 2002, who defined it as a demographic of over four billion people in the lowest tier of the world economic pyramid who live on less than $1500 USD a year (Prahalad, 2005). The BoP approach has undergone several iterations since its original conceptualization (BoP 1.0), and currently scholars are discussing the emerging BoP 3.0 approach, which represents a shift from poverty alleviation to sustainable development and new business models to incorporate the under-served populations (Casado and Hart, 2017; Helmsing, 2016; Dembek and York, 2020). The core premise of BoP 3.0 is that for-profit companies adjust their market-based solutions to inclusive, locally-led approaches that enable long-term financial sustainability in tandem with sustainable social impact (Chmielewski et al., 2020; London, 2016).

Through an explicit social mission and social value creation at its core, social entrepreneurship initiatives that engage with the BoP segment are becoming widespread, although prevalence rates of this type of social entrepreneurial activity still vary widely among countries and regions (United Nations, 2020). Desa and Koch (2014) argue that the complexities of BoP environments challenge the growth and scaling of social ventures due to three types of market failures: one is the procurement of resources in the social investment sector; the second is the economic insecurity that BoP beneficiaries face; and the third is a limited infrastructure that would allow market penetration. Under such conditions, sustaining and scaling that social value would depend not only on the capabilities of the social entrepreneur, but also on the strategic choices to manage those complexities (Goyal et al., 2015).

To achieve this, social entrepreneurship ventures may adopt different types of business models with distinct features to those of for-profit ventures. Thus, the driving questions of this study are what are the characteristics of business models for scaling social value in a sustainable manner? What can we learn from the business models implemented by successful social ventures in the BoP? Healthcare delivery at the BoP is of particular interest, as it is not widely analyzed in the social entrepreneurship literature. By examining the characteristics of social entrepreneurship business models, we aim to contribute to the understanding of existing business models to scale social value and sustainability.

2. Business models for social entrepreneurship in the BoP

Social entrepreneurship (SE) addresses market failures generated by the under provision of public goods, and is characterized by the creation of social value for targeted, underserved stakeholders (Ebrashi, 2013; Kibler *et al.*, 2018; Nicholls, 2008). By addressing social challenges, SE can play an important role in the provision of products or services that benefit people whose needs are not being met by public or for-profit institutions. While the concept of social entrepreneurship is often used interchangeably with social enterprise, they are both distinct at the core (Larivet, 2010; Luke and Chu, 2013). Social enterprises are not necessarily entrepreneurial (Thompson, 2008; Luke and Chu, 2013); they seek to solve social problems through business ventures, combining efficiency and resources, and may not be led by people who can be described as social entrepreneurs (Thompson, 2008). Social entrepreneurship implies individuals with an entrepreneurial orientation that seek the advancement of social objectives through opportunity identification, risk-taking, creativity and innovation to create social value (Nicholls and Cho, 2006; Bľanda and Urbančíková, 2020).

As SE gains ground, we need to further our understanding on how business models support the social mission in underserved markets. However, given the market-oriented approach to poverty alleviation at the BoP, much of the extant literature is on conventional business models for the creation of mutual value (Lehmann, 2009; Sánchez and Ricart, 2010; Ausrød et al., 2017; Margiono et al., 2018). Thus, we need to further our understanding of social business models for which, as mentioned before, inherent market failures pose challenges to growth and scalability, particularly failures related to mobilization of resources and infrastructure for distribution channels (Goyal et al., 2015; Gebauer et al., 2017). In addition, Health care delivery at the BoP is not widely analyzed in literature, despite the focus on how social business models focus on welfare-enhancing outcomes (Angeli and Kumar, 2016). In other words, innovation for business models that have the goal of delivering health care is still not fully comprehended or studied, even though it is necessary to establish a framework which allows for a complete understanding of SE and how it can ensure effectiveness and efficiency at the BoP.

A business model can be understood as a template that describes how an enterprise interacts with customers, partners, and suppliers. It also includes a structure of how the business connects with the market in order to create, deliver, and capture value (Abdelkafi and Täuscher, 2016; Angeli and Jaiswal, 2016). So three value dimensions are elemental to a business model: customer value proposition; value creation; and value capture or profit generation (Abdelkafi and Täuscher, 2016). Baden-Fuller and Morgan (2010) suggest looking at business models as recipes which combine organization and integration as key elements that provide the rules to produce a certain outcome. These elements can be combined in different manners, opening the possibilities for innovation in business models. The concern to understand such configurations for social entrepreneurship ventures at the BoP has been addressed by several authors. Gebauer et al. (2017) highlight the value proposition, value creation, and profit equation as three key elements of business models that should become (a) inclusive by actively involving the customer in value creation; (b) collaborative by engaging with strategic local partners to cope with market barriers; (c) complex in order to become sustainable and self-sufficient; and (d) scalable in terms of quantity and quality of its social impact.

Helmsing (2016) argues that viable business models at the BoP need to negotiate processes with BoP producers and distributors, and to engage with stakeholders to build awareness around their offering. The author asserts that the role of networks in the ´process of civic engagement´ is essential for the success of the social mission. Hossain et al. (2017) found that network embeddedness is key to engage in social change. Among these, cross-sectoral partnerships enhance value creation.

3. Methodology

We employed an abductive approach as it seemed the most suitable method given the nature of our research. The abductive approach is an alternative to case analysis as it allows to derive categories and concepts from the everyday activities and meanings of social actors (Blaikie and Priest, 2018). Thus, unlike deductive and inductive inquiry, this method is "grounded on the principle of generating plausible, "first suggestions" about phenomena and their explanations on the basis of observations from one´s data (Bamberger, 2019, p. 104). We sought to match theory and reality by reviewing the extant literature on social entrepreneurship at the BoP, and by conducting a semi-structured interview with one of the co-founders of the YOU Foundation. The interview questions were designed to gain insight of the motivations and choices to pursue the social mission and create social value.

4. The case of the YOU Foundation

Healthcare many times can be an impossible choice for families at the BoP, particularly for cancer patients in a country such as Nepal, which despite displaying rapid improvements in the poverty rate and a declining trend in mortality rates, still remains one of the poorest economies in Asia (World Bank, 2017). The economic burden of healthcare financing for a cancer treatment jeopardizes a family´s subsistence. According to Khatiwoda et al. (2019), treatment represents about 72 percent of the total medical cost for a cancer patient. The authors assert that despite the government's subsidy to medical care, most of the cost of healthcare for cancer is mostly paid out-of-pocket, driving families into financial catastrophe.

The YOU Foundation, still in its infancy, was created to address the economic vulnerability that cancer treatments generate for the poor in Nepal. Embracing what is called the "YOU Approach", in which the priorities of others are at the same level as your own, it seeks a win-win for cancer patients and their families. The vision of the co-founders of YOU Foundation is not only to be successful in their endeavor of helping cancer patients, but also to continue helping them through education and planting a new idea of leadership, with the consequence of facilitating a network of people who share the "YOU Approach" culture. In the foundation's own words, they hope "to support global impactful initiatives and a new generation of leaders based on the concept that the best way to pursue my own goals is to make sure that each person around me can reach his/her goals, achieve his/her higher satisfaction/happiness prior to me or at least simultaneously («YOU approach»)" (YOU Foundation, 2019). Their mission strives to engage individuals, communities and organizations in pursuing success and overall social responsibility.

The first step was to find a Nepalese bank that was interested in partnering with YOU Foundation. One of them accepted to establish an alliance as they were looking for strategies to expand their influence to rural areas of Nepal. After that, a pilot was planned for 2020 but due to the COVID-19 pandemic it has been postponed. The bank will grant a loan with a lower interest rate than that of other Nepalese banks that will cover 50% of the cancer treatment, while the YOU Foundation will help with an additional 10% as well as with training courses that will try to help the patient's family become more efficient. YOU Foundation has also affiliated with a Nepalese Foundation who will receive grants to operate directly with the Nepalese bank. Through the Nepalese foundation and the bank, the YOU Foundation has followed their objective of engaging "players of the local economy (government, banks, private sector) in creating a system favorable to each of them and helping patients and their families to receive cancer treatment" (YOU Foundation, 2019).

5. Discussion

As stated in the introduction, the main intent of this paper is to identify the characteristics of business models for scaling social value in a sustainable manner. As Cucari et al. (2020) state, in our literature review we were able to corroborate the ´fragmented nature´ of the extant literature on not only SE, but on SE at the BoP. As Dembek and York (2020) state, the BoP literature is dominated by for-profit business model analysis and business cases. Still, we were able to identify certain elements that appear as key to design business models for the BoP.

5.1 Value creation and customer segment involvement

As for our case study, the YOU Foundation addresses both challenges through a holistic business model which looks for long-term sustainable solutions for healthcare delivery to the BoP. In terms of its value proposition, the YOU Foundation proposes to create value in two ways: (a) by facilitating the patient's access to preferential bank loan rates by providing the collateral and (b) by facilitating access to training for the patient's family. The aim is to reduce the poverty penalty by increasing the probability of loan payment and minimizing the risk of financial catastrophe for the family. This implies local capacity-building and engaging beneficiaries and institutions under what Goyal et al. (2015) call a relationship-based approach.

Both, the healthcare service provider and the bank, receive value; however, most of the generated value goes to the beneficiaries. As stated by one of its founders "The You Foundation aims at fostering a virtuous system based on healthcare awareness and education: the transition of financing responsibility for healthcare expenditure from personal Out-Of-Pocket and donations to a wider number of local economies' constituents combines a GDP increase, an increase of public spending for healthcare and a faster growth of households' income, heading back to an increase of GDP".

5.2 Strategic local partnerships

Networking allows to develop partnerships to cope with market barriers and provide the basis for the scaling process. The YOU Foundation applies a relationship-based approach aimed at synchronizing with the local conditions. The founders are aware of the limitations posed by the local context and have designed a win-win strategy for all parties involved. The Foundation aims at strengthening the already existing alliances with a local bank and private businesses, by leveraging relationships with those institutions and organizations that share the YOU approach. By engaging in this strategic partnership, the local bank can obtain a greater share of the Nepalese market, and the foundation can obtain more capital to fund its operations.

5.3 Quality and quantity of social impact

The YOU Foundation is not focused on generating sustainable advantages, but on sustaining and scaling solutions. According to Dees and Battle (2006), the focus on social innovation entrepreneurship should be "social entrepreneurs who carry out innovations that blend methods from the worlds of business and philanthropy to create social value that is sustainable and has the potential for large-scale impact". Thus, under the proposed business model, healthcare is focused not only on quality cancer treatments, but on local capacity-building by offering the opportunity of education to the patient's caretakers.

In this manner, the family, as a customer segment, becomes an active participant in generating value. The goal is to make beneficiaries understand that it is not a charity. Social indicators of impact will be linked to patient outreach, completion of an educational program by family members, access to employment, households impacted, among others. Impact could be analysed from a multiplier effect perspective, departing from traditional measures focusing solely on the amount of beneficiaries.

6. Conclusion

This case analysis is a first attempt to contribute to the literature on social entrepreneurship at the BoP, focusing on healthcare. While we acknowledge that our case study, the YOU Foundation, is still in its infancy, we consider it to be a good example of a social entrepreneurship business model that embeds the desirable characteristics of this type of social venture for underserved populations. We see merit in addressing how such SE efforts are being undertaken in countries characterized by poverty and disadvantage and for which studies on for-profit business models predominate.

References

Abdelkafi, N. and Täuscher, K. (2016) 'Business Models for Sustainability From a System Dynamics Perspective', *Organization and Environment*, 29(1), pp. 74–96. doi: 10.1177/1086026615592930.

Angeli, F. and Jaiswal, A. K. (2016) 'Business Model Innovation for Inclusive Health Care Delivery at the Bottom of the Pyramid', *Organization and Environment*, 29(4), pp. 486–507. doi: 10.1177/1086026616647174.

Ausrød, V. L., Sinha, V. and Widding, Ø. (2017) 'Business model design at the base of the pyramid', *Journal of Cleaner Production*. Elsevier Ltd, 162, pp. 982–996. doi: 10.1016/j.jclepro.2017.06.014.

Baden-Fuller, C. and Morgan, M. S. (2010) 'Business models as models', *Long Range Planning*, 43(2–3), pp. 156–171. doi: 10.1016/j.lrp.2010.02.005.

Bamberger, P. A. (2019) 'On the Replicability of Abductive Research in Management and Organizations: Internal Replication and Its Alternatives', *Academy of Management Discoveries*, 5(2), pp. 103–108. doi: 10.5465/amd.2019.0121.

Bľanda, J. and Urbančíková, N. (2020) 'Social entrepreneurship as a tool of sustainable development', *Quality Innovation Prosperity*, 24(3), p. 21. doi: 10.12776/QIP.V24I3.1463.

Chmielewski, D. A., Dembek, K. and Beckett, J. R. (2020) '"Business Unusual": Building BoP 3.0', *Journal of Business Ethics*, 161(1), pp. 211–229. doi: 10.1007/s10551-018-3938-7.

Dembek, K., Sivasubramaniam, N. and Chmielewski, D. A. (2020) 'A Systematic Review of the Bottom/Base of the Pyramid Literature: Cumulative Evidence and Future Directions', *Journal of Business Ethics*, 165(3), pp. 365–382. doi: 10.1007/s10551-019-04105-y.

Dembek, K. and York, J. (2020) 'Applying a Sustainable Business Model Lens to Mutual Value Creation With Base of the Pyramid Suppliers', *Business and Society*, pp. 1–36. doi: 10.1177/0007650320973450.

Desa, G. and Koch, J. L. (2014) 'Scaling Social Impact: Building Sustainable Social Ventures at the Base-of-the-Pyramid', *Journal of Social Entrepreneurship*, 5(2), pp. 146–174. doi: 10.1080/19420676.2013.871325.

Gebauer, H., Haldimann, M. and Saul, C. J. (2017) 'Business model innovations for overcoming barriers in the base-of-the-pyramid market', *Industry and Innovation*. Routledge, 24(5), pp. 543–568. doi: 10.1080/13662716.2017.1310033.

Goyal, S., Sergi, B. S. and Jaiswal, M. (2015) 'How to Design and Implement Social Business Models for Base-of-the-Pyramid (BoP) Markets?', *European Journal of Development Research*, 27(5), pp. 850–867. doi: 10.1057/ejdr.2014.71.

Helmsing, A. H. J. (Bert) (2016) 'Conditions for Social Entrepreneurship', *International Journal of Social Quality*, 5(1). doi: 10.3167/ijsq.2015.050104.

Hossain, S., Saleh, M. A. and Drennan, J. (2017) 'A critical appraisal of the social entrepreneurship paradigm in an international setting: a proposed conceptual framework', *International Entrepreneurship and Management Journal*. International Entrepreneurship and Management Journal, 13(2), pp. 347–368. doi: 10.1007/s11365-016-0400-0.

Khatiwoda, S. R. *et al.* (2019) 'Estimating the direct cost of cancer in Nepal: A cross-sectional study in a tertiary cancer hospital', *Frontiers in Public Health*. Frontiers Media S.A., 7. doi: 10.3389/fpubh.2019.00160.

Kibler, E. *et al.* (2018) 'The evaluative legitimacy of social entrepreneurship in capitalist welfare systems', *Journal of World Business*. Elsevier, 53(6), pp. 944–957. doi: 10.1016/j.jwb.2018.08.002.

Larivet, S. (2010) 'Essay of clarifications and definitions of the related concepts of social enterprise, social entrepreneur and social entrepreneurship', in Fayolle, A. and Matlay, H. (eds) *Handbook of research on social entrepreneurship*. Edward Elgar Publishing Limited, pp. 29–56.

Lehmann, T. (2009) 'Scaling Social Impact: The Case of Aravind Eye Hospitals', (March). Available at: https://www.academia.edu/34953561/Scaling_Social_Impact_The_Case_of_Aravind_Eye_Hospitals.

Luke, B. and Chu, V. (2013) 'Social enterprise versus social entrepreneurship: An examination of the "why" and "how" in pursuing social change', *International Small Business Journal*, 31(7), pp. 764–784. doi: 10.1177/0266242612462598.

Margiono, A., Zolin, R. and Chang, A. (2018) 'A typology of social venture business model configurations', *International Journal of Entrepreneurial Behaviour and Research*, 24(3), pp. 626–650. doi: 10.1108/IJEBR-09-2016-0316.

Nicholls, A. and Cho, A. H. (2006) 'Social Entrepreneurship: The Structuration of a field', in Nicholls, A. (ed.) *SOCIAL ENTREPRENEURSHIP New Models of Sustainable Social Change*. Oxford University Press, pp. 99–118.

Pittaway, L. (2005) 'Entrepreneurship Education - A Systematic Review of the Evidence', (January), pp. 1–33.

Sánchez, P. and Ricart, J. E. (2010) 'Business model innovation and sources of value creation in low-income markets', *European Management Review*, 7(3), pp. 138–154. doi: 10.1057/emr.2010.16.

Thompson, J. L. (2008) 'Social enterprise and social entrepreneurship: where have we reached?', *Social Enterprise Journal*, 4(2), pp. 149–161. doi: 10.1108/17508610810902039.

United Nations (2020) *World youth report: Social entrepreneurship and the 2030 agenda*, *World youth report 2020*. doi: 10.18356/613c6857-en.

World Bank (2017) 'Climbing higher : toward a middle-income Nepal', *World Bank*, (May), pp. 1–70. Available at: https://documents.worldbank.org/en/publication/documents-reports/documentdetail/358501495199225866/climbing-higher-toward-a-middle-income-nepal.

Assessing the Impact of Human Capital on Innovative Development

Maxim Vlasov
Ural Federal University, Ekaterinburg, Russia Institute of Economics, Ural Branch of the Russian Academy of Sciences, Ekaterinburg, Russia
mvlasov@mail.ru
DOI: 10.34190/EIE.21.011

Abstract: The aim of the research is to study the interrelation between the level of human capital and innovation development in different countries in the context of transition to sixth technological level. In order to achieve the stated aim the author tries to understand the opportunities of developing countries and define the preconditions for their successful transition to developed countries group. The author formulates the hypothesis of considerable difference in sensitivity and influence of innovations on the level of human capital in that respect for groups of different countries. In order to test this hypothesis the author used analytical, statistic and correlation and regression analysis methods. Combination of these methods allowed for identifying different degree of relation between human capital level and GDP, human capital and innovations, innovations and GDP. According to such analysis there is a close connection between human capital level and GDP, less intense interrelation between innovations and human capital and weak relation between innovations and GDP. The author suggested taking certain measures in six directions to support innovation development of developing countries. Obtained results can be used for providing justifications and innovation processes regulation measures considering national priorities in academic, technological and economic development of the country.

Keywords: human capital, innovations, innovation development, academic and technological development, sixths technological order, education, investments, GDP

1. Introduction

Scientific and technological progress and the level of innovation (intellectualization) of the main factors of production, in addition to factors of globalization, geopolitical and financial instability, have a significant impact on the development of the national economy, its growth and competitiveness.

At present international economy is undergoing crisis period related to transition to the sixths technological order which formulates new requirements to human capital. Transition to new technological order is always accompanied by reconstruction of educational system, labor market transformation and changes in economic system as a whole. Professional skills, knowledge and competencies accumulated earlier in many specializations undergo significant changes. Certain professions and specialization can disappear entirely because they do not fit into new technological order and are replaced by new ones. This process was observed in different periods of development of modern civilization. For example, not that long time ago there were such professions as postman, typewriter, telephone operator, etc. Academic and technological development decreased the need to deliver letters to the doors of recipient, loo for typewriting services (everyone can type the text) or use manual connection to make a phone call.

Industrial revolutions, followed by modernizations, introduction of innovation technologies in companies created the demand for new specialists, which facilitated mastering new knowledge, skills and competencies. Therefore nowadays in the context of transition to new technological order we can expect transformation and significant changes in education system and labor market which will continue forming new knowledge accumulation cycle of human capital for the next 10-20 years.

Education system if a crucial component of human capital aimed at meeting the demand of the labor market and economy. Educational system might not be act fast enough to meet these requirements as it has time lag related to training and "supplying" necessary specialists to labor market. As a result there is a serious gap between actual and necessary human capital reserves. This gap becomes particularly severe during the periods of economic shock or crisis, which might demonstrate the change in technological orders and the need for reconstructing educational system in such a way that would make it capable of meeting labor market requirements. In such context participants take active measures aimed at filling this gap or optimizing existing human capital reserves.

Such situation developed in the modern history of Russia in 1990s after socialist development was replaced by capitalist one and educational system and specialists required by Soviet economy, were no longer able to meet

the needs of the Russian current reality. As a result a huge number of people with high level of human capital was set free: some of them went abroad others had to master new skills required at the labor market.

According to existing estimates in 1990s over 40% of Russian working population changed professions, two thirds of them during the initial stage of reforms in 1991 – 1995 (Kapiljushnikov, 2010). This huge – scale process of reorienting people towards new professions was called "the great reallocation of human capital", which is explained by transformation of economic system in general. In other words production forces accumulated during Soviet times were no longer adequate to production relations in capitalist environment. Construction of a new system and creating some sort of macroecomic balance in the county required significant costs in terms of time and other resources. However new economic model in Russia existed for a relatively short period of time and by now has completely outlived itself. This trend is typical not only of Russia, but of majority of countries in the world.

The main purpose of the study is to study the relationship between the level of human capital and innovative development in various countries of the world in the context of the transition to the six thtechnological order.

To answer the stated question the authors studied existing relations between human capital level and it's economic, academic and technological development as well as identified which groups of countries have the best starting grounds for transition to the new technological order. The aims of this research are:

- To define the level of interrelation between basic indicators of academic and technological development: human capital→innovations→GDP for different groups of countries in the world;
- To understand the conditions of developing countries' (particularly Russia) transition into the group of developed countries with the aim of further long-terms successful economic development.

2. Theoretical review

Economic science sees "human capital" as a relatively new notion despite the fact that in XVII century W. Petty identified the relation between labor skills and population's input into the creation of national wealth (Petty, 1940). Modern human capital theory was formed in 1960s by Nobel laureates T. Schultz and G. Becker.

Representatives of institutional approach were interested in the aspect of economic impact of human capital in the context of social institutions influence on its level (Stiglitz, 2009). Researchers believed in and provided solid proofs of the importance of social institutions for forming human capital as they were capable of influencing its qualitative and quantitative characteristics. In other words, authors of institutional approach theory thought that interaction between people in a certain social environment leads to the improvement of qualitative component of human capital. It facilitates strengthening of connection between generations, creating community, building continuous process of professional skills and competencies transfer which helps not only accumulate human capital but also improve its level and importance in the economic system.

Certain input into the development of methodology and understanding of human capital was made by UN experts. In its guidelines on measuring human capital UN provides definition of human capital as knowledge, skills, competencies and other qualities of people that have "overall influence" on social and economic welfare (UN, 2016). UN calculation method is based on integral qualities and certain component indicators of human capital such as average lifespan of generation, duration of active labor period, pure work power balance, family life cycles, etc.

Significant input into the development of human capital evaluation methodology was made by World Bank analytics. They suggested discount method of evaluating human capital with defining its price and qualitative characteristics (Patrinos, 2018). Such approach allows not only for defining human capital price, but also for evaluating synergy effects for national welfare. The higher the concentration of highly qualified specialists in economy is the higher is the output of each individual specialist is which creates long-term accumulation of human capital (Collin, 2018).

At present human capital is an independent complex and intensive development factor, basis of innovation and economic development of any country (Jensen, R., 2010). Evaluations conducted in many countries over time demonstrate that the return on human capital significantly exceeds the return on physical capital (Kapiliushnikov, 2010).

Return on human capital increases and turns into huge benefits for those countries where human capital is detained and accumulated. In this case we see not only continuous process of human capital reproduction, but also how it interacts with academic, technological and physical capital and is complemented by it. As a result of this interaction human capital is transformed into the most important resource for technical progress and long-term economic development.

According to various estimates process of effective interaction between human and physical capital accounts for 10-30% gap between countries in terms of per-capita GDP. The size of the gap is influenced primarily by quality of education, as well as by interaction between workers with different level of qualification. Our analysis also demonstrates strong interconnection. Comparative analysis of different countries showed that gap in per-capita GDP between countries can truly be explained by the differences in human capital level.

Domination of capitalist idea in 1990s lead not only to the globalization of international economy but also to increased competition for human resources and their quality. In order to increase competitiveness of human resources different countries increased investments into human capital up to 70% whereas investments into physical capital were only 30% (Goldin, 2016). It should be mentioned that majority of investments into human capital in advanced countries was made by state institutions which is particularly typical of EC countries (Campbell, 2020). Many researchers believe that this is one of the most important functions in the field of state regulation of economy (Amirat, 2020; Stewart, 2020; Patrinos, 2018).

The growth of the role of state institutions is particularly noticeable in innovation economy as innovations are always related to risks which business is not always ready to take. At the same time innovations need significant investments in tangible and intangible innovation system components (technoparks, technopolices, innovation centers, clusters, Hi-Tech territories, venture business, specialist training, etc.).

At present developed countries are in transition to the sixths technological order based on digital technologies where the main source is presented not by financial or physical capital, but by human one. In new digital economy intellectual labor involved in hi-tech technology allows countries with high level of human capital to form prerequisites for successful transition to the sixths technological order by mastering the new round of technological development.

The authors see the main task of this research not only in studying interrelation between human capital and innovation development in the most successful countries, but also in understanding the context of transition to the sixths technological order with the aim of forming long-term trends of sustainable economic development of Russia.

3. Metadata

In order to analyze the influence of human capital on innovation development of different countries we used correlation – regression method of analysis based on spatial and temporal lines. Database for correlation – regression analysis was take from World Bank statistic data for 2017 – 2018. This period was chosen as statistical information concerning human capital was available only for these years.

At present World Bank human capital study covers only 157 territories. Several countries during the research were divided into parts, e.g. China is subdivided into China, Hong-Kong and Macao. Research database includes the following indicators: human capital index (HCI), GDP per-capita (PC GDP)[1] and innovation development index of chosen territories.

In order to give objective presentation of the situation in the international economy presented by different groups of countries the studied pool was subdivided into 4 quadrants with their own characteristics. Such pool division allowed for demonstrating the connection between performance indicators under analysis for different categories of countries defining their place in the international economy.

- 1. The first quadrant is characterized by high level of human capital (0,5-0,9) and high level of per-capita GDP (> 25000USD), as well as innovation development index.

1 Further per-capita GDP

- 2. The second quadrant is characterized by medium level of HCI (0,4-0,5), medium and high level of per-capita GDP (> 21000USD), medium and high innovation development index.
- 3. The third quadrant is characterized by low level of human capital (0,22-0,5), low level of per-capita GDP (700$ to 17,900 USD) and low innovation development index.
- 4. The fourth quadrant is characterized by medium and high level of HCI (0,5-0,8) and medium and high level of per-capita GDP (from 18000 USD to 25000 USD) and medium innovation development index.

The closest index to HCI is the human development index (HDI) calculated by UN experts which is also subdivided into 4 categories. According to the most recent classification by UN experts countries are divided into 4 categories with the following characteristics: very high level HDI H (0,8-0,99); high HDI 0,7 – 0,799; medium HDI level 0,55 – 0,699 and low level – less than 5 (Consesao, 2019).

World Bank also introduced country classification based on per-capita GDP which is also considered by UN experts in defining HDI which also proves the importance of human resources in the country for forming income and economic development trends. According to this classification countries are also divided into 4 categories: high level above 45000USD; above average with 25000USD-44,900USD; above average – from 10000USD to 24,900USD and low level with 400USD to 9,900USD (Scognamillo, 2016).

Spread of countries with characteristics obtained in this research fits into the pattern of international classification.

Despite the fact that interval suggested by the authors is a bit bigger than in international classification though fitting into it authors believe that broader intervals allow for demonstrating countries' chances of moving between quadrants.

As we can see from Fig.1 on the first quadrant trend line divides countries. Authors believe that countries above the trend line are those that managed to move from the second quadrant to the first one. In international classification these countries possess high level of HCI though still lower than those with very high HCI but in favorable external environment resource – rich countries can achieve qualitative changes and enter the group of countries with high chances of transition to the sixths technological order.

Therefore approach suggested by authors allowed not only for placing countries into quadrants bu also for analyzing countries' chances for moving from one quadrant to another. It also facilitated formulating prerequisites for such transition that allows countries to improve their position in all three indicators. For example if the transition from the fourth quadrant to the second or the third the institutes in this country should follow state politics aimed at improving human capital components (e.g. broad access to healthcare and education).

Besides that, authors formulated hypotheses for country groups according to quadrants. Authors believe that in the context of transition to the sixths technological order countries from the first quadrant and possessing the highest level of human capital have the best starting grounds for implementing this transition. The countries from the third quadrant have the worst starting ground and will not be able not only move to the next technological order in the context of international economic crisis, but also will face the broadening gap with other countries, which will significantly complicate the transition from the third quadrant to the second and the fourth.

Results obtained by authors differ from existing research as obtained estimates are more qualitative as compared to simple country ratings and country ranks they provide the opportunity to evaluate country potential and understand which group it fits into even with lower ratings compiled by international institutions.

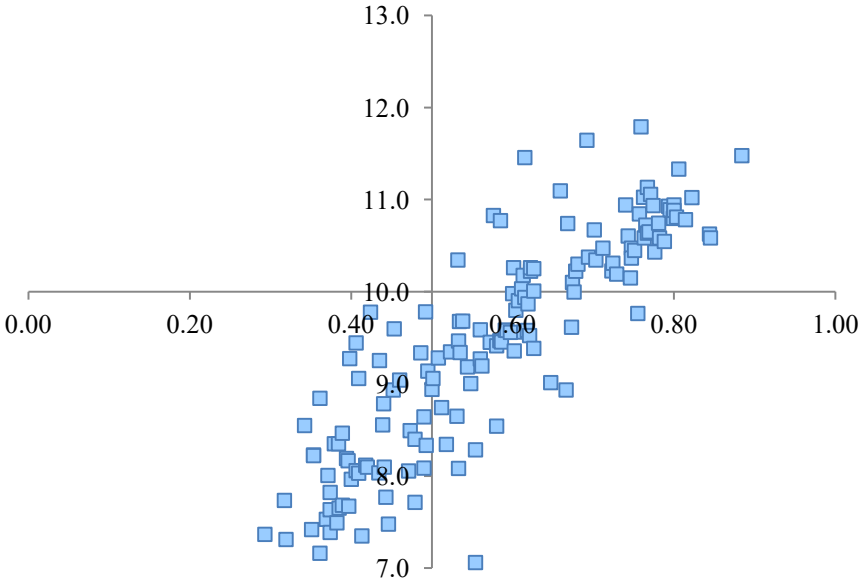
4. Research results

Analysis of the division of countries under research into quadrants shows that 157 territories fill three quadrants: the first, the third and the fourth. The first quadrant includes 52 territories, which is 32% of the pool; the third quadrant includes the largest number of countries – 59 or 38% of the overall pool; the fourth quadrant has 46 countries or 30% of the pool. The countries basically fall under the following categories according to the quadrants: developed weakly developed and developing respectively.

Placing countries by category is conditional, as developed countries' group includes some countries, which international organizations do not consider as developed ones. For example this group includes oil-producing countries with high level of income per-capita and high level of life, which actually placed them into the first quadrant, such as Saudi Arabia, UAE, Kuwait etc. Authors believe that countries rich in hydrocarbon resource could earlier be positioned in the second quadrant characterized by medium level of HCI, medium and high level of per-capita GDP.

Favorable external environment of the last decade allowed oil – producing countries to improve not only quality of life of their population but also to significantly upgrade human capital accumulation as advanced technologies were introduced for effective mining and use of resources. This implies mastering new skills and need for additional training which form the basis for upgrading human capital level.

Correlation – regression analysis for the studied countries and territories demonstrated significant non-linear connection between per-capita GDP and HCI (Fig. 1). Influence of human capital on GDP can be different for different categories of countries.



Source: based on World Bank data

Figure 1: Interrelation between per-capita GDP and human capital in world countries on average in 2017-2018

Whereas the degree of human capital influence on GDP of developing and developed countries is the same, weakly developed countries from the third quadrant demonstrate noticeably steeper tilt angle which reflects higher sensitivity between these indicators.

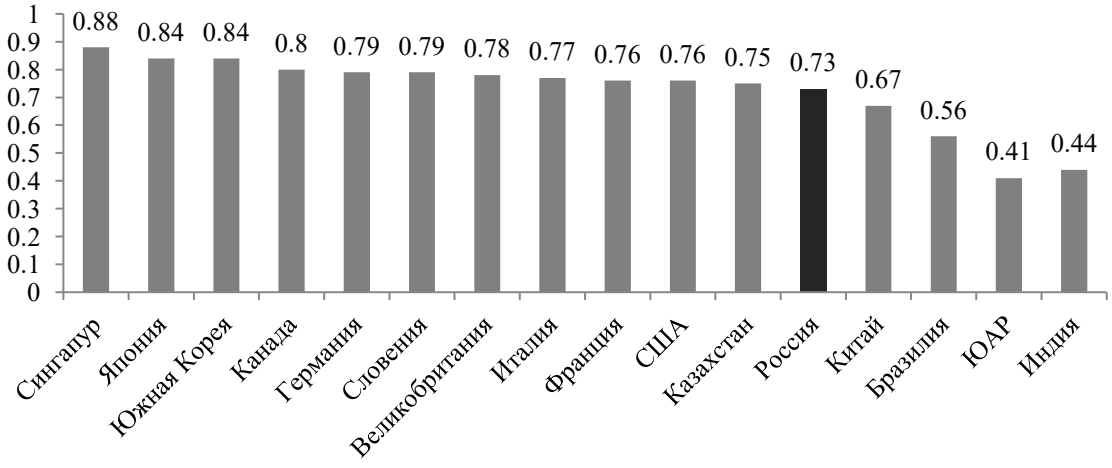
On the one hand it demonstrates that even small increase of income level in the country according to per-capita GDP will have positive influence on human capital level in the country. On the other hand it shows that existing potential of these countries, most of which are resource – rich ones, remains dormant.

However at present majority of weakly developed countries is placed in the third quadrant which demonstrates not only low level of human capital but also absence of opportunities for technological breakthrough. This will only deepen the gap even between weakly developed and developing countries in the new sixths technological order.

Developed and developing countries demonstrate lower level of human capital influence on GDP. This can be explained by complex economy or significant correlation with other factors on which economic development of the country depends, such as innovation component or the time between invention and its introduction into industry and use in large – scale manufacturing, etc.

As it was already mentioned human capital defines country's potential in transition to the new technological order and qualitative characteristics for its further development. Inter – country analysis demonstrates that at

present stage Russia has much more chances for long-term economic development than China and other BRICS countries because of higher level of human capital (Fig.2).



Source: compiled on the basis of World Bank data

Figure 2: Human capital index in individual countries for 2017-2018 on average

Authors believe that despite China's technological development its economy is stronger integrated into the world economic system which employs almost all available industrial resource. Therefore during the transition to the sixths technological order the country will face decrease of industrial resources because they fail to fit into the new environment.

Whereas in Russia where majority of industrial resources were dormant for many years there is an opportunity not only to re-launch them, but also to renovate them on a qualitatively different basis with the use of digital technologies. The same trend is characteristic of other CIS country – Kazakhstan. The country has even higher level of human capital and per-capita income in terms of GDP than Russia and has higher probability of transition to the new technological order and improving its positions in new economy.

As the research shows the connection between human capital and GDP is not linear which reflects a complex mechanism of international economic system. Authors believe that this mechanism can be further complicated by additional element in the chain, e.g. introduction of innovations.

The link between human capital and innovations is straight and linear but the level of their influence can vary considerably for different groups of countries. For example weakly developed countries the level of human capital influence on innovations is lower, whereas tilt angle reflecting this connection looks more horizontal compared to other groups of countries. It means that in weakly developed countries innovations without improving human capital level will not have broad positive effect as in developing countries with high level of human capital.

The degree of human capital influence on innovations in developing countries is higher than in weakly developed ones but lower than in developed ones. At the same time polarization between these two indicators in developing countries is higher than in weakly developed countries. For example Malaysia has medium level of human capital, high level of innovation in economy which allows for its dynamic development therefore the country moved from the second quadrant to the first one. Such countries as Kazakhstan, Serbia and Russia possessing high human capital level demonstrate lower level of innovation component in their economy with lower influence on economic processes therefore they are placed in the fourth quadrant.

Malaysian phenomenon can be explained by relocation of industrial resources and introduction of innovations from developed countries in South-Eastern Asian countries. This process can be characterized as transition or transformation of social – economic development into a more complex economy with deep labor division. This

process facilitated mastering new skills and knowledge, transformation of education system and growth of healthcare system importance which eventually led to noticeable growth of human capital.

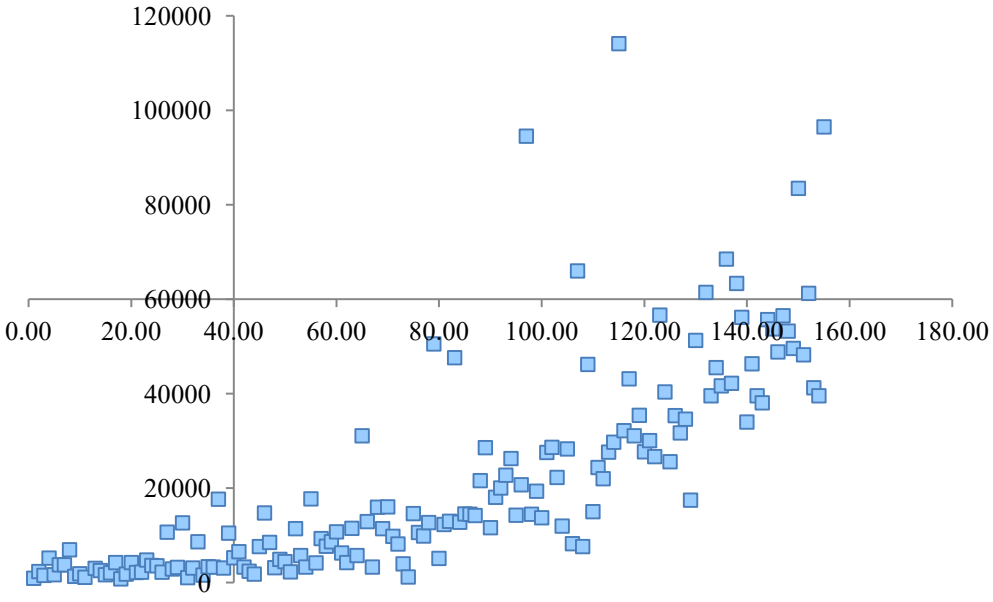
The process of highly qualified specialists' migration into other countries also was transformed by the need to meet new requirements and demand at the labor market. Some of these specialists had to master new skills and specializations, others integrated into academic communities with close communication and exchange of academic achievements, which facilitated new round of human capital accumulation in the host country.

Relocation of industrial resources was also uneven, therefore some South-Eastern Asian countries managed to transform existing human and industrial resources and move on to the level of developed countries. A vivid example of this is Singapore – world leader in innovations introduction and human capital level. Similar tendencies can be seen in the process of human capital transformation in South Korea, which is related to industrialization in 1970 – 1980s.

Industrialization undertaken by majority of countries in various periods during the 20th century allowed international economy to develop for 70 – 80 years. Larger duration of of modern technological cycle as compared to theoretical idea of technological waves span which according to Kondratjev is about 50 years (Kondratjev, 1922) can be explained by industrialization in different periods or relocation of industrial resources from developed to undeveloped countries (Alawamleh, 2019).

Relocation of industrial resources from USA, UK, Germany and other countries to South-Easter Asian countries prolonged the life of relocated technologies of the 4th and 5th order as manufacturing at these territories was conducted in an older technological order (Ren, 2020). However now this potential has come to an end, particularly in developed countries.

Analysis of interconnection between innovations and economic development according to per-capita GDP criteria demonstrated that at present only a small number of developed countries is mastering a new technological order (Fic. 3). Countries that demonstrate successful transition to the sixths technological order are the countries of so-called "capitalist core" - USA, Switzerland, UK, Sweden, etc. It is interesting to mention that Hong-Kong has already joined this group whereas China on average is in the fourth quadrant among catching-up countries.



Source: compiled on the basis of World Bank data and global innovation index

Figure 3: Interrelation between GDP per capita and innovation in 2018

Developed and developing countries in Europe are largely placed in the fourth quadrant and some move into the first quadrant. Most countries in the world are in the third quadrant and have less pronounced sensitivity to GDP which demonstrates not only the lagging of these countries but also difficulties in transition to new technological order because of discrepancy between accumulated human capital level an new digital economy environment.

Russia is in the third quadrant and is not yet in the group of catching-up countries, which implies that the climate for innovations is not altogether favorable. Negative tendencies for Russia can be explained by long period of innovation implementation at Russian companies as well as innovation imbalance3 in some branches and absence of modernization in other branches no less important for the economy. This affects the situation in the country as a whole.

5. Conclusion

As it was already mentioned at present developed countries are moving to the sixths technological order where state institutions play an important role in forming new environment for accumulating human capital. Russia with its high level of human potential is significantly lagging behind in terms of innovation development, which might indicate a weak role of state institutions in managing this process.

As the research demonstrates low level and quality of human capital create a situation in which investments into hi-tech branches do not provide adequate returns and this tends to worse in the context of technological order shift (Okada, K., 2018). Relatively dynamic progress achieved by Finland, Ireland, Japan, China, and Korea as compared to new European countries (Greece, Spain, Portugal) supports the conclusion that human capital formation is based on increasing level of education and culture of majority of the population in the given country.

As the research shows Russia has high level of human capital with high level of per-capita income in the country. The growth of international demand for raw goods, particularly hydrocarbons and metals during the last decade allowed the country to accumulate and upgrade the level of income. This accumulation resulted in the growth of income and strengthening the relation between human capital level and per-capita income in terms of GDP. According to research results Russia is in the first quadrant alongside with highly developed countries from Europe, America and Japan in terms of interrelation between per-capita GDP and human capital level.

Analysis of interrelation between innovations and human capital level showed less close correlation for several countries, including Russia (4th quadrant with high level of human capital and medium level of innovations in economy). Authors believe that less close correlation between these indicators reflects a longer period on innovation introduction in the companies as compared to other developed countries. We also believe that less sensitivity between innovations an human capital in case of Russia can be explained by uneven implementation of innovations in different branches of economy.

For example in export-oriented branches the process of innovation introduction and implementation goes much faster than in other sectors of economy. Such uneven spread can significantly decrease overall sensitivity of human capital as related to innovations. However we must say that Russia has good prerequisites for moving into the 1st quadrant which is characterized by higher returns on human capital for innovations.

At the same time the analysis of interconnection between GDP and innovations in the economy demonstrated that Russia is in the third quadrant together with the group of weakly developed countries with the opportunity for moving into the fourth quadrant. This situation can also indicate weak mechanism of broad introduction of innovations into the economy.

Creation of above – mentioned terms will create prerequisites for strengthening interrelation between human capital level and innovations, which in turn will strengthen the link between GDP and innovations. Without forming this important environment for innovation development Russia's transition to higher positions seems unlikely.

Acknowledgements

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References

21. *Goldin, Claudia.* - Human capital." In the Handbook of limetree edited by Claude Debolt and Michael John Haupert, 2016. Berlin: Springer. Pp. 55-86.
Alawamleh M., Ismail L.B., Aqeel. D. (2019). Bilateral relations between human capital investment and innovation in Jordan. Journal of Innovation and Entrepreneurship. Vol. 8. Is. 1. Pp. 1-17.
Amirat, A. Zaidi, M. (2020). Assessing Saudi Arabia's GDP growth under the Government Vision 2030: a Knowledge-based economy approach. Journal of Knowledge Economics. Vol. 11. Is. 3. Pp. 1145-1170.
Becker G. S. (1962). Investments in human capital: Theoretical analysis. Journal of Political Economy. Supplement.
Bondarenko G. I. (2003). Human capital as an indicator of the level of social development. Bulletin of the RUDN. №. 4-5. Pp. 159-165.
Bureau of Economic Analysis, Current Business Review, OECD. 1994, No. 11, pp. 37-71.
Campbell, S. G. Ungor, M. (2020). Revision of human capital and differences in Total Income. Economic modeling. T.91. Pp. 43-64.
Collin, Matthew, David N. Weil. The impact of increased investment in human capital on economic growth and poverty: A simulation exercise. Policy Research Working Paper 8590, World Bank, Washington, DC.
Jensen R. (2010).“(Perceived) Return to education and demand for school education."Quarterly economic Journal. №125 (2). Pp. 515-48.
Kapelyushnikov R. I., Lukyanova A. L. (2010). Transformation of human capital in Russian society (based on the "Russian monitoring of the economic situation and health of the population"). - 2010. p. 196.
Kondratiev N. D. (1922). World Economy and its Conjunctures during and after the War. 258 p.
Okada K. (2018). Dynamic analysis of demographic changes and accumulation of human capital in the R & D-based growth model. Journal of Economics. Vol. 130. Is. 3. pp. 225-248.
Patrinos, H. A., and Noam A. (2018) The Global Dataset on the Quality of Education: review and Update (1965-2018). Policy Research Working Paper 8592, World Bank, Washington, DC.
Ren S.M., Song Z.Y. (2020). Intellectual capital and firm innovation: incentive effect and selection effect. Letters on Applied Economics. Doi: 10.1080/13504851.2020.1767281
Ryazantzev S. V., Bozhenko V. V., Pazhnevsky Sh. Z. (2015). Trends of labor migration in the Russian Federation. New vectors of migration in the Eurasian space. Demographics. Sociology. Ekonomika. vol. 1, Moscow: Ekon-Inform.pp. 13-29.
Scognamillo A., Mele G., Sensini L. (2016). Non-renewable resources, Income inequality, and GDP per capita: An empirical analysis. Working Paper on Policy Studies No. 7831. Pp. 21.
Shultz T. V. (1962). Investment in a person. Chicago: University of Chicago Press.
Stetsenko Yu. S. (2010). The role of cultural and art institutions in the development of human capital. KE. No. 3.
Stiglitz J., Amartya S., Fitoussi J.P. (2009) "The measurement of economic performance and social progress has been revised."Document de Travail de l'OFCE No. 2009-33, Observatoire Francais des Conjonctures Economiques(OFCE). Paris.
Valishvili M. A., Nikitskaya E. F. (2015). Human capital in the context of innovative development of the regional economy. Fundamental Research. No. 2 (part 17). pp. 3785-3790.

The Impact of Contextual Factors on Entrepreneurship Education Outcomes

Anna Vuorio[1], Giulio Zichella[2] and Olukemi Sawyerr[3]
[1]School of Business and Management, LUT University, Lappeenranta, Finland
[2]Copenhagen Business School, Denmark
[3]California State Polytechnic University Pomona, USA
anna.vuorio@lut.fi
gz.om@cbs.dk
oosawyerr@cpp.edu
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Abstract: The question of who benefits from entrepreneurship education (EE) has puzzled both practitioners and academics alike. The results of EE impact research have been equivocal, and one suggested explanation is the influence of contextual factors such as the types of learning experiences, gender, and discipline. In this paper, we answer the question of which contextual factors shape the outcome of EE examining the outcome variables of entrepreneurial intentions (EI) and creative self-efficacy (CSE). We collected data between 2016-2018 in Denmark, Finland, and the United States using quasi-experimental pre-post survey design. The data consists of 210 students from three universities who were exposed to three different learning experiences, namely, writing a business plan, achieving proof of concept, and achieving proof of business. Through multi-value qualitative comparative analysis (QCA), the results show four unique combinations associated with high levels of EI after a learning experience. It seems that high EI is associated with developing proof of concept and proof of business, but not with writing a business plan. Also, students' fields of study and prior work experiences play a role in high levels of EI regardless of the learning experience. Similarly, seven unique combinations are connected to high levels of CSE. It seems that high levels of CSE after a learning experience are associated with achieving proof of concept and achieving proof of business, but not with writing a business plan. In addition, students' prior work experiences seem to play a role in CSE. These results imply that traditional business plan–based learning experiences may not generate the desired changes in attitudes from EE. Also, the results suggest that the effect that different learning experiences have on students may differ depending on contextual factors such as students' backgrounds including field of study and prior work experience.

Keywords: entrepreneurship education, learning experience, practice-oriented learning, QCA

1. Introduction

Entrepreneurship Education (EE) research has focused on entrepreneurial intentions (EI) as an indicator of EE programs' impact (Nabi et al, 2017). However, the results of prior literature on the effects of EE on EI have been mixed, ranging from positive influence (Bae et al., 2014) to no influence (Fayolle & Gailly, 2015) or negative influence (Oosterbeek et al, 2010). One reason for the equivocality is that prior studies have not considered the type of EE, whether theoretically or practically oriented (Piperopoulos & Dimov, 2015). EE impact research has also identified other outcomes of EE such as creativity perceptions. Although many studies have examined creative self-efficacy (CSE)and its impact on creative job performance, a smaller number of studies have examined CSE in the context of EE (Puente-Diaz & Cavazos-Arroyo, 2017).

There is a growing body of evidence in support of entrepreneurial pedagogies emphasizing learning-by-doing in developing entrepreneurial capacities including EI and CSE (Kuratko & Morris, 2018). However, there is limited evidence as to what is meant by learning-by-doing pedagogies and there is a need to compare different types of EE programs and their influence on different outcomes of teaching (Morris & Liguori, 2016). In addition, research has shown the impact of cognitive and behavioural factors on EE outcomes. Following causal complexity, multiple interconnected factors shape EI and CSE, and the same outcome may be achieved through multiple pathways. Prior research has shown that the level of EI and CSE are affected by factors such as prior work experience, entrepreneurial experience, discipline, and gender (Chen et al, 2002).

This study aims to tackle the above-mentioned issues by examining the impact of entrepreneurial learning experiences on EE outcomes of EI and CSE. The paper utilizes multi-value qualitative comparative analysis (mvQCA) approach. Configuration approach has been suggested to provide new insights about entrepreneurship (Douglas et al, 2020) and given that university students have various backgrounds, QCA allows us to examine entrepreneurial learning experience together with contextual factors to provide new insights and explanations about the effect of EE (Nabi et al, 2017).

2. Entrepreneurship education and entrepreneurial learning experiences

The main effect of EE on individual characteristics associated with successful entrepreneurial ventures is well supported in the literature. An important implication of this line of research is that characteristics that enhance the performance of the entrepreneurial firm can be taught through EE (Bae et al, 2014). Fisher et al. (2008) have defined entrepreneurship education as "the process of providing individuals with the concepts and skills to recognize opportunities that others have overlooked, and to have the insight, self-esteem, and knowledge to act where others have hesitated" (p. 315).

In response to calls for educational experiences that expose would-be entrepreneurs to real venture problems (Bird, 1995), entrepreneurship education has shifted from more programmed instruction to experiential learning (Mandel & Noyes, 2016). Different entrepreneurial learning experiences have been shown to have different effects on entrepreneurial outcomes (Nabi et al, 2017). In this paper, we distinguish three types of learning experiences: developing a business plan, proof of concept and proof of business. Developing a business plan typically consists of generating a document where several business-relevant elements essential when doing business are addressed. In the proof-of-concept students develop the business idea/plan into a working prototype, and address the technical feasibility, customer desirability, and venture viability of their prototype. Finally, in the proof of business students show the financial viability of their business plan and prototype by focusing on sales and profitability.

3. Entrepreneurial intentions as an outcome of entrepreneurship education

Intentions reflect the degree of effort and time individuals are willing to devote to successfully performing a specific behaviour (Ajzen, 1991). Entrepreneurial intentions (EI) – defined as individuals' propensities to act over a risky opportunity – are a powerful predictor of entrepreneurial entry and have been found to be important predictors of entrepreneurial behaviour (Krueger et al, 2000).

The main effect of EE on EI is well supported in the extant literature (see Bae et al, 2014, for a meta-analytic review). Many studies have provided evidence of a positive relationship between EE and the development and fostering of opportunity recognition (Bae et al, 2014; Fisher et al, 2008). However, others have not detected the impact of EE on EI (Fayolle & Gailly, 2015). More recently, it has been proposed that these mixed results might be due to pedagogical differences in approaches to entrepreneurship education. Piperopuolos and Dimov (2015) showed that the connection between self-efficacy and EI differs according to the type of EE, whether it is practically or theoretically oriented. As such, we expect the impact of entrepreneurship education program on EI to differ by type of program.

4. Creativity as an outcome of entrepreneurship education

Tierney and Farmer (2002) developed the CSE construct as an application of self-efficacy theory (Bandura, 1997) to employees' creative performance. Creativity is fundamental to the pursuit of innovative activities and it has been defined as the generation of useful ideas and solutions by individuals within an organization (Klijn & Tomic, 2010). CSE is employees' beliefs that they have the ability to produce creative outcomes in their work roles (Tierney & Farmer, 2002) and has been shown to positively relate to creative performance at work (Tierney & Farmer, 2011).

CSE has also been examined in the context of EE. Puente-Diaz and Cavazos-Arroyo (2017) found CSE to be a positive influence on university students' reproductive and creative imagination and originality. In addition, they found curiosity and perceived encouragement for creativity from professors to be predictors of CSE. Laguia et al (2019) found that past participation in a course related to creativity tended to increase CSE. Furthermore, creative problem-solving and creativity have been proposed as key competences that should be taught via EE (Kuratko & Morris, 2018; Morris et al, 2013).

5. Configurational enablers and barriers of entrepreneurship education

Configurational approach bases on causal complexity, which suggests that a specific outcome is generated by multiple different causal conditions (Ragin, 2008, 124), which is referred to as conjunction and equifinality. Conjunction explains how and why a configuration of different causal conditions (input variables) generate the outcome, while according to equifinality, a few configurations consisting of different causal conditions can result in the same outcome (Furnari et al, 2020). In the context of EE, this would suggest that the type of learning

experience is not the only thing that matters, but also prior experience, gender, and discipline (Fern, Cardinal, & O'Neill, 2012; Langowitz & Minniti, 2007; Parker, 2006). We argue that the fit between learning experiences' design and individual characteristics ultimately affect the effectiveness of EE (see figure 1).

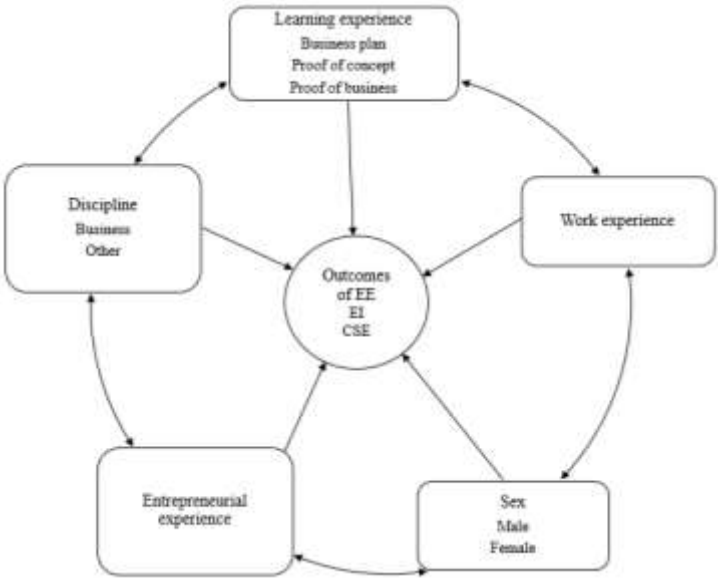

Figure 1: Configurational enablers and barriers of entrepreneurship education

6. Methodology and data collection

The paper follows quasi-experimental research with pre- and post-survey design, which has been used in the prior entrepreneurship education studies (e.g., Costa et al, 2018). The data was collected between 2016-2017 and 2017-2018 and it comprises of 209 university students from three countries, namely the United States (N=50), Denmark (N=138) and Finland (N=21). These students participated in three different learning experiences, in which the final deliverable varied (business plan, proof of concept and proof of business). Out of the 211 students, 24 participated in a learning experience, in which their task was to develop a business plan, 122 students had to demonstrate proof of business through prototype and pitching to investors, and 63 students were asked to demonstrate a proof of business through sales. The average age of respondents is 26 years.

6.1 Multi-value qualitative comparative analysis

Qualitative comparative analysis (QCA) is an analysis method that enables examination of configuration of input variables to a certain outcome variable. In this study, input variables include contextual factors and outcomes include EI and CSE. There are three forms of QCA, namely crisp-set, multi-value and fuzzy-set QCA (Thiem & Dusa, 2013). The simplest form of QCA is the crisp-set, which bases on Boolean minimization logic, and fuzzy-set bases on fuzzy logic, while mvQCA bases on multivalent logic, and as a result, categorical variables can be used to indicate membership in a specific category (Thiem, 2015). In other words, mvQCA enables inclusion of variables which reflect membership in multiple categories, but a case can only belong to a single category, e.g., traffic light with three different colours. Regardless of the type of QCA, the process for QCA is as follows: 1) calibrate dataset, 2) examine necessity and sufficiency of conditions, 3) form truth table, and 4) run systematic minimization to find configurations for a given outcome (Leppänen et al, 2019).

To calibrate the data, researcher sets thresholds for raw data scores to determine which respondents belong to the "fully in" or "fully out" membership class of a given condition (Douglas et al, 2020). Median values were used as base for calibration in the case of EI, CSE, prior entrepreneurial experience and prior work experience (see Table 1 below). Thus, inclusion threshold was set to six, while threshold for high prior entrepreneurial experience was set to two and prior work experience was set to five. The median was chosen due to skewness of the data: EI, CSE and work experience were positively skewed, while entrepreneurial experience was negatively skewed. Other variables were categorical.

The truth table was formed and following Douglas et al (2020) and Leppänen et al (2019), a consistency threshold of 0.80 was used to solve contradictions in the truth table. Consistency descries "the acceptable level of

dissimilarity" within a configuration that is associated with the outcome (Douglas et al, 2020). Additionally, the frequency cut-off was set to two cases, which resulted in losing only eight percent of the cases. The literature recognizes three types of solutions in QCA which are complex, parsimonious, and intermediate (Ragin & Sonnett, 2005). Complex solution bases only on empirical configurations of the observed data, and thus it is often referred to as conservative (Schneider & Wagemann, 2012, p. 162). Parsimonious solution includes logical reminders, which are theoretically possible configurations, in a form of simplifying assumptions to generate the simplest possible solution (Thiem, 2015). This means that the QCA enables inclusion of those configurations of conditions which are not present in data but are possible. Intermediate solution utilizes both complex and intermediate solution by relying only on easy counterfactuals as simplifying assumptions through setting directional expectations (Thiem, 2015). Thus, the researcher determines based on theoretical or case-based knowledge whether the condition is expected to be present, absent, or irrelevant for the outcome to be present. Not all simplifying assumptions are useful for minimization, e.g., pregnant non-female. To mitigate the risk of including untenable simplifying assumptions, contradictory simplifying assumptions were identified and excluded from the creation of intermediate solution.

6.2 Measures and descriptive analysis

The outcome variables of the study are EI and CSE. EI were measured via seven-point Likert-scale adopted from Liñán and Chen (2009) and one item from Davidsson (1995) and Autio et al (2001). To minimize common method bias, the scale was reversed. CSE was measured via Likert-scale ranging from 1-7 adopted from Tierney and Farmer (2002). Summated scales for EI and CSE were formed based on factor analysis. Due to a poor fit to a factor, items 6 and 7 for CSE were dropped. As suggested by the Cronbach's alphas (above 0.80), the measure can be deemed reliable (see Table 1). Both EI and CSE have been suggested to be affected by entrepreneurship education (e.g., Bae et al, 2014, Laguia et al, 2019). The following factors were included as input variables: sex (0=male, 1=female), discipline (0=non-business, 1=business), learning experience (0 =business plan, 1=proof of concept, 2=proof of business), entrepreneurial experience (consisting of multiple items ranging from 1 to 5) and work experience (ranging from 1 to 5).

Table 1: Descriptive analysis and cut-off values for calibration

	CA	Med.	Mean	St.d.	1	2	3	4	5	6	7	8
1. preEI	0.95	6.00	5.31	1.75	-							
2. postEI	0.96	6.00	5.24	1.82	0.72*	-						
3. preCSE	0.84	6.00	5.80	0.97	0.24*	0.30*	-					
4. postCSE	0.84	6.00	5.78	0.93	0.21*	0.32*	0.53*	-				
5. Ent. exp.	-	2.00	2.15	0.96	0.21*	0.08	0.19*	0.09	-			
6. Work exp.	-	4.00	4.11	1.05	0.16*	0.09	0.12	0.09	0.18*	-		
7. Sex	-	0.00	0.59	0.49	0.24*	0.13	-0.02	-0.10	0.06	0.08	-	
8. Discipline	-	1.00	0.70	0.46	0.26*	0.18*	0.05	0.08	0.25*	0.27*	0.29*	-
9. Lear. exp.	-	2.00	1.19	0.62	0.13	0.10	0.10	0.23*	-0.01	-0.01	-0.10	-0.04

Notes: pre=before learning experience, post=after learning experience, EI=entrepreneurial intentions, CSE=creative self-efficacy, Ent. exp.=entrepreneurial experience, Work exp. =work experience, Lear.exp. =learning experience, CA=Cronbach's alpha, St.d. =standard deviation.

7. Results

We analysed necessity and sufficiency of conditions. A condition is defined to be necessary for the outcome to exist if the consistency score is equal to or above 0.9 (Ragin, 2000). There are four distinctive configurations which are associated with high level of EI after a learning experience (see Table 2). These configurations cover 52 percent of cases in the sample (solution coverage), which is suggested to correspond to coefficient of determination in regression analysis (Douglas et al, 2020). The solution coverage is 0.92, which exceeds the threshold value of 0.80. The results show that none of the combinations include the business plan learning experience. Conversely, all the combinations include high level of EI before a learning experience and limited prior entrepreneurial experience.

Table 2: Analysis results for entrepreneurial intentions (outcome=post intentions)

High	1	2a	2b	2c	
Learning experience	❷	❶	❶	❶	
Entrepreneurial exp.	○	○	○	○	
Work experience	●			○	
Female		○	●	●	
Business major		○	●		
Pre-intentions	●	●	●	●	
Cases	15	8	37	21	
Consistency	0.94	1.00	0.89	0.95	
Raw coverage	0.14	0.07	0.29	0.18	
Unique coverage	0.14	0.07	0.13	0.02	
Solution consistency	0.92				
Solution coverage	0.52				

Non-high	3a	3b	4a	4b	5a	5b
Learning experience	❼	❼	❶	❶	❷	❷
Entrepreneurial exp.			●		○	
Work experience	○	●	●	●		●
Female	●	○	●	●		●
Business major		●	●	●	○	○
Pre-intentions		○		○	●	○
Cases	8	6	2	11	2	2
Consistency	1.00	1.00	0.67	0.75	0.77	1.00
Raw coverage	0.08	0.06	0.02	0.09	0.10	0.02
Unique coverage	0.08	0.06	0.02	0.09	0.10	0.02
Solution consistency	0.86					
Solution coverage	0.31					

Notes: Black circle denotes the presence of a condition: 2= proof of business, 1 = proof of concept, 0 = business plan. The size of the circle does not have any meaning. White circle denotes absence (or negation) of a condition. Blank space denotes that the condition is unimportant to a given configuration.

Pathway 1 shows the proof of business learning experience with students who have limited or no prior entrepreneurial experience), but with several years of prior work experience and high level of EI before the learning experience. We label the path *entrepreneurial-experience-accumulators*. Pathways 2a to 2c are the proof of concept learning experience, all three of which we label *novice-enthusiasts*. Pathway 2a) includes male non-business students with limited to no prior entrepreneurial experience and high levels of pre-learning experience EI; pathway 2b) are female students with limited or no prior entrepreneurial or work experience, but with high level of pre-learning experience; and pathway includes non-business students with no or limited prior entrepreneurial or work experience, but with high-level of pre-learning experience EI.

Six distinctive configurations are associated with non-high level of EI after the learning experience, which suggests that students with non-high post-learning experience EI did not benefit from their learning experience and are not likely to pursue entrepreneurship as a career. These configurations cover 31 percent of cases in the sample (solution coverage) and the solution coverage is 0.86. Pathways 3a and 3b include those students who participated in the business plan learning experience. We label pathway 3a *inexperienced-non-entrepreneurs*; it includes female students with low prior work experience. Neither discipline, pre EI level nor entrepreneurial experience seems to play a role in this configuration, suggesting that these students already know that they are not interested in entrepreneurship and their learning experience renders further support for their view. Pathway 3b includes male business students, who have work experience and non-high pre EI, thus the path is labelled *experienced-non-entrepreneurs*. It appears that writing a business plan does not seem to overcome these students' limited interest towards entrepreneurship. Pathways 4a and 4b comprise of female business students with high prior work experience and who participated in the proof of concept learning experience. Pathway 4a students have high prior entrepreneurial experience, while pathway 4b students have low pre learning EI level.

These students have experienced a more hands-on learning experience and it seems that their unwillingness to become entrepreneur has not changed. Thus, the path is labelled *convinced-non-entrepreneurs.* Pathways 5a and 5b include those students who have participated in the proof of business learning experience. Pathway 5a comprises of male non-business students with high pre-learning EI level and limited to no prior entrepreneurial experience. It seems these students have faced a reality check because of the learning experience and as a result their level of EI is not high after the entrepreneurial experience, thus the path is labelled *reality-checkers.* Pathway 5b includes female non-business students, who have high prior work experience and low pre-learning experience EI, thus the path is labelled *non-entrepreneurs.*

Four distinctive configurations are associated with high level of CSE after a learning experience. These configurations cover 41 percent of cases in the sample (solution coverage) and the solution coverage is 0.92, which exceeds the threshold value of 0.80 (See table 3). Pathways 6a and 6b are not associated with any learning experience. Pathways 7a and 7b are associated with those students who participated in the proof of business learning experience. Pathway 7a comprises of business students with limited to no prior entrepreneurial experience, who have high level of pre-learning experience CSE, thus the path is labelled *re-enforced-innovators.* Pathway 7b includes male non-business students who have limited to no prior entrepreneurial experience, but high prior work experience. The level of pre-learning experience CSE does not seem to matter to the configuration, thus the path is labelled as *creativity-appliers.*

Table 3: Analysis results for creative self-efficacy

High	6a	6b	7a	7b
Learning experience			❷	❷
Entrepreneurial experience	○		○	○
Work experience		●		●
Female	○	○		○
Business major			●	○
Pre-creative self-efficacy	●	●	●	
Cases	29	17	16	4
Consistency	0.91	0.96	0.94	1.00
Raw coverage	0.27	0.20	0.15	0.04
Unique coverage	0.08	0.04	0.08	0.02
Solution consistency	0.92			
Solution coverage	0.41			
Non-high	8	9	10a	10b
Learning experience		❼	❶	❶
Entrepreneurial experience	○	○	○	○
Work experience		●	○	○
Female	●	●	●	
Business major	○			○
Pre-creative self-efficacy	○	○	○	○
Cases	5	2	17	12
Consistency	1.00	1.00	0.88	0.92
Raw coverage	0.07	0.03	0.15	0.11
Unique coverage	0.06	0.02	0.15	0.11
Solution consistency	0.92			
Solution coverage	0.35			

Four distinctive configurations are associated with non-high level of EI (negation) after a learning experience. These configurations cover 35 percent of cases in the sample (solution coverage) and the solution coverage is 0.92. Pathway 8 is not associated with any learning experience. Pathway 9 consists of female students, who have limited or no prior entrepreneurial experience and high prior work experience, limited level of pre-learning experience self-efficacy and participated in learning experience with business plan. Thus, the path is labelled *experienced-disbelievers.* The pathways 10a and 12b are associated with the learning experience focusing on proof of concept. The pathway 12a includes female students with limited prior entrepreneurial and work experience and have limited level of pre-learning experience CSE. Thus, this path is called *inexperienced-non-innovators.* The pathway 10b includes non-business students with limited prior entrepreneurial and work

experience, who have limited level of pre-learning experience CSE. Thus, this path is also labelled *inexperienced-non-innovators.*

8. Discussion and conclusions

First, the results suggest that more experiential entrepreneurship education seems to be connected to high level of EI after an entrepreneurial learning experience. However, the results also suggest that that those who have entrepreneurial interest before learning experience get further re-enforcement for their thoughts, and those who do not really care about entrepreneurship, their views remain unchanged. Only individuals who already had high level of EI before participating in an entrepreneurial learning experience had high level of EI after the entrepreneurial learning experience. Only one configuration had students with high level of EI before going through a learning experience with proof of business and having medium to low level of EI after the learning experience, that of male non-business students. Thus, it seems that those with non-business background may face reality check when getting hands on entrepreneurial experience and as a result, their level of EI may decrease. Second, the results show that all configurations associated with high level of EI after learning experience contain limited or no prior entrepreneurial experience, while prior entrepreneurial experience does not seem to matter for medium and low level of EI after learning experience. This suggests providing further evidence of the re-enforcing role of EE on EI. The only exception includes females with both prior entrepreneurial and work experience. Third, in two out of four configurations for high post-EI, discipline played a role and in three out of four configurations, gender played a role. Similarly, both gender and discipline vary across all configurations for both high and medium or low EI after an entrepreneurial learning experience

Fourth, in the case of high level of CSE after a learning experience, there are two configurations that are associated with proof of business –learning experience, while the type of learning experience does not seem to matter for two configurations. For high level of CSE after a learning experience, proof of business is associated with two configurations, while it is not associated with any of the configurations with medium or low level of CSE after a learning experience. The level of students' CSE does not seem to be affected by any of the learning experiences. Students with high level of CSE after a learning experience had high level of CSE before the learning experience, and vice versa. In the case of proof of business, male non-business students with prior work experience and limited prior entrepreneurial experience, and business students with limited entrepreneurial experience seem to have high level of post-CSE. For proof of concept, female students with no or limited prior work and entrepreneurial experience, and non-business students with limited or no prior experiences seem have high level of post-CSE. Also, female students with high prior work experience and limited prior entrepreneurial experience in the case of business plans do not experience change in CSE. Female students with no or limited prior entrepreneurial experience and high level of pre-learning experience CSE, and male business students with high prior work experience and high level of pre-learning experience CSE, tend to have high post-learning experience CSE regardless of the type of a learning experience. Similarly, female non-business students with no or limited entrepreneurial experience and low or medium pre-learning experience CSE, tend to have low or medium after a learning experience regardless of the type of the learning experience.

Taken the results together, entrepreneurship education has limited potential in changing students' willingness to become an entrepreneur. It seems to rather act as a so-called testing board for students to try and see if entrepreneurship is really for them, or should they instead seek for employment in a company. Additionally, the use of mvQCA enables more detailed examination of outcomes of EE, thus contributing to the discussion on the effectiveness and role of EE in higher education.

References

Ajzen, I. (1991) "The Theory of Planned Behavior", *Organizational Behavior and Human Decision Processes,* Vol. 50 No. 2, pp. 179-211.

Bae, T. J., Qian, S., Miao, C. and Fiet, J. O. (2014) "The Relationship between Entrepreneurship Education and Entrepreneurial Intentions: A Meta-Analytic Review", *Entrepreneurship Theory and Practice,* Vol 38 No. 2, pp. 217-254.

Bandura, A. (1997) *Self-Efficacy: The Exercise of Control*, Freeman and Company, New York.

Bird, B. (1995). Towards a Theory of Entrepreneurial Competency. *Advances in Entrepreneurship, Firm Emergence and Growth*, Greenwich, Connecticut: JAI Press, 51-72.

Chen, G., Bliese, P.D., Payne, S.E., Webber, S.S., Mathieu, J.E., Born, D.H., and Zacharo, S.J. (2002) "Simultaneous Examination of the Antecedents and Consequences of Efficacy Beliefs at Multiple Levels of Analysis", *Human Performance*, Vol 14, No 4, pp 381-409.

Costa, S.F., Santos, S.C., Wach, D. and Caetano, A. (2018) "Recognizing Opportunities across Campus: The Effects of Cognitive Training and Entrepreneurial Passion on the Business Opportunity Prototype", *Journal of Small Business Management,* Vol 56 No. 1, pp. 51–75.

Douglas, E.J., Shepherd, D.A. and Prentice, C. (2020) "Using fuzzy-set qualitative comparative analysis for a finer-grained understanding of entrepreneurship", *Journal of Business Venturing,* Vol 35 No. 1, pp. 1–17.

Fayolle, A. and Gailly, B. (2015) "The Impact of Entrepreneurship Education on Entrepreneurial Attitudes and Intention: Hysteresis and Persistence", *Journal of Small Business Management,* Vol. 53 No. 1, pp. 75-93.

Fern, M. J., Cardinal, L. B., & O'Neill, H. M. (2012). "The genesis of strategy in new ventures: Escaping the constraints of founder and team knowledge." *Strategic Management Journal*, Vol 33, pp. 427-447.

Fisher, S., Graham, M. and Compeau, M. (2008) Starting from Scratch: Understanding the Learning Outcomes of Undergraduate Entrepreneurship Education. *Entrepreneurial Learning: Conceptual Frameworks and Applications*. Edited R. Harrison and C. Leitch. New York, NY: Routledge Studies in Entrepreneurship, 313-340.

Furnari, S., Crilly, D., Misangyi, V.F., Greckhamer, T., Fiss, P.C., and Aguilera, R.V. (2020) "Capturing Causal Complexity: Heuristics for Configurational Theorizing", Academy of Management Review [online] https://journals.aom.org/doi/10.5465/amr.2019.0298

Klijn, M. and Tomic, W. (2010) "A review of creativity within organizations from a psychological perspective", *Journal of Management Development,* Vol. 29 No. 4, pp. 322-343.

Kuratko, D.F. and Morris, M.H. (2018) "Examining the Future Trajectory of Entrepreneurship", *Journal of Small Business Management,* Vol 56 No.1, pp. 11–23.

Laguia, A., Moriano, J. A. and Gorgievski, M. J. (2019) "A psychological study of self-perceived creativity and entrepreneurial intentions in a sample of university students", *Thinking Skills and Creativity,* Vol 31, pp. 44–58.

Langowitz, N., & Minniti, M. (2007) "The entrepreneurial propensity of women." *Entrepreneurship Theory and Practice*, Vol 31, pp. 341-364.

Mandel, R. and Noyes, E. (2016) "Survey of Experiential Entrepreneurship Education Offerings Among Top Undergraduate Entrepreneurship Programs," *Education + Training*, Vol. 58 No. 2, pp. 164-178.

Nabi, G., Liñan, F., Fayolle, A., Krueger, N. and Walmsley,A. (2017). "The Impact of Entrepreneurship Education in Higher Education: A Systematic Review and Research Agenda", *Academy of Management Learning & Education,* Vol 16 No. 2, pp. 277–299.

Oosterbeek, H., van Para, M. and Ijsselstein, A. (2010) "The impact of entrepreneurship education on entrepreneurship skills and motivation", *European Economic Review,* Vol. 54 No. 3, pp. 442-454.

Piperopuolos, P. and Dimov, D. (2015) "Burst Bubbles or Build Steam**?** Entrepreneurship Education, Entrepreneurial Self-Efficacy, and Entrepreneurial Intentions", *Journal of Small Business Management,* Vol. 53 No. 4, pp. 970-985.

Puente-Diaz, R. and Cavazos-Arroyo, J. (2017) "Creative Self-Efficacy: The Influence of Affective States and Social Persuasion as Antecedents and Imagination and Divergent Thinking as Consequences", *Creativity Research Journal*, Vol 29, No 4, pp 304-312.

Ragin, C.C. (2000) *Fuzzy-Set Social Science*, University of Chicago Press, Chicago

Ragin, C.C. (2008) *Redesigning Social Inquiry: Fuzzy Sets and Beyond*, University of Chicago Press, Chicago

Schneider, C. Q. and Wagemann, C. (2012) "Set-theoretic methods for the social sciences: A guide to qualitative comparative analysis". Cambridge University Press: Cambridge, UK.

Parker, S. C. (2006) "Learning about the unknown: How fast do entrepreneurs adjust their beliefs?" *Journal of Business Venturing*, Vol 21, pp. 1–26.

Ragin, C. C. & Sonnett, J. (2005) "Between Complexity and Parsimony: Limited Diversity, Counterfactual Cases, and Comparative Analysis", in S. Kropp and M. Minkenberg, *Vergleichen in der Politikwissenschaft*. VS Verlag für Sozialwissenschaften: Wiesbaden, Germany, pp. 180-197.

Tierney, P. and Farmer, S. M. (2002) "Creative Self-Efficacy: Potential Antecedents and Relationship to Creative Performance", *Academy of Management Journal,* Vol. 45 No. 6, pp. 1137-1148.

Tierney, P. and Farmer, S. M. (2011) "Creative self-efficacy development and creative performance over time", *Journal of Applied Psychology,* Vol. 96 No. 2, pp. 277-293.

Thiem, A. (2015) "Parameters of fit and intermediate solutions in multi-value Qualitative Comparative Analysis", *Quality and Quantity,* Vol 49, pp. 657–674.

Thiem, A. and Dusa, A. (2013) "QCA: A Package for Qualitative Comparative Analysis", *The R Journal,* Vol 5 No. 1, pp. 87–97.

Female Founding: An Institutional Theory Perspective on the Effect of Gender-Specific Prejudices in Germany

Andreas Walkenhorst[1, 2], Christian Sturm[1, 2] and Natalie Westarp[1]
[1]accadis Hochschule Bad Homburg, Germany
[2]accadis Institute of Entrepreneurship, Bad Homburg, Germany
andreas.walkenhorst@edu.accadis.com
christian.sturm@accadis.net
natalie.westarp@accadis.net
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Abstract: This research is focused on whether female entrepreneurs face institutional discrimination based on prejudices. Therefore, in consideration of the institutional theory, this paper aims to clarify how informal institutions, such as norms, values and attitudes of society impact female entrepreneurship. To visualize these informal norms, values and attitudes of society towards women, common prejudices against women were utilized. The results revealed that the analyzed prejudices represent obsolete social perceptions against women which lack any validity and justification. However, these prejudices still negatively influence – directly or indirectly – the behavior, career choices, motivation and self-perception of female entrepreneurs.

Keywords: entrepreneurship, female entrepreneurship, institutional theory, prejudice

1. Introduction

In Germany, as a result of the declining labor market capacity and the positive development of the domestic economy, around 605.000 new businesses were created in 2019. However, when examining the new founded ventures in more detail, it is conspicuous that a divergence between male and female founders exists. In this context, the paper contributes to the current debate on economic parity for women in Germany and proposes measurements to exacerbate the contribution of women to economic and social success of society.

The reasons for the underrepresentation of women in entrepreneurial contexts are discussed in a variety of research domains. This circumstance is commonly attributed to ether personal or institutional aspects. For this reason, this paper examines the extent of institutional discrimination against women in the German entrepreneurial setting. In particular, this paper analysis the extent to which societal perceptions and attitudes, expressed through prejudices, influence the entrepreneurial activities of women, evaluating them in relation to a framework derived from institutional theory.

The paper is comprised of a literature-based discussion on the distinctive context of the German entrepreneurial setting and the role of female entrepreneurs as well as the role and potential impact of informal institution. To visualize these informal norms, values and attitudes of society towards women, common prejudices in Germany against women were utilized and tested for validity. Based on this conceptual background, the paper addresses the following questions: Does informal institutional discrimination in the entrepreneurial context against women exist in Germany? Do the considered prejudices represent obsolete social perceptions, or do they reflect societal reality? To what extent do women experience disadvantages as a result of informal institutional discrimination?

2. Literature review

Within the *New Institutional Economics*, institutions constitute the basis of economic activity. According to North (1990, 1995), these institutions, both formal and informal, are devised constrains which define the framework of interaction within politics, economy and society. In this regard, formal institutions relate to formalized constrains, including political, judicial and economic rules as well as contracts, whereas informal institutions relate to non-formalized, or uncodified constrains, such as norms, values, customs and traditions of society (North, 1995). Thus, institutions define the boundaries of entrepreneurial action. In this context, formal institutions provide the regulatory framework, while informal institutions constitute the societal accepted basis of entrepreneurship (Wade-Benzoni et al., 2002).

According to North (1990), informal institutions are, for example, customs, traditions, values and norms, which are specific to culture and thus, are deeply embedded in society. Both, North (1995) and Williamson (2000)

emphasis the path-dependency of informal institutions, describing the distinct influence of the past on the present and future. As a result of this, informal institutions change very slowly (Williamson, 2000).

Formal institutions, such as constitutions, common and specific (by)laws as well as contracts, govern interactions within complex societies and either complement or supersede informal institutions. According to North (1990, p. 47), formal institutions are characterized by a hierarchy, which "defines constrains, from general rules to particular specifications". Correspondingly, the hierarchy of formal institutions determines the importance for economic activity, as well as the necessary timeframe for institutional change (Williamson, 2000).

Within a liberal-democratic society, formal institutions are designed to be gender-neutral to prevent discrimination based on gender. Nevertheless, gender-specific formal institutions also exist to compensate for socially perceived disadvantages for - in this particular case - women. These specific formal institutions apply particularly to labor market and family policies (Welter & Smallbone, 2008).

In contrast, gender-specific informal institutions influence the status of women in society and their economic function. This applies especially to religion, customs and traditions (Welter & Smallbone, 2008). For instance, religious-based values might result in conflicting economic and societal functions of women, if societal expectations cause women to adhere to these regulations. Accordingly, societal expectations and attitudes influence the image of female entrepreneurs in particular, but also shape societal acceptance of female entrepreneurship in general (Welter, 2004;). Respectively, research has indicated that entrepreneurship is associated with predominantly male attributes, such as independence, aggressiveness and autonomy (Gupta et al., 2009). However, other cultural norms and values, such as the importance of the family and female participation in economic activities in general, also determine the role of female entrepreneurship (Welter & Smallbone, 2008). As a result of these differing societal expectations, tradeoffs between economic opportunities and family responsibilities may be expected. The conflicting objectives highlight the role of the family as both, a useful resource or possible constraint on female entrepreneurship. Thus, according to Welter and Smallbone (2008, p. 507), informal institutions "influence the responsibilities, tasks and the workload" of female entrepreneurs and define the "assistance from their milieu they might expect" when pursuing entrepreneurial opportunities.

Female entrepreneurship is influenced by a variety of factors, including the value attributed to female employment and the overall role of women in society (Achtenhagen & Welter, 2011). The rather traditional attitude of society towards working women in Germany is increasingly replaced by a more egalitarian attitude. (Rainer et al., 2018). This trend is reflected in the continually increasing numbers of working women in Germany: In 1959, women accounted for only 37,6% of the total workforce, whereas in 2019, this rate increased to almost 47,0% (Statistisches Bundesamt, 2020). However, nearly half of all working women are in part-time employment, which represents a compromise between the traditional role allocation in which women withdraw from the labor force after the birth of children, and men continue full-time employment.

The role of women in society has changed from a rather traditional attitude – which is based on the gendered division of labor - to a more egalitarian attitude (Rainer et al., 2018). This is in particular reflected in the changed attitude towards traditional role allocations between women (household and child rearing) and men (full-time employment). For instance, a survey by the Ifo Institute for Economic Research indicates that the support of a traditional allocation of roles has been declining drastically since the 1990s (Rainer et al., 2018). These changes in societal attitudes have been accompanied by political measures: This includes the recognition of mothers' child-rearing activities for pensions entitlements (maternity pension), the statutory right to daycare for children from the age of one year, as well as the systematic expansion of all-day care in schools.

Research indicates that career choices of women reflect societal attitudes and expectations regarding the 'correct' profession (Holst, 2002). This is particularly evident in most Western cultures, where entrepreneurship in particular, but economic activities in general, are mainly attributed with male characteristics (Ahl 2006). Schumpeter (1983, p. 93) already described the entrepreneur as a determined man, who is motivated by "the dream and the will to found a private kingdom, usually, but not necessarily, also a dynasty". This heroic, predominantly male glorification of the entrepreneur also applies particularly to the German society. Consequently, societal attitudes and "values implicitly understand women's entrepreneurship as less desirable and as an exception to the predominant male norm, which in turn affects the self-perceptions and individual attitudes of potential female entrepreneurs" (Achtenhagen & Welter, 2011, p. 768).

2.1 Gender-Specific prejudices in Germany

Within the socio-cultural perspective of psychology, prejudices are considered to be a norm embedded in the social environment (Duckitt, 1992), thus, prejudices can be considered informal institutions. The research within this perspective related to the influence of social norms on prejudice attitudes of individuals (Turner & Giles, 1981). Within this context, the emphasis is on two mechanisms primarily responsible for transmitting prejudice influences: Socialization and Conformity. The former relates to a gradual and complex process of learning and acquiring attitudes (Proshansky, 1966), the later relates to the embeddedness in a milieu with distinct discriminatory socio-cultural factors and attitudes (Pettigrew, 1958). In general, explicit and implicit prejudices are differentiated: Here, explicit prejudices refer to intentionally adopted negative attitudes based on distinctive characteristics, while implicit prejudices refer to unconscious associations that, nevertheless, negatively influence thinking and acting (Payne et al., 2010).

According to recent statistical surveys, approximately 63% of the German population have prejudiced attitudes towards women (United Nations Development Program [UNDP], 2020). In the following, the validity of the most common prejudices is tested:

"Women in Germany have a lower level of education than men"

The UNDP (2020) study indicates that 15% of the German society have prejudiced attitudes regarding the educational level of women. Yet 55% of all high school graduates (Statistisches Bundesamt, 2021a) and 49,8% of all university students (Statistisches Bundesamt, 2021b) are women. This demonstrates that no differences in educational levels between women and men prevail. However, the statistics prove that differences in the perused fields of studies exist. For comparison, in medical study programs women are represented at 68,1%, whereas in engineering women account for only 23,8% (Statistisches Bundesamt, 2021c).

"Women are untalented in science and technology"

As previously mentioned, no differences in educational levels between women and men exist. However, a detailed examination of natural science and technology-oriented study programs reveals, that within natural sciences (biology, chemistry, physics, and other) women represent approximately 47,1%, whereas only 23,2% female students study technology-oriented degree programs (engineering or computer sciences) (Statistisches Bundesamt, 2021c). The gender differences, which are particularly evident, are related to societal expectations regarding suitable occupations for women and men (Holst, 2002). Accordingly, this discrepancy is not related to women's ability or understanding, but to society's perception of a scientist or engineer, which are still male attributed.

"Women cannot be successful entrepreneurs"

Entrepreneurship is mainly attributed with male characteristics (Ahl 2006), however, this perspective is based on historic role allocations. These "gender stereotypes influence men's and women's perceived competence and worthiness of status in a particular context" (Eddleston et al., 2019, p. 619), causing women to question whether their entrepreneurial behavior meets societal expectations (Eddleston et al., 2019). As a result of this attitude, women are seen as less legitimate, credible and committed compared to their male counterparts. The resulting imposter fears are reducing women's desire for entrepreneurial activities. However, meanwhile, about 33% of all private businesses are women-owned (Halim, 2020). Although gender parity has not yet been achieved, there are sufficient examples of successful women entrepreneurs who are slowly changing the stereotype of the "male" entrepreneur.

"Women are not suitable for a management position"

Currently, around 15% of all board members of all companies listed in the Deutsche Aktien Index (DAX) are women. This demonstrates that, despite existing gender parity in the workforce, only few women reach top management positions in large German corporations. Yet, current surveys indicate that, a substantial majority supports an increase of women in top management positions (Wenter et al., 2019). In addition, current research suggests that corporations with greater representation of women in top management positions recognize an enhanced firm performance (Lyngsie & Foss, 2017).

The analysis reveals that prejudices represent obsolete social perceptions and lack any validity. However, these prejudices may still negatively influence the motivation and self-perception of businesswomen and female entrepreneurs.

3. Methodology

3.1 Aim and design

This study explores the possible impact of prejudices on female entrepreneurship. To determine in which stages of business creation, or entrepreneurial activities women are particularly disadvantaged by prejudices, expert interviews with female entrepreneurs in the Hoch Taunus Region, Germany, were conducted. A qualitative research design was chosen to examine the effects of prejudices and social expectations on various entrepreneurial activities.

3.2 Sample

The sample is composed of seven (n=7) female entrepreneurs, who established their business within the last ten years. Of these, four women founded a Start-Up, and three women are self-employed business owners. The enterprises operate in a variety of different sectors, including tourism, healthcare, consumer goods and consulting. The majority (86%) of the Start-Ups were financed by the founders' own capital, of which two received additional government funding. Only one of the seven Start-Ups (14%) received venture capital funding.

The Start-Ups were identified through in-depth research in business registers of the different cities and districts of the Hoch Taunus Region. For the selection of the organizations, two relevant criteria were applied: First, the majority of the business founders had to be women, second, the business must have been created in the past five years. Based on these criteria, a total of 32 potential enterprises were identified in the various company registers. Since the interviews were conducted in the first half of 2020, the low response rate of 22% can be explained by the impact of the initial "lockdown" in March and April as a response to the corona pandemic. An expansion of the database after the current “lockdown” is intended.

3.3 Data collection

Data was collected from participants via phone and/or video semi-structured interviews. To ensure an effective interview process, we followed the recommendations of Dresing and Pehl (2015). The first part of the interview focused on general information, such as structure, size, industry affiliation and business model of the organizations.

The second part of the interview related to the above discussed prejudices against women. In this section, the participants were asked about their business creation. In particular, the asked questions aimed to explore the disadvantages of women throughout the Start-Up founding process, seeking particularly to identify the influence of societal norms and values on their motivation and self-perception.

The last part of the interview consisted of demographic questions about the participant.

3.4 Data analysis

The analysis as based on the approach described by Mayring (2014) and was performed using three main sections: paraphrasing content-bearing passages, generalizing paraphrased content and categorizing new statements. As part of the first main section of the analysis, all non-substantial text segments were removed, and translated into a uniform language.

Within the second main section, the paraphrased content was generalized and abstracted. All similar paraphrased and generalized statements were combined. Similarly, all non-essential paraphrased and generalized statements were eliminated.

Finally, all paraphrased and generalized statements of individual interviews were combined and categorized. To ensure completeness and accuracy, the results were compared with the original material. For the evaluation and analysis, the software MAXQDA was used.

4. Results

Throughout the content analysis, four main categories emerged. All main categories consist of additional sub-categories that represent content variations.

Category	Sub-Categories
Female Entrepreneurs	Acceptance
	Opportunities and Risks
	Motivators and Goals
Women in Business	Career Opportunities
	Family and Career
	Women in Leadership
Education	School and University
	Entrepreneurship
	Technology & Science
Self-Perception	Skills and Competences
	Risk
	Success

4.1 Female entrepreneurship

The majority of the participants experienced a high level of *acceptance* towards the decision of starting a business, which is in particular evident in the support received by the personal and business environment. The women described the acceptance and support received: “We have received great feedback from family and friends […] but of course, in business you do not get anything for free, but still we have received a lot of support” (I5). Furthermore, the participants emphasized that the acceptance and positive encouragement they received was a significant motivating factor.

The participants consider entrepreneurship per se as an *opportunity* rather than a *risk*. This is primarily a result of the positive perception of advantages – which significantly exceed the disadvantages. In fact, many disadvantages associated with employment – insufficient career opportunities, incompatibility of family and career, etc. – are considered as non-existing in self-employment.

The described disadvantages of employment already describe essential *motivators* and *goals* of the female founders. In particular, the desire to organize family and career more flexible, as well as self-realization are important motivators. “I want to work on exciting projects […] however, in large corporations it´s all about managing the status quo” (I3). Among the most valued objectives of the participants is their own economic independence. Here, the primary is not financial dependence, but rather self-determined freedom.

4.2 Women in business

Prior to self-employment, all female entrepreneurs started their career in large corporations. However, they noticed that women still receive a significant lower salary compared to their male colleagues, and that *career opportunities* in large corporations are rather limited. “As a woman, it is still difficult to reach a senior management position, at least in some industries. In addition – and this is reflected in the statistics – women receive a comparatively lower remuneration despite equal qualification and tasks” (I4). Furthermore, the participants noted that balancing career (employee) and family remains at the expense of career opportunities. Self-employment, however, is considered an alternative to this.

Reconciliation of *family and career* is a topic of central importance. The participants reported that the reconciliation of career and family is in general considered critically by corporations. In this regard, participants experienced that absenteeism resulting from pregnancy, childbirth and parenting in particular are barriers to career. This is often the result of rigid and inflexible working arrangements in corporations, which complicate the reconciliation of career and family.

In addition, the interviewed female entrepreneurs mentioned that opportunities for *women* to advance to *leadership positions* are limited or predominantly restricted to male colleagues. “Besides the challenge of holding a leadership position, I also had to constantly prove myself to my male colleagues” (I6). The majority of the participants reported being underestimated regularly by both, male and female colleagues. According to the women entrepreneurs, this resulted in a change of behavior: The women acted more tough and professional. One of the interviewees elaborated, “Maybe that’s where the stereotype of the typical career women originates” (I1).

4.3 Education

Improved access to education is considered one of the most important economic success factors. However, the participants stated that *school* education in Germany doesn't properly prepare individuals for the challenges of being an entrepreneur. This applies to all possible degrees of the German school system. Moreover, even in *university* education, the training for entrepreneurial activities is inadequate. "General schooling, however, only helps in the formation of interest. A higher school or university eventually prepares for professional life - but unfortunately not for starting one's own business" (I5).

Entrepreneurship is an essential part of the economic system. According to the participants, the importance of entrepreneurial activities is well-recognized both in society and politics. Nevertheless, entrepreneurship and entrepreneurial skills are neither part of school nor university education. Although universities now offer a selection of programs, the women entrepreneurs noted that a combination of entrepreneurial and technical-application-oriented educational programs remain absent. "To start a business, it is not enough to know how to fill out a tax return or write a business plan. Technical knowledge for product development is just as essential" (I7).

In Germany, a gender-specific perception regarding the career choice of women and men still prevails, resulting in an underrepresentation of women in *technologically* and *scientifically* oriented professions. This fact was particularly criticized by the participants: "Even today, it is still rather unusual for a woman in Germany to pursue a technical or scientific degree" (I1). Therefore, it is often necessary for women entrepreneurs to either win a co-founder with the appropriate expertise or to acquire external know-how.

4.4 Self-Perception

The appropriate *skills* and *competences* are essential for creating a business; however, female entrepreneurs find themselves inadequately prepared for entrepreneurial activities. Partly, the participants attribute this lack of self-confidence to insufficient entrepreneurial education, as well as to society´s lack of confidence towards female entrepreneurship in general. "Without the appropriate education, doubts concerning one´s own abilities are – of course – normal, but the existing prejudices certainly increase the doubts" (I5). In addition, all interviewed female entrepreneurs reported that their skills and competences had been underestimated by business partner, bankers, and others, primarily on the basis of gender.

The assessment of the *risk* – with regard to entrepreneurial activities – is mainly depending on personal circumstances of the entrepreneur. Particular relevant influencing factors, with regard to the assessment of risks of entrepreneurial activities are age financial security and maternity. The risk associated with entrepreneurial activity is generally assessed lower by younger female entrepreneurs than by their older counterparts. Regardless of the age of the women entrepreneurs, the assessment of the risk decreases with increasing financial security, however, increases as a result of having children.

The participants define *success* beyond pure economic achievements. According to many of the interviewed women entrepreneurs, success is – of course – economically based, but also includes balancing work and family life. "I would consider my business as successful if I am more independent, have more financial freedom and can spend more time with my children" (I5). In addition, one interviewee noted that business development by women often require more time due to the double responsibility of work and family.

5. Discussion

This study highlights two essential insights: First, the prejudices against women analyzed in this study represent obsolete social perceptions, which lack any validity. Second, as a result of these prevailing prejudices, women entrepreneurs are still negatively affected – direct and indirect – by informal institutional discrimination in the German entrepreneurial context.

6. Indirect influence of prejudices

The indirect influence of prejudices on women´s entrepreneurial behavior is particularly evident in the choice of career and professional domain. Already in school, girls are confronted with prejudices such as *"Women are untalented in science and technology"*, thus resulting in stereotype threat. Gender-based prejudicial expectations are impairing women´s performance in natural and technology-based science, including math

(Ellison & Swanson, 2010), engineering (Logel et al., 2009) as well as chemistry and physics (Sunny et al., 2017). In addition, Cheryan et al. (2009) noted that stereotype threat not only impairs performance, but also increases women´s belonging concerns to a specific domain while at the same time decreasing their motivation to pursue a career within the particular domain.

The social restriction of women´s career choices inevitably minimize opportunities for female entrepreneurship. In particular, many of today´s innovative start-ups are founded in science-based or technological sectors. However, since women are underrepresented in these specific fields – especially as a result of stereotype threat – also fewer women are involved in start-up creations.

Current scientific debates attempt to elaborate and explain the reasons for women´s scarcity in senior management positions. In this context, personal and family responsibilities are reported as the main reason. The author Ellen Gilchrist (2002, p. 256) describes the family-work relationship as a "war, with guilt as their nuclear weapon and mutually assured destruction as their aim". Yet, these two factors – personal and family responsibilities – are based on societal stereotypes and prejudices. Stereotypes – generalized descriptive and prescriptive attributes shared by society – commonly associated with leadership include being White and Male. This stereotypical perspective of leadership can result in biased perceptions and evaluations of those who do not conform with the associated attributes. This perspective can contribute to the scarcity of women in senior management across various professions (Burgess et al., 2012).

In addition, prejudices such as *"Women are not suitable for a management position"* tend to reinforce stereotypical perceptions and thus resulting in stereotype threat. Thus, "the pernicious effects of gender stereotype-based threat can result in performance decrements that can accumulate over time and result in disengagement and decreased leadership aspirations" (Hoyt & Murphy, 2016, p. 388). This may be – at least partially – a reason why women are inadequately represented in firm succession.

6.1 Direct influence of informal institutional discrimination

In contrast to indirect influences – in particular those affecting behavior, career choices and motivation to pursue certain professions – several prejudices also directly influence women´s entrepreneurial activities. Prejudices as *"Women in Germany have a lower level of education than men"* actively degrade women´s qualifications. As a result, women experience a variety of barriers at work – generally referred to as the 'glass ceiling' – hindering advancements in career (Lyness & Heilman, 2006). Compared to men, women usually have fewer managerial responsibilities (Wajcman, 2013), receive less payment for same qualification and job (Aksoy et al., 2021) and also are less integrated in important networks with sponsors or mentors (Lyness & Heilman, 2006).

Overall, the prejudicial perception of women´s qualification results in a scarcity of women in top management positions.

The prejudice that *"Women cannot be successful entrepreneurs"* causes similar negative impact, affecting essential elements of the start-up founding process. In particular, start-up financing and entrepreneurial networking are affected. Current studies examine the impact of the personality, experiences, beliefs and perceptions of loan officers on the loan application process. The two studies – both based on UK data – conclude that gender-based differences are evident in the assessment criteria for approving loan applications and that these differences are independent of the gender of the loan officer (Carter et al. 200; Wilson et al. 2007). However, the reasons for gender discrimination are unclear. One possible explanation for this could be that, as a result of stereotypes and prejudices, loan offices discriminate – consciously or subconsciously – against women entrepreneurs.

7. Conclusion

Stereotypes and prejudices still significantly restrict women in Germany from engaging in entrepreneurial activities. This is partly attributed to the attitudes and values of women entrepreneurs, and partly to the attitudes and values of other stakeholders within the entrepreneurial context. Yet, these values and attitudes do not differ significantly, since both are based on the general attitudes and values of society. However, in entrepreneurship research the topic is currently insufficient considered, although it may provide a possibility to explain many of the differences between male and female entrepreneurs. Even in a liberal and democratic society such as Germany´s, informal institutions change slowly and are influenced by the past. However, not

only past values and attitudes are decisive. Many religions, for example, still propose a classical division of roles between men and women.

To better examine the influence of informal institutions, we propose to differentiate between direct and indirect influences. Here, we define indirect influences as those potentially influencing women´s attitudes and values – i.e., their self-image – in particular. These indirect influences are shaping behavior, career choices and motivation, however, do not directly affect economic or entrepreneurial success. Attitudes and values of other stakeholders within the entrepreneurial context however can directly influence female entrepreneurship. We are aware that direct influences – i.e. the assessment of negative effects for female entrepreneurs based on an individual's prejudices or stereotypes – will be extremely difficult to research.

In principle, we think that a more detailed examination of the negative effects of stereotypes and prejudices is necessary. As the initial data from our study suggests, outdated stereotypes and prejudices are still present in Germany´s society and in some cases have a significant influence on female entrepreneurs. The constant scientific examination of such stereotypes and prejudices can help to disprove them and thereby change existing informal institutions. On the basis of such scientific evidence, responsible actors from politics, science and education can derive and develop appropriate measures to minimize the effects of informal institutional discrimination.

References

Achtenhagen, L. and Welter, F. (2011) 'Surfing on the ironing board'–the representation of women's entrepreneurship in German newspapers. Entrepreneurship & Regional Development, 23(9-10), pp.763-786.

Ahl, H. (2006) Why research on women entrepreneurs needs new directions. Entrepreneurship theory and practice, 30(5), pp.595-621.

Aksoy, C.G., Özcan, B. and Philipp, J. (2021) Robots and the gender pay gap in Europe. European Economic Review, 134, p.103693.

Burgess, D.J., Joseph, A., Van Ryn, M. and Carnes, M. (2012) Does stereotype threat affect women in academic medicine?. Academic Medicine, 87(4), p.506.

Dresing, T. and Pehl, T. (2017) Praxisbuch Interview, Transkription & Analyse. Anleitungen und Regelsysteme für qualitativ Forschende. 5. Aufl. Marburg.

Ellison, G. and Swanson, A. (2010) The gender gap in secondary school mathematics at high achievement levels: Evidence from the American Mathematics Competitions. Journal of Economic Perspectives, 24(2), pp.109-28.

Gilchrist, E. (2002) The middle way: learning to balance family and work. The Bitch in the House, 26, pp.249-56.

Giles, H. and Turner, J.C. eds. (1981) Intergroup behaviour. Basil Blackwell.

Gupta, V.K., Turban, D.B., Wasti, S.A. and Sikdar, A. (2009) The role of gender stereotypes in perceptions of entrepreneurs and intentions to become an entrepreneur. Entrepreneurship theory and practice, 33(2), pp.397-417.

Halim, D. (2021) Women entrepreneurs needed—stat!. [online] World Bank Blogs. Available at: https://blogs.worldbank.org/opendata/women-entrepreneurs-needed-stat

Holst, E. (2002) Institutionelle Determinanten der Erwerbsarbeit–Zur Notwendigkeit einer Gender-Perspektive. Gender Matters, feministische Analysen zur Wirtschafts-und Sozialpolitik, edition sigma: Berlin, pp.89-109.

Ladge, J., Eddleston, K.A. and Sugiyama, K. (2019) Am I an entrepreneur? How imposter fears hinder women entrepreneurs' business growth. Business Horizons, 62(5), pp.615-624.

Logel, C., Walton, G.M., Spencer, S.J., Iserman, E.C., von Hippel, W. and Bell, A.E. (2009) Interacting with sexist men triggers social identity threat among female engineers. Journal of personality and social psychology, 96(6), p.1089.

Lyness, K.S. and Heilman, M.E. (2006) When fit is fundamental: performance evaluations and promotions of upper-level female and male managers. Journal of Applied Psychology, 91(4), p.777.

Lyngsie, J. and Foss, N.J. (2017) The more, the merrier? Women in top-management teams and entrepreneurship in established firms. Strategic Management Journal, 38(3), pp.487-505.

Mayring, P., 2014. Qualitative content analysis: theoretical foundation, basic procedures and software solution.

North, D.C. (1990) Institutions, institutional change and economic performance. Cambridge university press.

North, D.C. (1995) Structural-Changes of Institutions and Process of Transformation. Politicka Ekonomie, 43(5), pp.579-583.

Payne, B.K., Krosnick, J.A., Pasek, J., Lelkes, Y., Akhtar, O. and Tompson, T. (2010) Implicit and explicit prejudice in the 2008 American presidential election. Journal of Experimental Social Psychology, 46(2), pp.367-374.

Pettigrew, T.F. (1958) Personality and sociocultural factors in intergroup attitudes: A cross-national comparison. Journal of conflict resolution, 2(1), pp.29-42.

Proshansky, H. M. (1966) The development of intergroup attitudes. In L. W. Hoffman & M. L. Hoffman (Eds.), Review of child development research (p. 311–371). New York: Russel Sage Foundation.

Rainer, H., Albrecht, C., Bauernschuster, S., Fichtl, A., Hener, T. and Ragnitz, J. (2018) Deutschland 2017-Studie zu den Einstellungen und Verhaltensweisen der Bürgerinnen und Bürger im vereinigten Deutschland (No. 96). ifo Forschungsberichte.

Statistisches Bundesamt. (2020) Bevölkerung, Erwerbstätige, Erwerbslose, Erwerbspersonen, Nichterwerbspersonen [jeweils im Alter von 15 bis unter 65 Jahren]: Deutschland, Jahre, Geschlecht. Available at: https://www-genesis.destatis.de/genesis/online?sequenz=tabelleErgebnis&selectionname=12211-0001#abreadcrumb

Statistisches Bundesamt. (2021a) Schulen – Absolventen/Abgänger nach Abschlussart und Geschlecht. Available at: https://www.destatis.de/DE/Themen/Gesellschaft-Umwelt/Bildung-Forschung-Kultur/Schulen/Tabellen/liste-absolventen-abgaenger-abschlussart.html

Statistisches Bundesamt. (2021b) Bildung und Kultur – Schnellmeldungsergebnisse der Hochschulstatistik zu Studierenden und Studienanfängern/ -innen. Available at: https://www.destatis.de/DE/Themen/Gesellschaft-Umwelt/Bildung-Forschung-Kultur/Hochschulen/Publikationen/Downloads-Hochschulen/schnellmeldung-ws-vorl-5213103218004.pdf?__blob=publicationFile

Statistisches Bundesamt. (2021c) Studierende nach Semester, Nationalität, Geschlecht und Studienfach. Available at: https://www-genesis.destatis.de/genesis/online?sequenz=tabelleErgebnis&selectionname=21311-0003#abreadcrumb

Sunny, C.E., Taasoobshirazi, G., Clark, L. and Marchand, G. (2017) Stereotype threat and gender differences in chemistry. Instructional Science, 45(2), pp.157-175.

Wade-Benzoni, K.A., Hoffman, A.J., Thompson, L.L., Moore, D.A., Gillespie, J.J. and Bazerman, M.H., 2002. Barriers to resolution in ideologically based negotiations: The role of values and institutions. Academy of Management Review, 27(1), pp.41-57.

Wajcman, J. (2013) Managing like a man: Women and men in corporate management. John Wiley & Sons.

Wenter, G., Aichinger, E. and Wagner, G. (2019) Frauen und Führung. Deloitte Consulting GmbH. Available at: https://www2.deloitte.com/content/dam/Deloitte/at/Documents/consulting/at-deloitte-umfrage-frauen-und-fuehrung-2019.pdf

Welter, F. (2004) The environment for female entrepreneurship in Germany. Journal of Small Business and Enterprise Development.

Welter, F. and Smallbone, D. (2008) Women's entrepreneurship from an institutional perspective: the case of Uzbekistan. International Entrepreneurship and Management Journal, 4(4), pp.505-520.

Williamson, O.E. (2000) The new institutional economics: taking stock, looking ahead. Journal of economic literature, 38(3), pp.595-613.

Entrepreneurship Education and Emancipation: A Political Perspective

Andreas Walmsley and Birgitte Wraae
International Centre for Transformational Entrepreneurship, Coventry University, Coventry University, UK and Department of Applied Business Research, Faculty of Business and Technology, UCL University College, Denmark
ad3412@coventry.ac.uk
biwr@ucl.dk
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Abstract: The evaluation of entrepreneurship education's impact has caused much debate. In part this is driven by varying notions of what its purpose is. What we propose to do in this paper is extend these discussions into the political domain. While we recognise that entrepreneurship education is not typically associated with, or indeed even attempts to foster political change, we argue that in its essence it converges with Critical Pedagogy, especially in its empowering function (Santos et al., 2019). More directly Hägg and Kurczewska (2016) allude to Freire's (2005 (1972)) notion of *praxis* and its democratising function in relation also to entrepreneurship education. Taking this possible convergence between entrepreneurship education and Critical Pedagogy as a starting point for our exploration, we assess the extent to which EE leads to the growth in interest in politics and a greater willingness to engage in politics and therefore assumes a (political) emancipatory function. To test these ideas we draw on a sample of sixty Danish students engaged in entrepreneurship education. In a pre- and post-intervention design, we sought to establish the extent to which education develops a number of political attributes associated with emancipation: socio-political control, political interest, civic engagement and changes in political orientation in students. Although results were not conclusive, there was an indication that political measures had changed. Given the absence of research on the political outcomes of EE at the level of the individual this study sets the scene for further work in this area

Keywords: entrepreneurship education, critical pedagogy, politics, emancipation

1. Introduction

In recent years research in entrepreneurship has both increased in quality and diversity (Audretsch, 2012). Research in entrepreneurship education (EE) has likewise seen greater diversity as well as interest(Morris and Liguori, 2016, Rideout and Gray, 2013, Winkel, 2013). No longer are EE scholars content with outlining the 'what' of EE, questions are being raised about the 'how' and 'for whom' and also 'for what purpose' (Fayolle and Gailly, 2008, Lackéus, 2015).

As the benefits of being entrepreneurial in many spheres of life continue to be recognised (Gibb, 1993, Gibb, 2011, Wiklund et al., 2011), EE's reach is extending beyond a traditional focus on students in the business/economics discipline. What we aim to do here is continue with the exploration of the reach of EE beyond its traditional focus.

Specifically, we aim to explore the relationship between EE and a political emancipatory dimension. The rationale for this investigation is firstly a clear gap which exists in this regard. The relationship between EE and politics remains under-explored with no study to our knowledge trying to relate EE to the political domain. Indeed, more generally the relationship between entrepreneurship and a political dimension, notably democracy, has received very limited attention (Audretsch and Moog, 2020). Secondly, there are strong grounds to assume a relationship exists because as Soltis (1968) has argued, and others have confirmed (Rexhepi and Torres, 2011) education is never value-neutral.

2. Literature review

We propose that EE aligns with many of the traditional precepts of an emancipatory education aligned with Critical Pedagogy whereby its implications extend far beyond the economic, indeed, where the economic is not even the primary focus. Kuckertz (2021) for example writes about 'higher-order' consequences of EE and Bandera et al. (2020) write of unintended 'dark' consequences of EE. Thus, we can distinguish between deliberate and unintended or ancillary outcomes of EE.

It would be remiss not to mention that others have argued for a reorientation away from a pure economic focus in entrepreneurship research. Calás et al. (2009) make a case for a refocussing of entrepreneurship on social change. Rather than seeing social outcomes as a by-products of the economic, entrepreneurship as a social activity in itself. Similarly, Rindova et al. (2009) in the introduction to a special issue on entrepreneurship and emancipation define entrepreneuring not solely on the basis of economic change but as bringing about new social, institutional and cultural environments.

With regard to a critical pedagogy, we refer here to Freire's work (especially his seminal text: Pedagogy of the Oppressed). The parallels between Freire's thinking and entrepreneurship education have begun to attract interest. Santos, Neumeyer, and Morris (2019) for example, refer to his work in the exploration of the empowering function of EE in a poverty setting. Hägg et al.'s (2016)work revolves around Freire's concept of *praxis* understood as the interplay between action and reflection and how education is about individualisation and socialisation. Crucially for the purposes of our paper, Hägg et al. (2016) relate the idea of praxis to the purpose of education. They mention education "as a means for democratization and the development of liberate free-thinking individuals" (Hägg et al., 2016, p. 703) which they relate to the American progressive education movement, amonst whose adherents they include Freire. This seeking to change the system (politically and socially) lies at the heart of emancipation (Brown and Sakimoto, 2017; Inglis, 1997) whereby the notion of a liberate, free-thinking individual places this very clearly as much in the political domain, as it does the economic. This is where our paper departs from much previous work as we explore the extent to which EE holds within it the seeds of a political, emancipatory, dimension. Our research question therefore is: "To what extent does entrepreneurship education impact political attributes in students?"

As an exploratory study we draw on four constructs commonly used in political science that indicate an individual's engagement with politics. The four constructs we identified are: political interest, socio-political control, civic engagement and political orientation (see Figure 1).

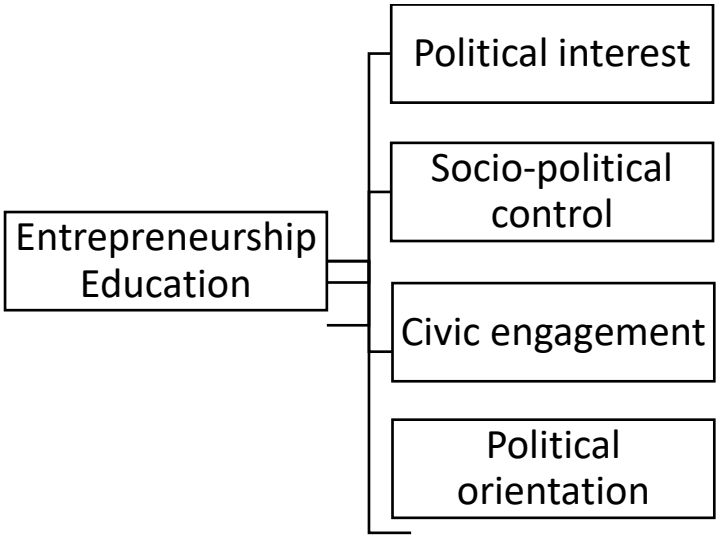

Figure 1: Hypothesised relationships between EE and political dimensions

These four constructs are further explained in the next section.

3. Methodology

The methodology underpinning our study is one of a pre- and post-test survey. The sample comprised a cohort of both Danish and International students students on an entrepreneurship programme at a university in Denmark. All students began their study September 2020 and were as such new students on the programme. First semester consists of six subjects related to EE, for instance entrepreneurship, the entrepreneurial mindset, the entreprenurial ecosystem, creative processes and business models combined with traditional subjects such as project management and philosphy of science.

The entrepreneurial learning approach is based on the learning principles used at Babson College (Neck et al., 2017, Neck et al., 2014) giving the students the tools to work with a business idea from very early on in the semester; 'doing by learning'. The business idea along with a prototype is assessed at an exam at the end of the

semester (December).The classes started with physical presence at the university but because of the pandemic classes went online.

The survey was designed in Survey X-act. The students got the link to the first of the two surveys the first day of the programme while attending in class while the second link was handed out as a part of an online class late November. The links were also posted on the online learning portal along with reminders to of the survey. 57 useable responses were received at timepoint 1 (T1) and 47 at timepoint 2 (T2). Unfortunately, although we asked students to provide a unique identifier across the two time points only 14 did. As such this limits the possibility of matching pairs as would for example occur in a paired T-test. Consequently, we did not use inferential statistics, and yet believe that the results still offer a first useful indication of the impact of EE on political outcomes as they relate to the individual.

3.1 Measures

Four measures were selected based on their prevalence in the literature and face validity in terms of providing access to any potential political change (see Figure 1). The four consructs that were used are as follows:

- Political interest (Prior and Bougher, 2018)

Political interest is the "relatively enduring predisposition to reengage" with political content over time. This measure was selected because a change in attitudes or beliefs on their own is insufficient to bring about change. Similar to socio-political control, political interest serves to move beyond solely assessing a change in political orientation.

- Socio-political control (Chan and Mak, 2020)

The Socio-political Control Scale measures participants' beliefs about their ability in social and political systems. It consists of 17 items that assess two dimensions of socio-political control, including leadership competence (i.e., perceived ability to organize a group of people) and policy control (i.e., perceived ability to influence policy decisions in an organization or community). This was included as a measure because it is important to understand the extent to which individuals believe they have control to shape the political domain. This aligns with entrepreneurship's action orientation and self-efficacy beliefs that are widely regarded as high for entrepreneurs.

- Civic engagement (Chan and Mak, 2020)

The Active and Engaged Citizenship Scale is an integrated measure that assesses civic engagement (Zaff et al., 2010). With this measure we are seeking to understand the extent to which EE leads to an increase in civic engagement.

- Political orientation (Oskarsson et al., 2015, van de Werfhorst, 2020)

This question draws primarily on Oskarsson et al. (2015) though to an extent also on van de Werfhorst's (2020) measurement of political orientation. Questions here relate to government policy on:

- Opinions on redistribution of wealth
- Immigration policy opinions
- Foreign policy attitudes

Political orientation was used as a measure to see the extent to which EE changes students' political orientation.

The survey at T2 also included some open-ended questions to try to help us strengthen claims of causality surrounding the impact of entrepreneurship education. The open-ended questions relate to students' own perception of themselves and whether that has changed because of the course and to a given change in their political views and engagement.

4. Results

In terms of gender split 46% of respondents were female, 54% male. 46% were Danish, 49% from other European countries, with the remaining 5% international beyond Europe. Respondents' mean age was 26.32 years with the youngest student 20 and the older 50. In terms of where respondents saw themselves on a 'social ladder' (1 being right at the bottom and 10 being right at the top) the mean score was 5.86. Most respondents (82%) congregated just slightly higher than the centre (5-7). No-one scored themselves higher than 8.

We hypothesised that EE would lead to a greater level of political interest. Using Prior and Bougher (2018) this was measured by response to the following statement: "Would you say you follow what's going on in government and public affairs? A comparison of means between t1 and t2 indicate an increase in interest in what is going on in Government (t1, $\bar{x}$ = 2.04; t2, $\bar{x}$ = 1.70; greater interest is indicated by a lower score).

Moving on to the development of socio-political control, we can see in Table 1 an increase across all 17 items barring the last two (Cronbach Alpha = 0.736 indicating a satisfactory level of reliability, 5-point Likert scale). This is a strong indication that there has been a change in students' perceptions of SPC although we also recognise that for some of the items the change is quite small, as is the change overall ($\bar{x}_{t1}$ = 3.32; $\bar{x}_{t2}$ = 3.49).

Table 1: Changes in socio-political control measures

	Pre	Post	Difference (Post-Pre)
I find it very easy to talk in front of a group	3.18	3.85	0.67
A person like me can really understand what's going on with government and politics	2.81	3.33	0.52
People like me are generally well qualified to participate in political activity and decision making in our country	2.63	3.02	0.39
I enjoy political participation because I want to have as much say in running government as possible	2.53	2.72	0.19
It is important to me that I actively participate in local issues	2.93	3.11	0.18
I am often a leader in groups	3.51	3.67	0.16
I feel like I have a pretty good understanding of the important political issues which confront our society	3.3	3.46	0.16
A good many local elections are important to vote in	3.39	3.52	0.13
I would prefer to be a leader rather than a follower	3.6	3.7	0.1
I would rather have a leadership role when I'm involved in a group project	3.49	3.59	0.1
Other people usually follow my ideas	3.75	3.85	0.1
I can usually organize people to get things done	3.98	4.07	0.09
There are plenty of ways for people like me to have a say in what our government does	3.09	3.17	0.08
It makes a difference who I vote for because whoever gets elected will represent my interests	3.47	3.54	0.07
Most public officials would listen to me	2.56	2.63	0.07
I like to work on solving a problem myself rather than wait and see if someone else will deal with it	3.96	3.85	-0.11
I like trying new things that are challenging to me	4.32	4.2	-0.12
Average	3.32	3.49	0.16

The next construct we focussed on is civic engagement using Chan and Mak's (2020) Active and Engaged Citizenship Scale. We performed reliability analysis using Cronbach's Alpha on the thirty items that make up the scale which resulted in a CA = 0.87 which indicates a high level of internal consistency. In contrast to the changes in socio-political control, although there was an increase in civic engagement, it was very small (0.05). We can see however that there was at the outset quite a high level of civic engagement across many of the items. Students scored particularly high on the wanting to 'make the world a better place' ($\bar{x}_{t1}$ = 4.30; $\bar{x}_{t2}$ = 4.42) and

the importance of helping other people ($\bar{x}_{t1}$ = 4.41; $\bar{x}_{t2}$ = 4.44). It was also clear that speaking up, expressing views, or engaging at a political level increased over the course of the programme.

Table 2: Change in civic engagement

	Pre	Post	Difference (post-pre)
Expressing my views in front of a group of people is something I would do	3.43	3.72	0.29
Contacting or visiting someone in government who represents my community is something I would do	2.77	3.05	0.28
Speaking up for equality (everyone should have the same rights and opportunities) is important to me	4.09	4.35	0.26
Help out at a school is something I would do	3.71	3.91	0.19
Contacting an elected official about the problem is something I would do	2.68	2.83	0.15
It's not really my problem if my neighbours are in trouble and need help*	2.87	3.02	0.15
I often think about doing things so that people in the future can have things better	3.88	4.02	0.15
I believe I can make a difference in my community	3.64	3.79	0.15
When I see someone being treated unfairly, I don't feel sorry for them*	3.37	3.49	0.12
Helping to make the world a better place to live in is important to me	4.30	4.42	0.12
When I see someone being taken advantage of, I want to help them	4.04	4.14	0.11
Helping to make sure all people are treated fairly is important to me	4.27	4.37	0.10
Volunteer your time (at a hospital, day care center, food bank, youth program, community service agency) is something I would do	3.80	3.91	0.10
Helping to reduce hunger and poverty in the world is important to me	3.93	4.02	0.09
Signing an e-mail or written petition is something I would do	3.52	3.60	0.09
In my neighbourhood, there are lots of people who care about me	3.11	3.19	0.08
Mentoring/peer advising is something I would do	3.91	3.95	0.04
It is important to me to contribute to my community and society	3.59	3.63	0.04
Contacting a newspaper, radio, or TV talk show to express your opinion on an issue is something I would do	2.64	2.67	0.03
Helping other people is important to me	4.41	4.44	0.03
Being a leader in a group or organization is something I would do	4.02	4.05	0.03
In my town or city, I feel like I matter to people	2.75	2.76	0.01
Tutoring is something I would do	3.64	3.65	0.01
Writing an opinion letter to a local newspaper is something I would do	2.75	2.74	-0.01
Helping to make my city or town a better place for people to live is important to me	3.62	3.56	-0.06
People in my town or city make me feel important	2.82	2.74	-0.08
People in my town or city listen to what I have to say	2.91	2.81	-0.10
Helping a neighbour is important to me	3.93	3.81	-0.11
I feel sorry for other people who don't have what I have	3.30	2.91	-0.40
My tutors really care about me	3.43	2.98	-0.45
Average	3.50	3.55	0.05

*Reverse coded

The last construct we looked at was political orientation. Here we asked five questions beginning with where on a scale of 1 to 10 students would place themselves on a scale of being political 'left' or 'right' (1 equals strongly left, and 10 equals strongly right). The mean score rose from 5.1 to 5.2 indicating a very small shift to the right though evidently still very central. Figure 1 provides a comparison over the two time points where we can see a shift towards both ends of the political spectrum, though again this shift is quite small and the almost symmetrical distribution of responses is notable.

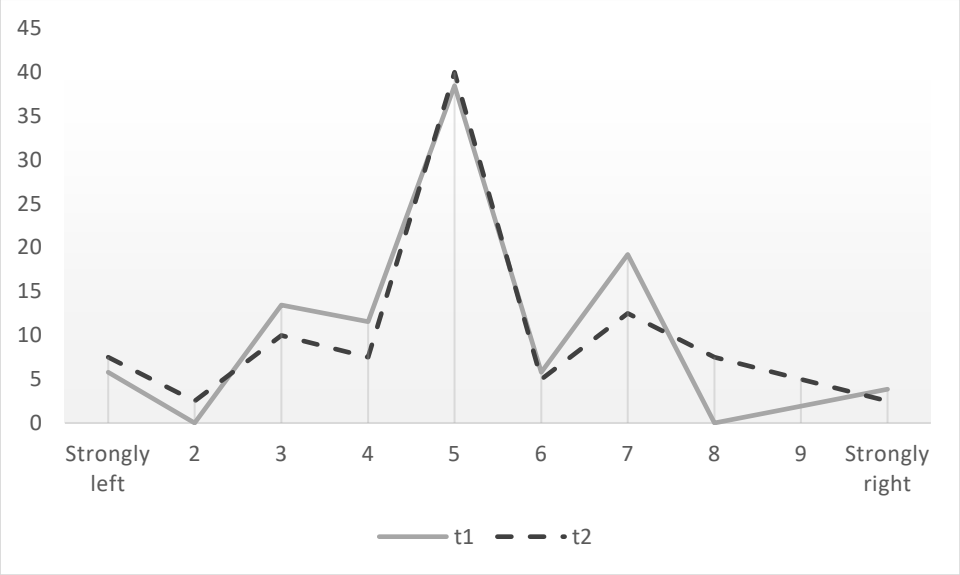

Figure 2: Political orientation (%)

Table 3 indicates a move towards a more liberal political orientation. Although there was only a minimal change with regard to how the government should deal with income inequality, with regard to immigration attitudes became more liberal across all three measures (albeit starting from a high base).

Table 3: Political orientation

	Pre	Post	Difference (Post-Pre)
To what extent do you agree or disagree with the following statement: "The government should take measures to reduce differences in income levels" (1 = strongly disagree; 5 = strongly agree)	3.28	3.27	-0.01
Would you say it is generally bad or good for Denmark's economy that people come to live here from other countries? (0=bad for the economy; 10 = good for the economy)	7.47	8.02	0.55
Would you say that Denmark's cultural life is generally undermined or enriched by people coming to live here from other countries? (0 = cultural life undermined; 10 = cultural life enriched)	7.68	8.44	0.76
Is Denmark made a worse or a better place to live by people coming to live here from other countries? (0 = worse place to live; 10 = better place to live)	7.87	8.24	0.37

Qualitative comments were also collected in relation to how individuals felt they had changed and also what brought about any changes. Many students provided an indication that they had not changed, or did not feel they had changed, certainly not in terms of political outlook or civic engagement (changes in skills and confidence were mentioned more frequently). In a few cases the impression was gained that students were reluctant to acknowledge change, as though changing one's views was a sign of weakness: "There have been no changes because I have fixed convictions", or "It didn't change much because education like this one can change how I think and what tools I have but cannot change how am I. "

There were exceptions however with some students referring to the coming together of different people with different backgrounds as resulting in a change in political outlook: "I had the opportunity to work with many different groups, and in that way to collaborate with personalities that are quite different from mine." It was evident that some students were more self-reflective and self-critical in their reflections on potential change. Overall, though there was little that indicated a direct link between EE specifically and change in the political measures here this contrasts to a degree with the statistical measures we used. Although we did not test for statistical significance, for reasons already mentioned, there is some evidence that political measures did change. We could interpret this result as being too small for respondents to notice, i.e. they were not conscious of the change themselves.

5. Conclusion

This study has contributed to our understanding of the impact of entrepreneurship education in offering a, to our knowledge, first attempt at measuring its impacts on political, thereby emancipatory, outcomes as they relate to the individual. Overall, we have found a fairly consistent change in the constructs we measured across time points 1 and 2 towards a more politically oriented individual. We recognise however the limitations that are apparent in our study relating to relatively small sample size and the absence of statistical inference. We also recognise that any change in political outcomes could equally relate to other factors, most obviously it could be HE attendance in general rather than the EE programme that led to the observed changes. There is further scope to extend our research and we hope out study offers others a platform for doing so. More specifically a number of further avenues for research could be envisaged as a result of our efforts, notably:

Further testing/replication of our study in other scenarios including larger samples and the possible inclusion/identification of moderating and mediating variables (given our sample size this is not something we tested for here). Moderating variables could, for example, relate both to general demographic factors (gender, age, ethnicity) but also to variables that we assume could make a difference (e.g. levels and type of prior education, family background, socio-economic class etc.).Further work on the constructs we have adopted from political science literature to test and adapt them to an EE scenario. Further conceptual work on the relationship between alternative pedagogical approaches in EE, including critical pedagogy, and political outcomes.

We also believe that our study contributes to the body of knowledge accumulating on entrepreneurial ecosystems. Rather than just finding themselves in an environment, we believe the entrepreneur could play an active role in shaping their environment via political engagement. The extent to which entrepreneurs believe this to be the case, and possibly even engage in political activity could be of interest to the research community. Ultimately, our study supports the idea of the entrepreneur as an active shaper of the entrepreneurial ecosystem (Drakopoulou Dodd and Anderson, 2007).

At a broad level, the proposed study offers entrepreneurship educators a fuller appreciation of the place of their subject within educational theory. It should help make sense of the 'political potential' inherent in EE and here parallels could be seen with Critical Pedagogy and associated education theory and movements. This could then have implications for practice in, for example, the development of self-efficacy and autonomy leading to emancipation and empowerment (not solely economic empowerment but also political empowerment). We recognise EE takes place within an institutional setting (Brush, 2014) and so educators need to be aware of how their own values align (or not) with the institutional parameters that will, to an extent, bind them (Wraae and Walmsley, 2020). Although much EE focuses on business start-up, we agree with Neck and Corbett (2018) that the skills and competencies developed as part of EE may lead to more productive lives. Here we extend the discussion of what this might mean into the political arena.

References

Audretsch, D. 2012. Entrepreneurship Research. *Management Decision,* 50**,** 755-764.

Audretsch, D. & Moog, P. 2020. Democracy And Entrepreneurship. *Entrepreneurship Theory And Practice*.

Bandera, C., Santos, S. C. & Liguori, E. W. 2020. The Dark Side Of Entrepreneurship Education: A Delphi Study On Dangers And Unintended Consequences. *Entrepreneurship Education And Pedagogy***,** 2515127420944592.

Brown, C. & Sekimoto, S. 2017. Engaging Critical Pedagogy In The Classroom: A Student-Centered Approach To Advertising Education. Journal Of Advertising Education, 21, 18-24.Brush, C. 2014. Exploring The Concept Of An Entrepreneurship Education Ecosystem. *In:* Hoskinson, S. & Kuratko, D. (Eds.) *Innovative Pathways For University Entrepreneurship In The 21st Century.* Emerald Group Publishing.

Calás, M. B., Smircich, L. & Bourne, K. A. 2009. Extending The Boundaries: Reframing "Entrepreneurship As Social Change" Through Feminist Perspectives. *The Academy Of Management Review,* 34**,** 552-569.

Chan, R. & Mak, W. 2020. Empowerment For Civic Engagement And Well-Being In Emerging Adulthood: Evidence From Cross-Regional And Cross-Lagged Analyses. *Social Science & Medicine,* 244.

Drakopoulou Dodd, S. & Anderson, A. 2007. Mumpsimus And The Mything Of The Individualistic Entrepreneur. *International Small Business Journal,* 25**,** 341–360.

Fayolle, A. & Gailly, B. 2008. From Craft To Science: Teaching Models And Learning Processes In Entrepreneurship Education. *Journal Of European Industrial Training,* 32**,** 569-593.

Freire, P. 2005 (1972). *Pedagogy Of The Oppressed,* Continuum, New York.

Gibb, A. 1993. The Enterprise Culture And Education. Understanding Enterprise Education And Its Links With Small Business Entrepreneurships And Wider Educational Goals. *International Small Business Management Journal,* 11.

Gibb, A. 2011. Concepts Into Practice: Meeting The Challenge Of Development Of Entrepreneurship Educators Around An Innovative Paradigm: The Case Of The International Entrepreneurship Educators' Programme (Ieep). *International Journal Of Entrepreneurial Behavior & Research,* 17**,** 146-165.

Hägg , G. & Kurczewska, A. 2016. Connecting The Dots – A Discussion On Key Concepts In Contemporary Entrepreneurship Education. *Education + Training,* 58**,** Tbc.

Inglis, T. 1997. Empowerment And Emancipation. Adult Education Quarterly, 48, 3-17.

Kuckertz, A. 2021. Why We Think We Teach Entrepreneurship - And Why We Should Really Teach It. *Journal Of Entrepreneurship Education,* 24**,** 1-7.

Lackéus, M. 2015. Entrepreneurship In Education. What, Why, When And How. Paris: Oecd.

Morris, M. H. & Liguori, E. 2016. Preface: Teaching Reason And The Unreasonable. *In:* Morris, M. H. & Ligouri, E. (Eds.) *Annals Of Entrepreneurship Education And Pedagogy.* Northampton, Ma, Usa: Edward Elgar Publishing.

Neck, H. & Corbett, A. 2018. The Scholarship Of Teaching And Learning Entrepreneurship. *Entrepreneurship Education And Pedagogy,* 1**,** 8-41.

Neck, H., Greene, P. & Brush, C. 2014. *Teaching Entrepreneurship: A Practice-Based Approach,* Cheltenham, Uk, Edward Elgar.

Neck, H., Neck, C. & Murray, E. 2017. *Entrepreneurship. The Practice And Mindset.*, Sage Publications.

Oskarsson, S., Cesarini, D., Dawes, C. T., Fowler, J., Johannesson, M., Magnussen, P. K. E. & Teorell, J. 2015. Linking Genes And Political Orientations: Testing The Cognitive Ability As Mediator Hypothesis. *Political Psychology,* 36**,** 649-665.

Prior, M. & Bougher, L. 2018. "Like They've Never, Ever Seen In This Country"? Political Interest And Voter Engagement In 2016. *Public Opinion Quarterly,* 82**,** 822-842.

Rexhepi, J. & Torres, C. A. 2011. Reimagining Critical Theory. *British Journal Of Sociology Of Education,* 32**,** 679-698.

Rideout, E. & Gray, D. 2013. Does Entrepreneurship Education Really Work? A Review And Methodological Critique Of The Empirical Literature On The Effects Of University-Based Entrepreneurship Education. . *Journal Of Small Business Management,* 51**,** 329-351.

Rindova, V., Barry, D. & Ketchen, D. 2009. Introduction To Special Topic Forum: Entrepreneuring As Emancipation. *Academy Of Management Review,* 34**,** 477-491.

Santos, S. C., Neumeyer, X. & Morris, M. H. 2019. Entrepreneurship Education In A Poverty Context:An Empowerment Perspective. *Journal Of Small Business Management,* 57**,** 6-32.

Soltis, J. 1968. *An Introduction To The Analysis Of Educational Concepts,* Reading, Addison Wesley.

Van De Werfhorst, H. G. 2020. Are Universities Left-Wing Bastions? The Political Orientation Of Professors, Professionals, And Managers In Europe. *The British Journal Of Sociology,* 71**,** 47-73.

Wiklund, J., Davidsson, P., Audretsch, D. & Karlsson, C. 2011. The Future Of Entrepreneurship Research. *Entrepreneurship Theory And Practice,* 35**,** 1-9.

Winkel, D. 2013. The Changing Face Of Entrepreneurship Education. *Journal Of Small Business Management,* 51**,** 313-314.

Wraae, B. & Walmsley, A. 2020. Behind The Scenes:Spotlight On The Entrepreneurship Educator. *Education & Training,* 62**,** 255-270.

Conceptualizing Consumer Rationality Through the Narrative of Dissatisfaction

Ignasius Heri Satrya Wangsa
Universitas Katolik Musi Charitas, Palembang, Indonesia
ignherisw@oum.edu.my
ig_heri@ukmc.ac.id
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Abstract: Within the assumption of economic rationality consumer has treasured sufficient resources to make the best decision that lead him to satisfaction. Meanwhile it may happen the condition of dissatisfaction. Consumer may not be able to get what he expects. By mixed-method approach the concept of need-benefit relevance in the narrative of consumer's dissatisfaction is explored. Results show pattern of participants' narrative that significantly indicate the dynamic change of need and creative efforts by the business to offer various level of product benefit. This conceptual research may contribute references in Consumer Behaviour specifically in the integrated areas of consumer's need, product benefit and need-benefit relevance.

Keywords: consumer's need, product benefit, need-benefit relevance

1. Introduction

Consumer has resources to make his best decision. In the context of economic rationality consumer's best decision refers to his capability to recognize the benefit of the product that fits with his need (Arcidiacono, 2011 ; Balakrishnan et. al., 2000). It is within product capacity to maximize its benefit that the condition of consumer's satisfaction will be created. This perspective introduces the discourse of dissatisfaction as the falling of ideal condition which is experienced by consumer in his effort to satisfy his need (Liu & McClure, 2001 ; Yang & Mattila, 2012).

The phenomenon of dissatisfaction is in contrast with consumer's authority (Smith, 1987) to choose the relevant product benefit. As the rationality would always be directed to the fullfilment of expectation, the dissatisfaction seems to be in the opposite direction. Meaning to say the rationality does not seem to work in dealing with the best decision that leads to consumer satisfaction (Escalas, 2004).

Economic rationality has so far been directed to the discussion of need and product benefit. There is an interactive process of consumer's engagement in choosing the relevant product benefit. While the nature of rationality in economic perspective is to find the relevance between need and product benefit, indeed it is not always a successful effort (Bettman et. al., 1998). Within trend of competitive environment consumer's need might be challenged by the attractivenes of product benefit. Innovative mindset of the business have been able to produce various level of benefit covering all aspects of human need.

It is common to know the reality of competitive environment where creativity and innovation have led the business to employ their best resources ie. the creation of product benefit in order to win the competition and the heart of consumer as well. As technology has become part of the industry the demand for efficiency is growing.

This conceptual article aims at finding pattern of consumer's dissatisfaction narrative that may contribute references in Consumer Behaviour specifically in the integrated areas of consumer's need, product benefit and need-benefit relevance

2. Theoretical review

Bruner (1986, 1990) in Escalas (2004) explains how people use written expression as manifestation of their experiences. This will be the foundation that the narrative is a common way to tell about connectivity. Connectivity refers to the interactional producer-consumer where the process of satisfaction takes place (Yang and Matilla, 2012). In the economic activity setting the interaction is made between those who intend to exchange their resources. The exchange itself is conditioned within the atmosphere of getting connected. In other words, those involved in this connectivity may have equal capacity exchanging their resources in a single

motive ie. need fulfillment. While rationality refers to careful consideration of resource allocation, it drives the actors in the commitment of maximum satisfaction (Gottman, 1959 in Arcidiacono 2011:6). The relational commitment between consumer and producer is that they have different interpretation of value. Consumer would always seek value following the motive of need fulfillment so that maximum satisfaction could be achieved (Balakrishnan et. al., 2000). Likewise, producer would find the way maximizing the profit by creating marketable values (Strong, 1997; Carrigan & Attalla, 2001 ; Marguerat & Cestre, 2004 in Arcidiacono 2011:6).

Liu and McClure (2001) have explored pattern of post-purchase dissatisfaction and classification of consumer complaint and introduced the concepts of collectivism and individualism in the discourse of dissatisfaction. This perspective of the externality has expanded the conceptual discussion of dissatisfaction into multi-cultural space ie. certain cultural context contributes to the expression of dissatisfaction. In the culture of collectivism the expression is more reserved and people might withdraw from telling something in a direct manner as required by the collective agreement or social norm. On the contrary, the culture of individualism has given more space for direct expression.

In the frame of producer-consumer connectivity the function of exchange is targetted to the highest performance. Yang and Mattila (2012) proposed the concept of failure in which the connectivity is failed. This gives idea that the dissatisfaction issue is related to the unsuccessful relation between producer and consumer. The creative business-mindset which is manifested through the creation of product benefit fails to get connected with market demand. On the other side, consumer has difficulty to perceive product benefit.

The proposed notions in the consumer rationality adapted from Bettman et. al. (1998, p. 189) can be described as follow: (1) Decision making and related factors ie. total amount of information processed, the selectivity in information processing, and the pattern processing; (2) Choice and the problem of options, attributes, and values of the attributes; (3) The environmental traits (Dijksterhuis et, 2005, p. 193).

Based on the above theoretical view, content analysis framework is proposed as the followings diagram (see Figure 1 and Figure 2). Those diagrams explain the territory that is used to mediate insightful discussion related to consumer rationality in the narrative of dissatisfaction. There are two territories that are used to facilitate the understanding of consumer rationality. First, the application of three concepts of dissatisfaction as the problem of disconfirmation of expectation, perceived attribution, and equity. Second, the use of two relevant keywords ie. need and product benefit.

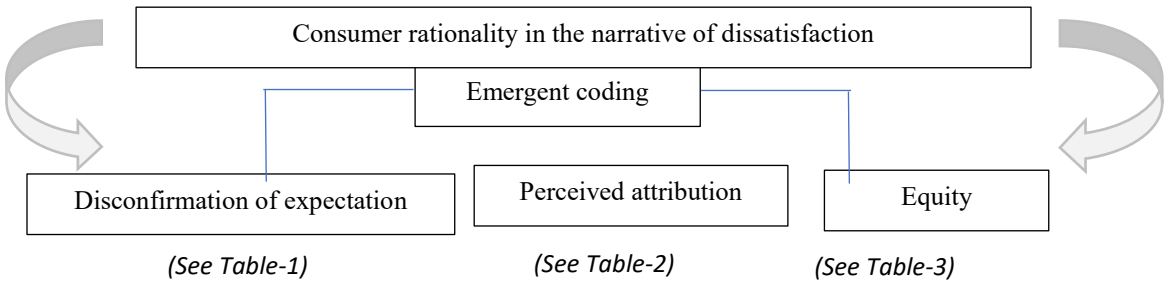

Figure 1: Content analysis framework (1) through emergent coding

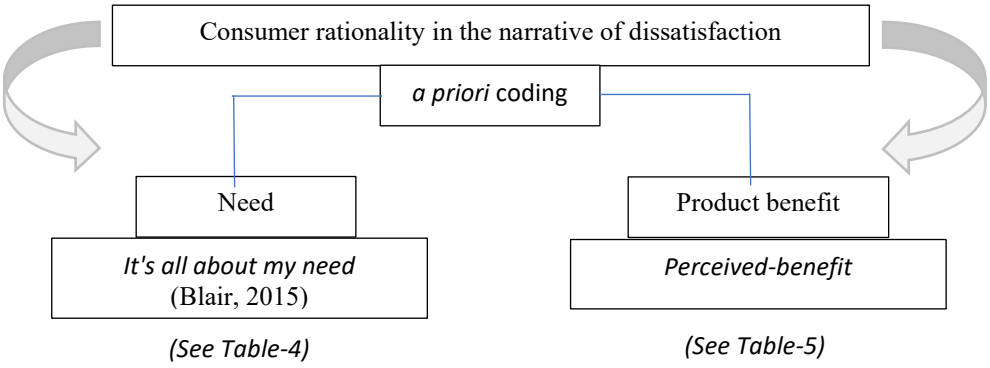

Figure 2: Content analysis framework (2) through *a priori* coding

Figure 2 shows the discourse of consumer rationality in the narrative of dissatisfaction which is explored by the application of emergent coding technique. The exploration covers three areas related to consumer rationality in the narrative of dissatisfaction. They are disconfirmation of expectation, perceived attribution and equity. The objective is to produce supported proposition that would explain need-benefit relevance. In Figure 3 *a priori* coding is applied, and the two related keywords are used. They are need and product benefit. The purpose is to validate the possible relevance between need and benefit.

3. Research method

Participants were selected among undergraduate students at the Faculty of Business and Accountancy - University "X" Palembang-Indonesia taking Marketing Management subject. They were given take-home assignment and required to write one-page composition entitled *"My Story of The Worst Ever Product"*. Two participants' narratives were chosen. Interpretative and reflexive principles were employed to reveal the hidden message (Blair, 2015) of dissatisfaction which later on would be oriented to produce proposition related to consumer rationality. Therefore, content analysis was used using emergent coding (Stemler, 2001 in Blair, 2015 p. 16) collected from the participant's narrative of dissatisfaction, and an *a priori* coding system drawn from template analysis (Crabtree & Miller, 1992; King, 1998 in Blair, 2015, p. 17). Next, 100 respondents were required to fill up questionnaire, and quantitative approach ie. regression analysis was applied to measure the correlation between variables in product benefit and belief in benefit. This approach was used to provide references that would explain the concept of consumer rationality in the narrative of dissatisfaction by exploring consumer's need, product benefit and need-benefit relevance.

4. Results and discussion

Results from qualitative approach are presented at the following table. In Table-1 the emergent coding is used to find and identify word/s that are related to the disconfirmation of expectation. Each word/s that has been identified are coded. Next, concept and theme are derived.

Table 1: Results

The emergent coding (1)
Disconfirmation of Expectation (DE)

Participant	Coding	Concept	Theme
AB (518 words)	wondering (DE-1), really sucks (DE-2), weren't the product (DE-3), thought its good performance (DE-4), wasted a lot of effort (DE-5)	DE-1, DE-2 = emotional involvement DE-3, DE-4 = unexpected product DE-5 = wasted effort	resourceful
JY (831 words)	I realized there was this kind of small damaged (DE-6), I was really disappointed not only of the product but also of myself (DE-7)	DE-6 = unexpected product DE-7 = emotional involvement	

From Table-1 the result shows the quality of being resourceful. There is a strong sense of ownership and selectivity (DE-3) that participants are trying to negotiate their own economic capacity while developing an interaction with the product. Rationality calculates how much the portion need to be allocated in exchange of certain benefit. There is emotional element involved in the rationalization of dissatisfaction (DE-1, DE-2). Additionally, participant expresses wrong buying. In this case the limitation of rationality as natural phenomenon ie. cognitive biases is revealed (Arcidiacono, 2011). The disappointment also explains the essential part in buying decision (DE-7). Meaning to say, the dissatisfaction is a shared system that provides a link between the self and the product. Expression of disappointment found in unexpected goal was made when participant actually began to think about a relationship with the product (DE-4, DE-6). In *"wasted a lot of effort"* (DE-5) participant's manifestation of dissatisfaction is materialized by not being able to manage time resources effectively.

Table-2 shows a perception that price corresponds with quality. Lower price attractiveness is still dominant (PA-4, PA-8, PA-10). The strong expression of blinded (PA-9) means a disappointment which is directed to wrong decision. This reveals price-related attractiveness may potentially have a risk in which consumer cannot get what

he/she pays. Sacrificial values of consumer's resources are not well transferred. It is participant's regret to have failed in making the best decision. Rationality does not seem to operate in a correct way as expected.

Table 2: Results

The emergent coding (2)
Perceived Attribution (PA)

Participant	Coding	Concept	Theme
AB (518 words)	a little bit expensive (PA-1), save money (PA-2), comparing prices strategy (PA-3), were cheaper compare to (PA-4), quality (PA-5), a quality kind of product (PA-6)	PA-2, PA-5, PA-6 = investment PA-1, PA-3, PA-4 = price sensitive	price consideration
JY (831 words)	it simple yet attractive (PA-7), it was sold at a low price (PA-8), we are blinded if we see a low price product (PA-9), low priced (PA-10), I was so blinded by the low price (PA-11)	PA-7, PA-8, PA-9, PA-10, PA-11 = attractiveness	

Table 3: Results

The emergent coding (3)
Equity (EQ)

Participant	Coding	Concept	Theme
AB (518 words)	he knew a lot of products well better than me (EQ-1), disappointed me as a consumer (EQ-2), prove it through their products (EQ-3)	EQ-1 = objectivity EQ-2, EQ-3 = fairness	contribution
JY (831 words)	I also learned something from this incident (EQ-4)	EQ-4 = learning experience	

Equity is a condition of fairness. It is a participant's acceptance that product is able to be perceived as fair (EQ-4). In any case of being unfairly treated the participant is also able to interpret as an experience of learning (EQ-4). The theme of contribution is identified as the unfair experience in the narrative of dissatisfaction is able to produce values. Concept of objectivity (EQ-1), fairness (EQ-2, EQ-3) and learning experience (EQ-4) have become major component for the identified theme ie. contribution. Objectivity means the ability to value the product by objectively making comparison with other product. Fairness is psychological condition when consumer is dealing with the potential loss of his/her rights for product benefit.

Table 4: Results

A priori coding (1)
"It's all about my need." (ND)

Participant	Coding	Concept	Theme
AB (518 words)	with my very own money (ND-1), opt to choose (ND-2), in my own point of view (ND-3), would just like to comment (ND-4)	ND-1, ND-2 = authority ND-3, ND-4 = subjectivity	individualism
JY (827 words)	When we are disappointed to a product, of course we don't buy it the next time (ND-5)	ND-5 = consequences	

Table-4 show consumer's independence in authorizing resources (ND-1, ND-2), and together with the value subjectivity (ND-3, ND-4) and consequences (ND-5) those two components create theme individualsm. The value of individualism means the higher level of self-confidence. Participants are very independent in term of making his decision to use their own economic resources.

Table 5: results

A priori coding (2)
perceived-product benefit (PB)

Participant	Coding	Concept	Theme
AB (518 words)	I was satisfied with its performance (PB-1), it didn't function well as much as it did for the last months (PB-2)	PB-1 = generallization PB-2 = endurance	achievement
JY (827 words)	sometimes we sell products like this (PB-3)	PB-3 = value-added	

Consumption experience is about achievement (Table-5). In the discourse of dissatisfaction the participants express the positive side when they are able to recognize product benefit (PB-3). Despite the disappointment over participants' relationship with the product they are able to find resolution (PB-1, PB-2).

Table 6: Results

Regression Analysis
Variables in Perceived-Benefit

Model: Y = 0.249 + 0.524X1 + 0.004X2 + 0.375X3			
Y	Perceived-Benefit (PB)		
X1	Visual Benefit (VB)	t_{value} = 4.022 / Sig. 0.000	t_{table} = 2.365 / Sig. 0.01
X2	Emotional Benefit (EB)	t_{value} = 0.031 / Sig. 0.975	t_{table} = 2.365 / Sig. 0.01
X3	Experiential Benefit (EXB)	t_{value} = 2.917 / Sig. 0.004	t_{table} = 2.365 / Sig. 0.01
R^2	0.618		
F	51.781 (Sig. 0.000 < 0.01)		
N	100		

Table-6 shows the simultant correlation between Visual Benefit (VB), Emotional Benefit (EB) and Experiential Benefit (EXB) towards Perceived-Benefit where F_{value} is significant at p value < 0.01. Coefficient of Determination (R^2) is accounted for 0.618 which indicate that 61.8% of variables VB, EB, EM and EXB can explain the Perceived-Benefit. Also, results show the partial correlation of VB and EXB that significantly contribute to Perceived-Benefit.

As it is shown on Regression Analysis the perception of product benefit is determined by the involvement ie. effort to participate in building connectivity with the product. From this view the role of participants is significant. They are the ones who will qualify the product benefit through their willingness to engage in a consumption experience.

5. Conclusion

This preliminary research is meant to trigger in-depth study in consumer rationality within the discourse of narrative of dissatisfaction. As we have found that dissatisfaction can provide indication of revealing consumer *black-box*, it is argued that scientific inquiry may be involved by the business to respond the trend of competitive market. Meaning to say there should be certain boundary that need to be reconsidered in dealing with the study of consumer.

There would always be a gap between consumer's economic-related efforts that lead him into a rational man and his expectation to reach his idealism. This phenomenon has put the narrative of dissatisfaction into its contributive role providing sufficient reference in consumer rationality.

The narrative of dissatisfaction gives an idea about consumer involvement ie. his participation in developing certain level of relationship with the product. It tells how the need and product benefit can be recognized

through product engagement. Overall, it gives direction onto how product engagement mediates consumer's learning process in finding need-benefit relevance.

References

Arcidiacono, D. (2011). Consumer rationality in a mutidisciplinary perspective. The Journal of Socio-Economics

Balakrishnan, P.V., Nataraajan, R. & Desai, A. (2000). Consumer rationality and economic efficiency: Is the assumed link justified?. *Marketing Management Journal*, Vol. 10, Issue , pp. 1-11

Bettman, J. R., Luce, M. F., & Payne, J. W. (1998). Constructive consumer choice processes. *Journal of Consumer Research*, *25*(3), 187–217. https://doi.org/10.1086/209535

Blair, E. (2015). A reflexive exploration of two qualitative data coding techniques. *Journal of Methods and Measurement in the Social Sciences*, *6*(1), 14. https://doi.org/10.2458/v6i1.18772

Dijksterhuis, A., Smith, P. K., Van Baaren, R. B., & Wigboldus, D. H. J. (2005). The unconscious consumer: Effects of environment on consumer behavior. *Journal of Consumer Psychology*, *15*(3), 193–202. https://doi.org/10.1207/s15327663jcp1503_3

Escalas, J.E. (2004). Narrative processing: Building consumer connections to brands. *Journal of Consumer Psychology*, Vol. 14, No. 1 & 2, pp. 168-180

Liu, R. R., & McClure, P. (2001). Recognizing cross-cultural differences in consumer complaint behavior and intentions: An empirical examination. *Journal of Consumer Marketing*, *18*(1), 54–74. https://doi.org/10.1108/07363760110365813

Smith, N. C. (1987). Consumer Boycotts and Consumer Sovereignty. *European Journal of Marketing*, *21*(5), 7–19. https://doi.org/10.1108/EUM0000000004694

Yang, W., & Mattila, A. S. (2012). The role of tie strength on consumer dissatisfaction responses. *International Journal of Hospitality Management*, *31*(2), 399–404. https://doi.org/10.1016/j.ijhm.2011.06.015

Transformational Leadership: Developing Self-Confidence, Learning, and Creativity

Stig Ytterstad and Johan Olaisen
Norwegian Business School, Norway
stig.ytterstad@bi.no
johan.olaisen@bi.no
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Abstract: This study is a longitudinal mixed-method analysis of a six-day intervention in transformational Leadership. It investigates to what extent the intervention makes the leaders develop more skills in innovation and creativity. Few studies investigate the change in the ability and skills in Intellectual Stimulation (Challenging old ways of thinking, promote creativity) in interventions in transformational leadership development. Among several objective changes, there is a positive development in Intellectual Stimulation. There is no change in the control group. A qualitative part of the study linked the Learning Styles traits (Sternberg, 1988, 1997) to Intellectual Stimulation and creativity in transformational leadership behavior. The traits chosen are the Internal (Alone), External (With others), Conservative (The well-known), Liberal (The new), and the Legislative (Problem definition). How important is coaching in the significant change? This study has interviews with both the coach and coachee. In 50 % of coachee reports coaching as very important for their development, and 43 % report "quite a lot," and 7% as unnecessary. The coaches report self-confidence as an essential obstacle to leadership development. Having self-confidence is vital for learning and creativity, and coaching strengthens self-confidence and learning and creativity. Do one need a basis to absorb the transformational leadership skills, as prescribed in theory? From research, skills and other sorts of capabilities, like communication and sharing a vision, are behaviors that to be learned. The data shows there has been a development in a positive direction in this intervention. The development of capabilities within communication skills throughout the organization transformed the organization, and these capabilities are a part of transformative Leadership. The improved communication also improved creativity and organizational learning. The creativity increased through learning and communication as a part of the transformative Leadership. Still, some report it is difficult to develop and share a vision and to create a strategy from the vision. The way from developing the vision and through implementing the vision into strategy and transformative leadership is challenging. However, personal coaching looks like a way to implement the vision and strategy into Leadership and management.

Keywords: transformational leadership, learning, longitudinal, mixed method, coaching

1. Introduction and theoretical foundation of the study

Considerable data support the effectiveness of transformational Leadership (Bass, 1985, 1998, 2008). Being a role model, goal-oriented, promoting a vision, motivation, and creativity, and developing a conscious relationship with their employees are central elements (Yukl, 2012). Bass and Riggio (2006) outline the approach: first, the participants should take the leadership style test in transformational leadership, then introduce this way of leading, and then set goals within this way to lead. In support of the development process, the leader should associate himself with a coach or mentor. The development of specific action plans for implementing transformational leadership emphasizes workshop training (Bass, 1990). A field experiment assessed the effectiveness of a training intervention, and after the intervention, the subordinate's organizational commitment was significantly enhanced (Barling et al., 1996).

We looked at theoretical contribution to leadership development (Lynham, 2000; Brungardt, 1997), learning (Sternberg, 1988, 1997, and Dweck, 2017ab). Within the transformational leadership paradigm, how much can they develop in the factors in Intellectual Stimulation? Which of the different factors do the participants need to develop, and which of them will they struggle to evolve? What can we learn from their learning process? What sort of feedback do they give from the learning process?

What is Intellectual Stimulation? The characteristic of intellectually stimulating leaders is that they approach problems by questioning the assumptions used to address the problem previously. Intellectually stimulating leaders encourage others to approach the problem from many angles, perhaps not previously considered. They enlarge the perspective used by followers to understand problems; they make mistakes a constructive part of the learning process. These leaders do not necessarily solve the problem; instead, they enhance the subordinate's capability to solve the current problem and challenges coming up (Avolio, 1999). The leaders enable the employees to develop solutions and, more importantly, make the employees believe they come up with the solutions. The leaders strengthen the employee's creativity and self-confidence. Do one need a basis to

be able to absorb the learning that transformation leadership requires? Conger et al. (Conger & Kanungo, 1988; Conger & Benjamin, 1999; Conger & Toegel, 2003) argue this, and Bass and Riggio (2006) make these ideas their own. Conger & Kanungo (1988) believe that all forms of leadership training have two essential functions. It should make the individual aware of the figure and dynamics of Leadership and the different behaviors. The second function works so that, through training, the individual is to discover their basis for these behaviors, thereby developing their leadership qualities. However, the theory does not tell what sort of development a leader may have in being innovative, creative and promote Intellectual Stimulation in the process of becoming a transformational leader (Bass & Riggio, 2006). Elements from the Thinking or Learning style by Sternberg (1988, 1997) include this study. We want to see how it relates to Intellectual Stimulation behavior (Bass, 1985; Bass & Avolio, 1991). The Learning styles traits used are Internal (Alone), External (With others), Liberal (The new), and Legislative (Problem definition). Research shows that the External, Liberal, and Legislative connects to creativity and exploration of new things (Sternberg, 1988,1997). Research supports the use of coaching in a development process and was therefore used in this intervention. Leadership coaching involves a practical, goal-focused form of one-on-one learning and behavior change (Hall, Otazo, & Hollenbeck, 1999; Peterson, 1996). Using coaches in this intervention is because coaching is part of the design that Bass and Riggio (2006) have described for developing transformational leadership. Managers who have had coaching report that they perform better (Kampa-Kokesch et al., 2001; Feldman et al., 2005; Grover and Furnham, 2016; Jones et al.,2016). Those coached report that they have gained greater self-insight and developed positive aspects of themselves during coaching (Gegner, 1997; London, 2001). A longitudinal study has findings that show that the coaches have gained an increased belief in their own ability to set their own goals (Evers, Brouwers, and Tomic, 2006). Furthermore, there is an increase in critical curiosity, that what a teacher gives meaning, creativity, learning reactions, and learning commitment (Wang, 2012). About one hundred top managers had coaching, and two-thirds of these reported that they become better at listening and communication, also during follow-up surveys later (Nowack, 1999). Between 55% and 70% of coaches report the benefits of coaching: expanded self-awareness can set better goals and have a more balanced life (London (2001). A systematic review of the academic and practitioner literature of business and executive coaching's effectiveness as a developmental intervention for organizations shows that coaching is a valuable tool (Grover and Furnham, 2016; Jones et al.,2016).

2. Methodology

This longitudinal mixed methodology will address whether participants in a transformational leadership intervention will practice more innovation and creativity as part of the Intellectual Stimulation in the transformational leadership functions after completing the course than before. This study uses a convergent parallel mixed-methods design. It is a type of design in which qualitative and quantitative data are collected in parallel, analyzed separately, and then merged. In this study, we use quantitative data from an MLQ5x survey (Bass & Avolio, 1991) to test transformational leadership theory that predicts the Transformational leadership full-spectrum model, positively or negatively, to which extent the participants will be creative and innovative after the intervention. The interviews explore how transformational leadership behavior was reported or not from the participants in the intervention group. The interviews uncover different sides of the learning process. Mixed-method data better understand the "why" and the "how" of the transformational factors in a leadership development process. The longitudinal approach's choice is to determine whether the intervention group's transformational leader's characteristics changed as expected. A longitudinal study strengthens the reliability and validity compared to a quantitative survey study done at one point in time. The data collection took place in the years 2008-2009 at the Norwegian Business School BI in Norway. Thirty-nine women and 29 men participated in the intervention group. The average age is 38,7 years. The youngest is 26 years, and the oldest 53 years. Both the intervention and control groups are leaders in management courses. For the quantitative data in the MLQ5x survey, the number in pre-intervention is N=66. Pre-control: N=179. Post-intervention N= 43; Post-control: N = 76. There are 50 interviews from the intervention group for the post-qualitative data and four interviews from the control group. The course offers participants three hours of coaching, which involves two external ICF coaches. In the sample of 50 informants, ten informants have not used a coach.

Do one need a basis to be able to absorb the learning that transformation management requires? Researchers claim it (Conger & Kanungo, 1988; Conger & Benjamin, 1999; Conger & Toegel, 2003; Bass and Riggio, 2006), and therefore, it became part of the qualitative study. Bass and Riggio's (2006) five points are based on the questions; here is a modified version. There are two changes in their contribution. We divided the first point into two questions. It concerns the ability to evaluate critically (in a context) and the ability to track problems. As a question, it perceiving as two different statements, and therefore divided into two questions. Bass and

Riggio (2006) use the term envisioning to describe their second competence. In that way, we hope to capture the ability to innovate and create change through this trait—the findings codes in "low," "medium," and "high."

3. Quantitative data collection and analysis

The results for Standard Deviation for MLQ 5x for the intervention and control groups show there is not much difference in the distribution of the intervention group and the control group.

The quantitative results for the intervention group.

Does the transformation leadership intervention cause any development from pre to post for the participants? The means, t-values, and p-values in the intervention pre and post MLQ 5x survey are reported in Table 1. There are three significant changes: Idealized Influence (Attribute) (p = .006), Intellectual Stimulation (p = .030) and Laissez-Fair Leadership (p = .007). In addition, there is a significant development in Extra efforts (p = 0.009).

The quantitative results for the control group.

Means, t-values , and p-values in the control group in the MLQ 5x test show no significant change in the control group for pre-and post-surveys.

Table 1: Changes in the MLQ 5x scores in the pre-post intervention group

(Pre: N=66; Post: N = 43).

MLQ	Mean Intervention pre	Mean Intervention post	t	P
Idealized Influence (attribution)	2.63	2.94	2.962	.006
Idealized Influence (Behaviour)	3.25	3.34	1.054	.299
Inspirational Motivation	3.09	3.22	1.529	.136
Intellectual Stimulation	2.76	2.99	2.272	.030
Individualized Consideration	3.16	3.31	1.988	.055
Conditional Reward	3.04	3.18	1.639	.111
Management-by-Exception (Activ)	1.82	1.66	-1.448	.157
Management-by-Exception (Passiv)	1.32	1.15	-1.581	.123
Laissez-faire	0.71	0.54	-2.891	.007
Extra Efforts	2.62	2.87	2.760	.009
Efficency	3.00	3.14	1.540	.133

4. Qualitative data collection and analyses

Which factors are relevant for leadership development when we analyze the data? Six months after the intervention, the participants share their experiences. What does the intervention group (N=50) report? Their answers compare to differences and similarities to the control group (N=4). From post-empirical data, one can see the qualitative findings provide the objective changes that emerge.

Half of the interviewed say they have changed their way of leading because they have become “more conscious." This result perceives as a critical finding. What was the role of coaching in leadership development? The coaches reported that the participants were open to coaching. Development in being a role model and being able to create visions was often the choice. Regularly was it said from coachee to coach: "I will never be a motivator." (Coach 1, "Else"). The most significant obstacles to becoming a transformation leader seem to be: how one sees oneself, self-image, and self-esteem – this is something that plays a huge role in becoming a transformation leader (Coach 1, "Else").

Coachee's experiences. What experience do the participants have with coaching in their development of transformational leadership skills? 50% perceived that coaching was "fundamental," and those who felt that coaching was "somewhat important" spoke 43%. For 7%, coaching is not essential. Experiences with coaching: "I came very fast forward in my development (…) Because development becomes so much bigger, and faster, and more efficient" (Informant 58). "It gave me clarity in my mind, and (it) simply was very good for me" (Informant 19).

The learning data. In the 50 interviews, 59 % of leaders want to learn something new with others, 18 % learning alone, and 23 % a mixture of both. Some answers indicate they first want to be alone and then have the learning process together with others. The most, 68 %, reports no change in learning, and 32 % reports a change. We do not know why the change took place—questioned if they prefer new stuff or more of the well-known a significant 77 % wanted to learn something new (Liberal). Asked how important it was in the learning process to do the problem definition and strategy making (Legislative), 38 % answered it was not significant, 52 % a little, and 10 % a lot. As a follow-up question, 68 % answered a more Legislative learning style, and 34 % has no change.

Part of the interviews covers the basis of competencies (Conger et al., 1998). The skills to Conger et al. are 1. Critical evaluation (of a context) and problem-finding skills, 2. Visioning (goals) and planning (tactics) skills, 3. Communication (articulation and interpersonal sensitivity skills), 4, Exemplary personal behavior and impression management skills, and 5. Empowering skills (Conger & Kanungo, 1988; Bass & Riggio, 2006).

To "evaluate critically," 50 % responded positively to this statement and 50 % medium ability. The leaders, on the question to be able to track problems, 43 % reported they have a high ability to do so, and 55 % medium and only 2 % low on this skill. The skill to "Envision" was the most challenging thing to do; only 23 % said "high" on they had the skill. 70 % report medium and 7 % low on this. Known from the theory (e.g., Bass % Riggio, 2006), leading with visions is vital. Still, only 28 % reported "high", 61 % “medium” and 11 % “low” on this skill. The result here was weaker than expected. To have an "influential leadership", 30 % said "high" on this question, 65 % medium, and 5 % low. For the last of the skills, know when to delegate to a subordinate, 54 % think they do that (high), 44 % quite a lot (medium), and 2 % little (low).

5. Merging results for comparison

Intellectual Stimulation. Intellectual Stimulation, as expected, and shown in Table 1, is a significant increase (p = .30) in the intervention group's score from pre to post. The average increased by .23 to M = 2.99. Despite this reported development, only seven percent have chosen this as their leadership development area in the interviews. Intellectual Stimulation has an increased ability to think new and to question traditions and ways of working. Furthermore, the participants convey that they have become better at supporting processes of independent thinking and creativity. "Per-Egil" put it this way: “When someone comes up with something new, I initially do not think it is such a good idea; I commend them very much for coming along and encouraging them to do it again then” (Informant 67).

This excerpt from the interview with "Per-Egil" reflects the process many are going through. The leaders become more open to new thoughts and input. Not least, it happens in the context of "disruptive innovation,," creativity and ways of dealing both with planned and unforeseen changes. Even though few had chosen this as a development area, there has been a significant change. The reason for the change may lay in the awareness created through the training elements mentioned above. However, one does not know exactly. There are no significant changes in the control group.

The learning perspective must be part of the qualitative empiric data. One can observe that most of these leaders (59 %) prefer to learn new skills with others, or partly alone and then together (23 %). They also like to learn things they did not know before (77 %) and learn it in a structured way (54 %). The leaders like, to some degree, to have different perspectives on what they learn ("a little" 52 % and "a lot" 10 %). The qualitative data also uncover the basis competencies (Conger) to master transformational Leadership. The leaders report the ability to Envision is the one skill with the weakest basis to learn ("high" 28 %, "middle" 70 %, "low" 7 %). The second most difficult is to communicate Visions ("high" 28 %, "middle" 61 %, and 11 % "low") to their surroundings. The assumption is that these two skills are important as bases for enhancing creativity.

6. Interpret of results: A discussion

What elements explain development in Intellectual Stimulation?

From the leader's data's general characteristics, will they, after an intervention, change their old way and habits? What will the leader do more of that create a readiness for changing one's way of thinking? Will there be more a willingness to think and develop new perspectives? Moreover, will there be the leader's behavior to promote a discussion of new trends and ideas and offers examples to change associates `perceptive on opportunity or problem? How important is the role of coaching in the process?

From the skills (Conger & Kanungo, 1988), the lowest result on "high" for both "Envision" (23 %) and "Vision" (28 %) and relatively high on medium: Envision 70 % and Vision 61 %. Since these factors are considered essential skills to have in Intellectual Stimulation, it might indicate this level of skills is "good enough." It also might be part of the explanation for the reported objective change. We know this learning style significantly correlates with all five transformational leadership styles (Ytterstad & Olaisen, 2021). Could this also be part of the explanation for the results - they have this skill in the first place.

From the rest of the results on different necessary skills to develop transformational Leadership, the medium results must be considered relatively healthy, from 44 % to 70 %. For the rest of the "high" results, it goes from 30 % to 54 %. Which also are a good result. If we look at the other end of the scale, we see 11 % consider themselves "weak" in the ability to communicate a vision. One might see this skill as conscious of being a role model (Individual Influence (Attribution)).

"Evaluating critically" is quite strong in this group: 50 % medium and 50 % high. This fact indicates a relatively high ability to think things through and look forward to possible consequences. Could it be a base skill that was there and further on developed through the intervention? The fact strengthens this argument; there was no development in the control group. The ability to "evaluate critically" had 50 % high and 50 % medium. The same trend is to be seen for the skill to be able to track problems. Here 43 % high and 55 % medium to do so. This skill indicated a strong learning Judicial preference (Process and results evaluation) and was unexpected, and more researched is needed. For the skill to have the ability to have an "influential leadership," 30 % "high," and 65 % medium. This ability and the last one of the skills, "knowing when to delegate to a subordinate," had 54 % "high" and 44 % "medium." The element the two of them have in common is "relation" is involved. Therefore, the understanding is that the External learning style (With others) could explain this strong result.

The anticipation is that the participants have a two folded process; partly, they attract to the energy of collective creativity. On the other hand, they seek to avoid boredom and learn of too easy things. They like to have a challenge.

7. What elements explain development in intellectual stimulation?

The positive changes that occur through the transformational leadership intervention are in line with previous studies' experiences in this area (Dvir et al., 2002; Barling et al., 1996; Aarons, 2006). The present study seeks to deepen the understanding of what happens in an intervention. Bass (2008) believes what makes leadership training results is the participants' attribution, the composition of the learning group, and the course holder's behavior. The measurement criteria influence the training outcome (Bass, 2008). Leaders' skills and capabilities, such as communication, problem-solving, sharing visions, decision making, and more, are behaviors to be learned (Brungardt, 1997).

How much of the development can be explained by coaching? Part of the essential findings in this study is the vital role coaching plays in this leadership development. It shows the importance of having an external resource person who supports and challenges a leader in the development process. This part may be more critical than earlier thought. Challenged by the right questions from a coach who genuinely wants the leader's development seems central to the change we see. Could it be that several significant changes in sum constitute a qualitative change? As these changes now present, it is not easy to conclude. At the same time, it may be central to understanding leadership change mechanisms and, therefore, be further investigated. As reported, there is a significant development in Intellectual Stimulation, which includes the ability to re-examine critical assumptions to problems and a "readiness" for changing in thinking. These elements have much in common with the term "open mindset" (Dweck, 2017ab), and a closer look into this must come in future studies. When asked the

control group whether they had a management development, they responded affirmatively. The responses to the informants did not relate this development to a theory or model. On this question, one sees the most significant distinction between the intervention group and the control group. To be able to create visions. The intervention group prefers imagining goals and thinking strategically. It perceives as demanding to communicate visions for those who do not have a strong preference for this. We assume that what the participants have trained on and gained experience with will also score higher.

8. Conclusion

The finding indicates that transformational leaders develop their ability to Intellectual Stimulation and creativity during this intervention. The objective findings show a positive development in Intellectual Stimulation, and there is no change in the control group. Only seven percent had chosen Intellectual Stimulation as an area to develop, and still, the objective data shows a significant development. Half report coaching as very important for their development, and 43 % "quite a lot." Do one need a basis to absorb the transformational leadership skills, as prescribed in theory? From research, skills and other sorts of capabilities, like communication and sharing a vision, are behaviors that to be learned. The data shows there has been a development in a positive direction in this intervention. The development of capabilities within communication skills throughout the organization transformed the organization, and these capabilities are a part of transformative leadership. The improved communication also improved creativity and organizational learning. The creativity increased through learning and communication as a part of the transformative leadership. Still, some report it is difficult to develop and share a vision and to create a strategy from the vision. The way from developing the vision and through implementing the vision into strategy and transformative leadership is challenging. However, personal coaching looks like a way to implement the vision and strategy into Leadership and management. The coaching strengthens the self-confidence for learning and creativity and enabled new creative solutions through team cooperation.

9. The implication for theory

The findings from this mixed-method study are interesting from a theoretical perspective. Transformative leaders seem to profit from the learning process in several ways. The function and role of the coach in the intervention seem vital. More investigation should be focused on the problems to make and communicate visions. Our theoretical findings have implications upon the transformation leadership theory and the modernization and robustness of the theory. Coaching has significant importance for developing self-confidence, creative solutions, and learning, and by that transformative Leadership in itself. Self-confidence, learning, and creativity are essential for all knowledge-intensive processes. Transformative Leadership should then also be of significance for improving knowledge-sharing and knowledge management. Transformative leadership in our case is essential for the development of value creating knowledge processes in both teams and working groups. Transformative leadership promote the knowledge sharing in teams and working groups.

10. The implications for practice

The practice prefers today's leaders who can deliver attractive "visions" and "envision" and convincingly presenting them. Our results indicate that we should prefer and train transformative leaders. Transformative leaders are the best for creative tasks and new ideas in corporations. The transformative leaders are the best in handling the very rapidly changing work life. The vision skill might be essential for a greener and more sustainable leadership. Our findings' practical implications might be fundamental for the practice of the transformational leadership theory through the training, coaching, and recruitment of transformative leaders. Transformative leadership promotes self-confidence, learning, and creativity and will then be needed in all knowledge-intensive processes. The more knowledge-intensive processes the more helpful will transformative leadership be for both explicit and tacit knowledge sharing.

11. Limitations

The number of respondents and informants is relatively tiny. The results and conclusion must, therefore, looked at with caution. However, we compensate for the sample's size, increasing the participants' closeness using mixed-method and triangulation. A larger sample might increase the study's significance and reliability, while in-depth interviews might increase the study's depth, complexity, and validity. A further methodological triangulation might improve the reliability and validity.

12. Further research

The significance of theory is a need for more research to understand more of the Intellectual Stimulation process. There is a gap in knowledge of the different parts of the development process to be investigated further. The importance of transformative leadership for knowledge-intensive team and working group processes needs to be investigated. Knowledge management should be compared with transformative leadership to compare how the different approaches are working in different settings.

References

Aarons, G. A. (2006). Transformational and transactional Leadership: Association with attitudes toward evidence-based practice. Psychiatric Services, 57(8), 1162-1169.

Avolio, B. J. (1999). *Full leadership development: Building the vital forces in organizations*. Sage.

Barling, J., Weber, T. & Kelloway, E. K. (1996). Effects of transformational leadership training on attitudinal and financial outcomes: A field experiment. Journal of applied psychology, 81(6), 827-832.

Bass, B. M. (1985). *Leadership and performance beyond expectations*. Collier Macmillan.

Bass, B. M. (1990). From transactional to transformational Leadership: Learning to share the vision. *Organizational Dynamics*, *18*(3), 19-31. *Impact, Mahwah*.

Bass, B. M. & Avolio, B. J. (1991). MLQ Multifactor leadership Questionnaire (Form 5X-Rater). Binghamton, NY: Center for Leadership Studies, Binghamton University.

Bass, B. M. (1998). Transformational Leadership: industrial. *Military, and Educational Impact, Mahwah*.

Bass, B. M. & Riggio, R. E. (2006). Transformational Leadership (2 ed.). New Jersey.

Bass, B. M. (2008). The Bass Handbook of Leadership. Theory, Research, & Managerial Applications (4 ed.). New York.

Brungardt, C. (1997). The Making of Leaders: A Review of the Research in Leadership Development and Education. Journal of Leadership & Organizational Studies, 3(3), 81-95.

Conger, J. A., & Kanungo, R. N. (1988) Charismatic Leadership, the elusive factor in organizational effectiveness. San Francisco. CA: Jossey-Bass Publishers

Conger, J. A., & Benjamin, B. (1999). Building leaders: How successful companies develop the next generation. San Francisco. CA: Jossey-Bass Publishers

Conger, J. A., & Toegel, G. (2003). Action learning and multi-rater feedback: Pathways to leadership development. *The future of leadership development*, 107-125.

Dvir, T., Eden, D., Avolio, B. J. & Shamir, B. (2002). Impact of transformational Leadership on follower development and performance: A field experiment. Academy of Management Journal, 45, 735-744.

Dweck, C. (2017a). *Mindset-updated edition: Changing the way you think to fulfill your potential*. Hachette UK.

Dweck, C. S. (2017b). From needs to goals and representations: Foundations for a unified theory of motivation, personality, and development. *Psychological Review*, *124*(6), 689.

Evers, W. J., Brouwers, A., & Tomic, W. (2006). A quasi-experimental study on management coaching effectiveness. *Consulting Psychology Journal: Practice and Research*, *58*(3), 174.

Feldman, D. C., & Lankau, M. J. (2005). Executive coaching: A review and agenda for future research. *Journal of Management*, *31*(6), 829-848.

Gegner, C. (1997). Coaching: Theory and practice. *Unpublished master's thesis, University of San Francisco, California*.

Grover, S., & Furnham, A. (2016). Coaching is a developmental intervention in organizations: A systematic review of its effectiveness and its mechanisms. *PloS one*, *11*(7), e0159137.

Jones, R. J., Woods, S. A., & Guillaume, Y. R. (2016). The effectiveness of workplace coaching: A meta-analysis of learning and performance outcomes from coaching. *Journal of Occupational and Organizational Psychology*, *89*(2), 249-277.

Kampa-Kokesch, S. & Anderson, M. (2001). Executive coaching: A comprehensive review of the literature. Consulting Psychology Journal: Practice and Research, 53, 205-228.

London, M. (2001). Leadership development: Paths to self-insight and professional growth. Psychology Press.

Lynham, S. A. (2000). Leadership development: A review of the theory and literature. In *Proceedings of the academy of human resource development* (pp. 285-292). Baton Rouge, LA: AHRD.

Nowack, K. (1999). 360 Degree feedback. *Intervention: 50 performance technology tools*, 34-46.

Peterson, D. B. (1996). Executive coaching at work: The art of one-on-one change. *Consulting Psychology Journal: Practice and Research*, *48*(2), 78.

Sternberg, R. J. (1997). Thinking styles, Cambridge University Press.

Sternberg, R. J. (1988). Mental self-government: A theory of intellectual styles and their development. *Human development*, *31*(4), 197-224.

Ytterstad, S., Olaisen, J. (2021). Conference paper to the 19th European Conference on Research Methodology (ECRM), Portugal.

Yukl, G. A. (2012). Leadership in Organizations (8 ed.). New York: Pearson Education, Limited.

Wang, Q. (2012). Coaching for learning: exploring coaching psychology in inquiry-based learning and development of learning power in secondary education. *Procedia-Social and* Behavioral *Sciences*, *69*, 177-186.

PhD Research Papers

How to Drive Innovation by Tapping Into the Intrapreneurial Capabilities of Engineers?: A Case Study of a FinTech SME

Maher Alzyadat, Bidyut Baruah and Anthony Ward
University of York, UK
msqa500@york.ac.uk
bidyut.baruah@york.ac.uk
tony.ward@york.ac.uk
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Abstract: Intrapreneurship has been gaining momentum in organizations for self-renewal, driving growth, and taking the business to new heights. Technology firms are running on challenging innovative capabilities while striving to achieve competitive advantage and survive in a complex and high volatile business environment. Such firms must speed up the intrapreneurial process initiated by their engineers in more efficient and productive ways. Engineers are considered the backbone and main assets in technology firms to explore new opportunities and develop innovative products, solutions, and services. These firms require their engineers to adopt more intrapreneurial roles and operate with an intrapreneurial mindset to accelerate innovation. It becomes imperative for these firms to promote intrapreneurship as a core business strategy and discover their engineers' talents in this context. However, researchers have not explored the driving factors of intrapreneurship among engineers and how an organization can empower them to act more intrapreneurial. It is, therefore, one of the key research gaps in the fields of intrapreneurship and engineering. This paper addresses these gaps and explores how SME organizations can inspire and motivate their engineers to become intrapreneurs and develop new innovation capabilities. This exploratory study follows qualitative research using case study methodology. The data is collected through semi-structured interviews with managers and engineers from a FinTech firm based in the UK. Our exploration study results reveal that the internal enabling factors of intrapreneurship among engineers in SMEs are much more interactive and multi-faceted. These factors are related to 'supportive management', 'intrapreneurial culture', and 'strategic orientation' with a combination of various sub-constructs of each. The firm succeeded in building a supportive culture driven by the Kaizen process that actively engages engineers in suggesting and implementing improvement to the company and contributes effectively to its success through innovation. As a result, engineers feel they are trusted, and their contribution is valued and rewarded. They can take ownership and act proactively and deliver results beyond their duties. The results will help firms understand the intrapreneurial potential of engineers and build a supporting organizational framework conducive to intrapreneurship in which the engineers' intrapreneurial capabilities are unleashed and stimulated.

Keywords: engineer, intrapreneurship, intrapreneur, intrapreneurship enabling factors, innovation, Fintech

1. Introduction

Globalization driven by the revolutionary development in technologies and changes in market and industry has impacted many companies' competitive situation (Corbett et al., 2013). Such problems significantly affect the business environment that became increasingly complex, dynamic, and uncertain (Delić et al., 2016). Thus, further challenges are imposed on organizations to create, implement, and maintain innovation and revitalize themselves.

Many researchers and practitioners have suggested intrapreneurship as the main solution for globalization challenges that can give grounds for competitive advantage (Baruah and Ward, 2015) and achieving organizational growth, profitability, renewal, and success (Antoncic et al., 2018). Authors such as Seshadri and Tripathy (2006) asserted that unleashing employees' entrepreneurial spirit latent is an essential step in building intrapreneurial organization for companies seeking to survive and prosper. Many technology-based firms today rely on intrapreneurship to develop and differentiate their products and services. For instance, pioneering technology-based large firms such as 3M, Apple, Google, Sony, ORACLE, Facebook, and LinkedIn have successfully adopted intrapreneurship as part of their business strategy to foster the commercialization of technologies in their industrial sectors. Intrapreneurship is seen as a key priority inside these large organizations, and a primary factor in their business success resulted in creating and developing innovative products and advanced technology applications.

The concept of intrapreneurship has become an effective approach that can be adopted in an attempt to define specific strategies and action plans in which to incorporate substantial contributions from employees (Mohanty, 2006). For Amo (2010), intrapreneurship is recognized as a tool for employees who want to realize their entrepreneurial vision. Overall, this study considers intrapreneurship as an organization level process related to

the organizational practices, strategies, and behaviors by which a firm seeks to innovate, develop new products, technologies, and services, and foster more initiatives from its employees.

1.1 The relevant roles of engineers to drive innovation

Technology firms occupy a central position in modern economies that drive economic growth and productivity and creating new industries. In these firms, engineering is a crucial profession that acts as the backbone for many of these firms. Many researchers consider engineers the company's special professional workforce to produce and develop innovations (Menzel et al., 2007), where their skills and ideas are a great source of technological development (Alam et al., 2020). For many years, engineers have introduced some of the most successful innovations that contribute significantly to the wealth and quality of life we live in today. Such as PlayStation, Gmail, and new interactive features in Facebook as the 'Like button'.

Over the years, the role and expectations from engineers have evolved. Today there is increased pressure on engineers to innovate and utilize their entrepreneurial capabilities within the organization. According to Alam et al (2019), they must take a more influential role in the innovation processes within an organization. Kriewall and Makemsom (2010) state that market demands require more intrapreneurial engineers to bring high technology-based designs, incorporate more creativity in their roles, and design value-added products and processes that increase revenue and profit for their employer. Menzel et al. (2007) called engineers 'technology intrapreneurs' to play a significant role in technology innovation due to their professional background and technical skills.

While the importance of intrapreneurs is well recognized, organizations struggle to nurture them (Edison et al., 2018). Managing engineering professionals is critical if organizations wish to retain talented employees (Martínez-León et al., 2018). Intrapreneurship is only achieved when intrapreneurs are motivated and supported to take action (Mohanty, 2006). This, therefore, shows the significant role engineers play in the success of technology firms and their contribution to innovation through intrapreneurship. Therefore, harnessing the full potential of engineers as a primary workforce in a technology firm is absolutely vital for a company's success. Thus, if engineers are given the platform and opportunities within their role to act more intrapreneurial, then this will be an added competitive bonus for the firm. However, in order for this to happen, the organization should be willing to create an atmosphere that motivates engineers to engage in intrapreneurial functions.

1.2 The special setup of intrapreneurship in SME

SMEs possess different organizational characteristics related to the organization structure, culture, and capabilities compared to large firms. The phenomenon of intrapreneurship is well established and studied for large firms that dominate the attention of most scholars and researchers. Hughes and Mustafa (2017) mentioned that SMEs function differently from large firms in terms of intrapreneurship, and readily researched models from large firms could not fit or be applied to SMEs. Besides institutional context, SMEs have distinct organizational challenges and operational strategies that are different from large firms.

SMEs operate with limited resources; they are believed to be at a disadvantage regarding their resource endowments and capabilities involving human, financial, and structural R&D (Fernández-Olmos and Ramírez-Alesón, 2017). Accordingly, SMEs face more challenges to embrace intrapreneurship and retain intrapreneurs. Such loss of intrapreneurs will potentially have more detrimental effects and harm SMEs than large firms (Carrier, 1996). In this context, many intrapreneurs become dissatisfied when the organization decides neither to support their creative new product ideas nor to fund development efforts that they think will succeed (Jones, 2013). Eventually, they may consider leaving and establishing their own businesses, which then imposes more uncertainty and challenges on the SMEs. This, therefore, implies more pressure on SMEs to facilitate intrapreneurship in their organizational culture and create an environment that supports, attracts, and retains these intrapreneurs.

1.3 Research gap and purpose of the study

Building upon the above literature, there is a high demand to develop the intrapreneurial capabilities of engineers where organizations seek to accelerate the innovation initiated by them. However, the lack of literature addressing the organization enabling factors that stimulate intrapreneurship among engineers leaves a critical gap. Investigation and exploration of the conditions that may foster engineers' intrapreneurial

behaviors in the context of a technology-based firm are scarce. Alam et al (2020) stated that research on intrapreneurship for engineers and its impacts on their employers is still in its evolutionary phase and studies are rare.

Furthermore, there is no significant empirical research on how organizations can make the most out of their engineers by adopting intrapreneurship and making better use of their potential. The purpose of this study is to explore and understand the influential factors of intrapreneurship within established tech-oriented SMEs that nurture engineers to act more intrapreneurial. The paper will address the following central question:

- How can technology firms drive success in innovation and organizational productivity by utilizing their engineers' intrapreneurial capabilities?

1.4 Methodology and sampling

An in-depth case study approach was adopted to gather information-rich data and gain a great deal of understanding about the studied phenomenon (Yin, 2017). Accordingly, an exploratory study based on qualitative research using semi-structured interviews was conducted (Saunders et al., 2016). Authors such as Hornsby et al (2002), and Blanka, (2019) emphasize the need for qualitative research to explore the organizational, cultural, and management context in which intrapreneurship can occur. This, therefore, signifies these selection options as an effective methodology approach for exploring the phenomenon of intrapreneurship among engineers within a technology organization setting.

The firm representing the case study was purposefully selected. C1 is an Information and Communication Technology (ICT) firm and is a pioneer in the FinTech sector in the UK. It is characterized as both very innovative, by producing several innovative products and solutions using complex and cutting-edge technologies such as Artificial intelligence (AI), Machine Learning (ML), and Big Data, and very knowledge-intensive, focusing on applied research. The firm is engineering intensive, where the majority of resources are engineers by profession. The FinTech sector encompasses innovative financial solutions enabled by IT that revolutionizing the financial services industry by simplifying transactions, reducing costs, enabling innovation, and empowering customers.

The interviews were conducted online with managers from different hierarchical positions, including executive and middle management. The sample of engineers has been selected from different engineering functions with varying roles and different years of work experience. Participants were contacted via email or LinkedIn. Most interviews lasted for approximately an hour and were recorded on external tape then transcribed. The emerging themes were analyzed using Nvivo, which is a software tool for analyzing qualitative data. Secondary data in the form of technology, marketing, and financial information were collected from different internet resources to triangulate with the interviews. The interview guide through open-ended questions provides a general framework for the discussion but is sufficiently dynamic to explore the interviewees' views in-depth. Managers were asked to tell the story of innovation and how it is essential to the firm's success, what are their views on the culture, management practices, and firm strategies to encourage innovation, and how the organization motivates, supports, and empowers its engineers. The questions asked for engineers centered around how they demonstrate and engage with innovation in their roles, how they contribute to the firm's success, how they perceived the organization's support, and what factors and conditions influenced them to be innovative.

Each participant in this study has been assigned a specific code for the purpose of anonymity, as shown in table 1. The company selected is referred to as 'C1' as well. The Participants' background and job titles have been anonymized to maintain confidentiality.

Table 1: Reference code for participants

Participant Code	Hierarchy level
1	Executive manager
2	Executive manager
3	Middle manager
4	Middle manager
5	Engineer
6	Lead Engineer
7	Engineer

2. Intrapreneurial influencing factors for engineers

C1 has a compelling vision and a culture of innovation that is inspiring. C1 has created an intrapreneurial organization that empowers engineers. They are the main innovators who enrich the intrapreneurial process with creative ideas and successfully transform them into meaningful products, solutions, and technologies. Following its launch in 2014 as a startup SME, it is considered as a fast-growing firm. Currently, C1 is working for over 400 enterprise clients across 60 countries, and the number of employees has risen to 200.

The intrapreneurial setup in C1 reflects a mixture of different elements of management, organizational culture, and strategy. All interact and work together to help the organization succeed in catalyzing its engineers' skills and capabilities. The following section discusses the enabling factors and their subconstructs that emerged from the research analysis.

2.1 An intrapreneurial supporting culture

The culture at C1 is driven by an agile system that structures engineers into autonomous and self-organizing teams consisting of multiple tribes and squads, and a Kaizen process involves every employee to make a consistent improvement to the success of the firm. Different tribes of engineers are working on different product lines consisting of multi squads. In addition to encouraging horizontal interactions among engineers, this structure makes teams very independent, owning specific parts of functionality end-to-end while still enabling sharing knowledge between team members and between different teams, as explained by participant 4. This kaizen process involves all engineers working towards creating a culture of constant improvement where small ideas, suggestions, and creative initiatives lead to successful innovation. Participant 6 reflected on his experience in the company, and how he was influenced by the culture, *"Working in this culture, you will have a strong sense of product ownership because you are the one who is responsible for building, designing, and testing functions. It is like your baby, so you want it to grow, and this push always the efforts to think of new ways to improve or polish it".* The supportive culture drives engineers' intrapreneurial behavior, which is perceived by them as the main factor to embark on innovative activities, as explained by most interviewees. According to participants 1 and 3, this culture defines norms, behavior, practices, and ways of working that align everyone's efforts to achieve the firm's vision and objectives.

The cultural factors that enable engineers to flourish and excel in their role are discussed in greater detail in the following sections:

2.1.1 Freedom

It is clear that engineers are given the freedom to innovate and provide new solutions. As explained by participant 1, *"The way to motivate engineers is to give the space to innovate, provide them the problem and give them the freedom on how to solve it within the right constraints".* This freedom of implementing innovation gives the engineers more innovative options to explore new ways and new technologies. It is clear that providing freedom for engineers will give the space for making mistakes that give more room for innovation to happen, as noted by participant 4. It is important that organizations encourage workers to make choices on their job process and not blame them for making mistakes while innovating (Kuratko & Hodgetss, 2007). Participant 3 notes, *"Because we tried to bring to life Kaizen, especially at the first three years of someone's career, we will give engineers a lot of room to make mistakes so as to learn quickly in this environment and progress the product further".*

As noted by Azami (2013), intrapreneurship motivates employees to come up with distinctive business initiatives without necessarily taking formal permission from the management. In this regard, participant 1, as a manager, clarifies that *"I am empowering engineers within the teams to have the autonomy… People do not need to ask my permission to do or try something sensible. Even if it is something that ultimately fails, they do not need to seek my permission to try or do. They need my permission if they want to go far off the roadmap or to miss customer commitments".* This encourages engineers to enjoy finding their own ways of doing things, manage their work, and take ownership without consulting their leaders. One of the common views among all the interviewees in this study is that by encouraging autonomy, engineers feel that they are more trusted. This then gives them the confidence that their innovation can benefit their team and the whole company, thereby empowering them to be committed to achieving the company's vision.

2.1.2 Supportive system of recognition, appreciation, and rewards

The characteristics of varying reward systems could influence individuals' conceptualization of benefits (Carraher et al., 2003) and have a powerful influence on their tendencies to behave in intrapreneurial ways. Based on the engineer's and managers' feedback, the company ensures a wide range of rewards and recognition to meet the different engineers' preferences for what reward or recognition motivates them. Therefore, this company has adequate attractive and competitive reward systems with various benefits and incentives, including financial and non-financial rewards. According to participant 1, *" I think it depends on the engineer. Some engineers love to have papers to their name, that is important to them. Other engineers love bonuses and pay rises. Some engineers love recognition, so they prefer to be called out in a company event about something great they have done".* The firm focuses on rewarding and appreciating engineers' good efforts in a timely manner and very quickly, as explained by participant 3. This will keep them positively charged, give them a high motivation to continue working with the same passion along the process of innovation, and empower others to follow the same attitudes. According to participant 2, The recognition system gives equal importance to reward teams and appreciates the group effort as of individual in this firm.

2.1.3 Open communication and team collaboration

Flexible and open communication methods are well established throughout the entire organization so that engineers can express and share their ideas and efficiently transfer knowledge. Communication openness and quality of communication as characteristics of the organization are positively related to intrapreneurship (Antoncic, 2007). In C1, open communication is well-defined and practiced on the engineering team-level, including squads and tribes, across multidisciplinary teams, and towards the management layer. This can occur in formal and informal ways supported by the firm's intrapreneurial culture and flexible structure.

As discussed by most participants, the organization's physical environment, such as free desks and open spaces, facilitates communication, enriches social life, and maintains continuous interaction between employees and their management teams. The organization support communication by using relevant technology tools to facilitate interaction and socialization. According to participant 3, *"we ensure that the teams have got the right tools to be able to communicate effectively with each other. We run many fun activities using these tools".*

The findings from the interviews indicate that innovation is pure teamwork activity that fundamentally requires technical collaboration between different teams. Collaboration is the spirit of work within teams and across multidisciplinary teams as well. The firm's teamwork is characterized by robust information sharing, consistent interaction and communication, close relationship, and a valuing of team contribution. This complies with Hisrich's (1990) view, who explained that close working relationships allow the vision and objectives to be accomplished through an atmosphere of trust and counsel.

2.2 The company vision and strategic elements

The firm strategy focuses on expanding the business and being a major player in FinTech globally, and building a robust platform that is unrivaled in its technological capabilities. The organization utilizes its strategy to support intrapreneurship and align it to business growth. The company has a strategic focus based on various factors incorporated into being an intrapreneurial organization. These are explained in the following sections.

2.2.1 Recruitment process

One of the main strategies to drive innovation in this company is to recruit relevant engineers who are talented, technology-driven, and willing to develop and improve their skills. The company always looks for engineers with team spirit to work in an open and collaborative environment and willing to spread the knowledge around the team and share that experience with others. Engineers will contribute to the team's overall success, deliver the team's roadmap, and participate in creating their team priorities with a strong focus on team achievements rather than individual delivery. They follow a clear recruitment process that helps to achieve the firm's values. Participant 1 explains*, "We are very clear on our hiring process, and it is our company values that we want to hire people who are curious and proactive….. who can pull our company values. If we succeed in the hiring process, we just give them space so that innovation will happen".* Innovation is then started by recruiting engineers who are hungry to develop their skills and willing to take more responsibilities quickly. It is about giving them the opportunity to be promoted and supported by the wide organization mechanism.

2.2.2 Competence development

The company is keen to build the competence of all engineers and expand their expertise in different technologies. In this context, it focuses on creating and spreading new knowledge within the firm. Therefore, competence development combines formal education with implicit knowledge and skills acquired through working experience. One of the Kaizen focus is to provide the opportunity for engineers to learn, develop problem-solving skills, and build new competencies continually. The team structure based on multiple tribes and squads allows the management to build teams quickly and integrate different perspectives and experiences. Engineers are given the opportunity to be part of multiple squads or move between different squads based on business requirements or engineers' interests. As explained by participant 3*, "If an engineer willing to expand his experience in a specific area, we can easily respond by mix up the tribes and squads".*

The firm runs a formal mentoring program and provides an engineering buddy scheme to share and build competencies among engineers. New engineers joining the firm will be paired with an expert to support them in their journey and mentor them in some areas that they do not score highly. Mentors provide technical support and ensure that the new engineers act according to cultural values and adopt these values very quickly, as highlighted by participants 3. Developmental support in the form of coaching, mentoring, and advice is an essential promoting factor of developing intrapreneurial skills and intrapreneurship (Blanka, 2019).

2.2.3 The clarity of the vision and business strategy

Engineers draw on their innovation on the clarity of the firm strategy and vision, which is critical to promote innovation and engineering initiatives with the overall business strategy. Participant 2 emphasizes this and says*, "one of the single biggest things I think is having clarity on the company's growth strategy. Because that is where innovation will start".* This clarity provides engineers with specific boundaries and constraints as a framework to innovate accordingly, as noted by participant 6 *"The management encourages innovation, but in the end, it is a business. So whenever the manager says to you that you are free to innovate, what they are saying is that you are free to innovate with certain boundaries".* Hence, they will show a commitment toward demonstrating the strategy and achieving the company's goals. Participant 1 says*, "Many engineers are very committed to the company's vision. They love what we are doing".*

The company has a clear business strategy but is not adopting any formal strategy for innovation, and there is no specific innovation project or one team responsible for innovation, which incorporates any engineer from any function to act more intrapreneurial. Participant 2 illustrates this further and explains how innovation is related to the firm strategy *"We do not have a separate innovation strategy. We have a company strategy for how we are going to grow. The innovation work we do is the work where we explore opportunities and ideas as to how best to execute that strategy".* The company seeks to connect the innovation work to the core strategy rather than treating it as something separate. The benefits for this are clear for engineers to be more innovative. According to participant 4, the strategy can provide a framework for innovation where engineers have the freedom to explore interesting ideas and do experiments and try new things. As a result, engineers have more freedom and flexibility to explore a wide range of opportunities and select the best ways to solve market problems.

2.3 Leadership and management support for the innovation process

Managers play a major role in promoting and facilitating intrapreneurship by having a greater involvement in enhancing intrapreneurial activities (Hornsby et al., 2002). Hence, the analysis shows that managers at different levels are considered sponsors and facilitators for intrapreneurial activities of their engineers. They show high commitment to the practices that foster innovation and promote a culture that sustains it. In C1, their support was found to be significant along the innovation process, starting from encouraging idea generation, supporting idea development and implementation. They play a substantial role in voicing their engineers' ideas with the business part and facilitating the vision and strategy down to the level of engineers.

The findings show that managers are always receptive, welcome, and listen to new ideas initiated by their engineers. According to Participant 5, *"My direct manager or his manager always encourages new ideas and suggestions. They are coming from an engineering background and have a sense of engineering ideas".* The engineering and technical background and capabilities of managers were seen as influential factors in being receptive to engineers' ideas, moving them forward, and coaching engineers in this technology-based firm. This

allows managers to have a logical mind to understand, value, and judge the technical aspects of their teams' initiatives, as illustrated by participant 1, *"Managers need to have the same mind as engineers and to be close in terms of speaking the same language so engineers can easily communicate with them".* This supports the views of participant 4, who justified, *"My background has helped me a lot. I guess I can connect on an engineering level. I need to just turn different switches on when doing the management stuff and when I am discussing with an engineer on research idea".*

The role of the manager is extended to keep engineers motivated and to strive for new ideas even when they bring ideas out of the core competence of the firm. Managers have to explain why some ideas got rejected so that engineers can learn from the feedback and going forward. As illustrated by participant 3*, "The manager needs to justify why some ideas are not going to be taken forward to provide justifiable reasons and convince the engineer. They need to investigate if this was due to miscommunication from the manager downward or whether it is just the misalignment from the bottom up. So trying to identify which barrier needs to be removed, and then next time engineers typically have a better understanding of how to progress that".*

2.3.1 The role of management to translate the vision down to engineer

Engineering managers play a major role in bridging between the business and engineering processes. As explained in the literature, managers play a major role in fostering communication about the company's mission, goals, and priorities (Hornsby et al., 2002). Here comes the role of engineering managers, as explained by participant 4, *"My role is not to dictate the vision. My role is to communicate the vision and make sure that goals are very well defined, and convince engineers that it is the right one that takes the company in the right direction".* In C1, managers open many discussions about the goals and objectives that engineers want to achieve. They are keen to involve engineers in many details about the business, such as market needs and customer feedback. The participants confirm that sharing the vision on every level and involving all engineers will convince engineers to be part of the strategy as they consider themselves as partners in charting the organization's direction.

On the other side, Managers speak the business language on behalf of their engineers when they take ideas forward. Participant 2 explains how it is difficult for engineers to demonstrate their idea out of engineering context, and it is the manager who supports this gap by bridging engineers with the business part of the company *"One way to demotivate engineers, I guess, is to expect them to be able to express their idea in a business context or indeed a business person".* Managers provide sponsorship or the impetus for new opportunities from lower organizational levels and make them accessible to top management (Ren and Guo, 2011). They can support engineers' ideas by guiding them with the process and showing them how it could potentially fit with the firm's vision. Participant 4 adds, *"All you have to do is basically convince the senior leadership team that how this idea is actually helping us achieve our goals".*

Overall, the findings from this case study analysis show that creating an intrapreneurial culture is significant for keeping engineers motivated and productive. Allowing flexibility to innovate in their roles and having no penalty for making errors in the process can facilitate their intrapreneurial skills. Researchers such as Hisrich (1990) and Falola et al. (2018) support some of these views. One of the main characteristics of C1 is their open communication structure. As Zahra (1991) notes, such an approach can help in the process of developing new ideas, keeping employees up-to-date with market and industry trends, and promote teamwork and interdisciplinary cooperation.

C1 strategically focuses on the recruitment process by hiring talented engineers and developing their competencies and expertise. In a similar context, Williamson et al. (2013) and Nandan et al. (2015) emphasize recruiting new employees who are motivated to innovate and "think outside the box", and the organization should have all the support in place, such as training programs, competence development, and coaching aspects.

Management support is another aspect that is vital for facilitating and promoting intrapreneurship. Researchers like Staub et al. (2019) highlighted how supportive leaders are open to innovative ideas, maintain friendly relations with subordinates, provide personal support, encourage their employees' development, and fulfill their needs positively influencing their performance. This was evident in the case of C1.

Organizations must take proactive steps to promote innovation by providing a platform that will allow engineers to adopt intrapreneurial roles. The results from C1 indicate how the organization has successfully created an environment conducive to fostering intrapreneurial spirit among engineers, which is illustrated in the figure below.

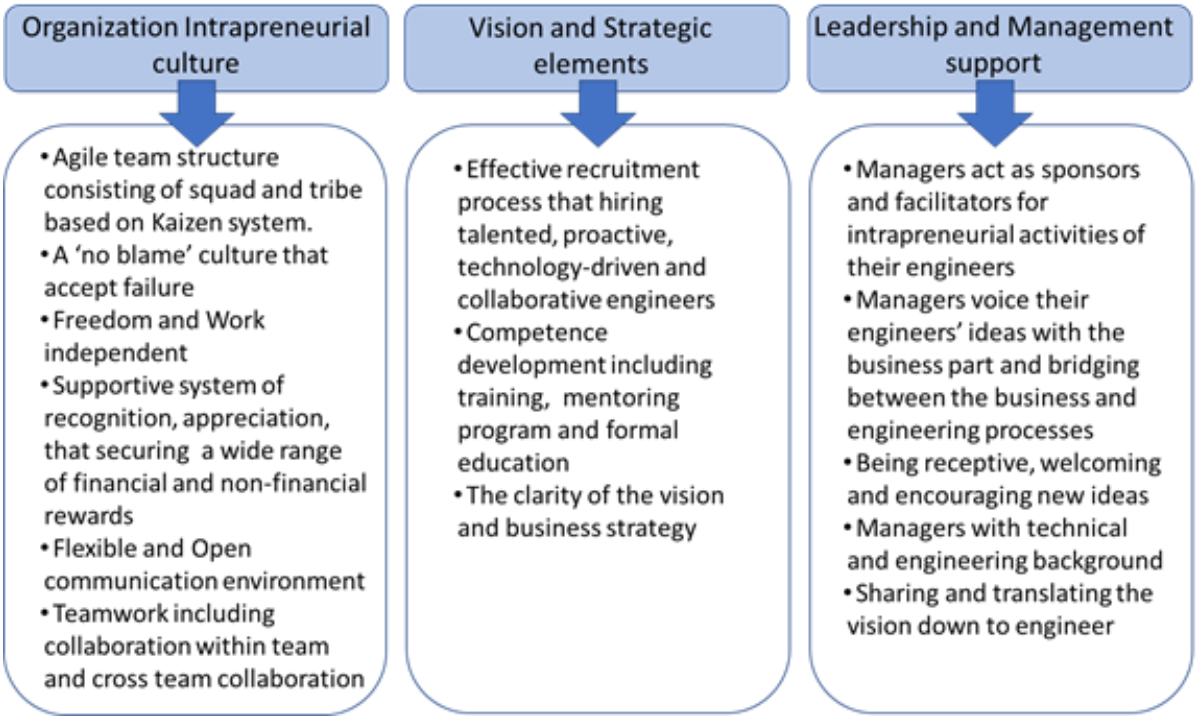

Figure 1: Intrapreneurial influencing factors among engineers in C1

3. Conclusion

Intrapreneurship is considered a strategic route to achieve growth and improve business performance through motivating and encouraging employees to innovate and explore new opportunities within an organization. This study explored the factors that empowered engineers in an SME. The results indicate that creating an intrapreneurial culture, providing a clear strategy, and ensuring supporting management practices converge together as the main framework to drive engineers' intrapreneurial capabilities. Today, there is a need for technological organizations to boost their engineers' engagement and productivity so they can perform at their best. The study results find that empowering engineers to be influential contributors to innovation starts from the recruitment process. This includes hiring innovative and expert engineers, motivating them in their roles, giving them the freedom, rewarding their innovative efforts, and ensuring constant support so that they thrive within the firm. This support is derived from different mechanisms of culture, strategy, and management. As seen in the case study of C1, these are influenced by the agile structure of teams and Kaizen culture, where every engineer is empowered to drive continuous improvement in the organization in the form of new suggestions, ideas, and a better way of doing things.

The findings contribute to the literature by providing a comprehensive picture of intrapreneurship in engineering practices. The findings will help technology organizations to create an intrapreneurial culture and provide adequate management support that cultivates the intrapreneurial potential of engineers. This research focuses on a single case study from the FinTech industry. Future research can be expanded to include multiple case studies of technology-based firms from different industries.

References

Alam, M. Z., Kousar, S. and Rehman, C. A. (2019). Role of entrepreneurial motivation on entrepreneurial intentions and behaviour: theory of planned behaviour extension on engineering students in Pakistan. *Journal of Global Entrepreneurship Research*, 9 (1), p.50.

Alam, M. Z., Nasir, N. and Rehman, C. A. (2020). Intrapreneurship concepts for engineers: a systematic review of the literature on its theoretical foundations and agenda for future research. *Journal of Innovation and Entrepreneurship*, 9 (1), p.8.

Amo, B. W. (2010). Corporate entrepreneurship and intrapreneurship related to innovation behaviour among employees. *International Journal of Entrepreneurial Venturing*, 2 (2), p.144.

Antoncic, B. (2007). Intrapreneurship: a comparative structural equation modeling study. *Industrial Management & Data Systems*, 107 (3), pp.309–325.

Antoncic, J. A., Antoncic, B. and Li, Z. (2018). Creativity of the Entrepreneur, Intrapreneurship, and the Growth of Small and Medium-Sized Enterprises: Evidence from China. *Chinese Business Review*, 17 (7), pp.336–341.

Azami, S. (2013). Intrapreneurship-"An Exigent Employement". *International Journal of Scientific & Technology Research*, 2 (4), pp.194–198.

Baruah, B. and Ward, A. (2015). Metamorphosis of intrapreneurship as an effective organizational strategy. *International Entrepreneurship and Management Journal*, 11 (4), pp.811–822.

Blanka, C. (2019). An individual-level perspective on intrapreneurship: a review and ways forward. *Review of Managerial Science*, 13 (5), pp.919–961.

Carraher, S. M., Hart, D. E. and Carraher, C. E. (2003). Attitudes towards benefits among entrepreneurial employees. *Personnel Review*, 32 (6), pp.683–693.

Carrier, C. (1996). Intrapreneurship in small businesses: an exploratory study. *Entrepreneurship Theory and Practice*, 21 (1), pp.5–20.

Corbett, A. et al. (2013). Corporate Entrepreneurship: State-of-the-Art Research and a Future Research Agenda. *Journal of Product Innovation Management*, 30 (5), pp.812–820.

Delić, A., Đonlagić Alibegović, S. and Mešanović, M. (2016). The Role of the Process Organizational Structure in the Development of Intrapreneurship in Large Companies. *Naše gospodarstvo/Our economy*, 62 (4), pp.42–51. Edison, H. et al. (2018). Innovation Initiatives in Large Software Companies: A Systematic Mapping Study. *Information and Software Technology*, 95 (November 2017), pp.1–14.

Falola, H. O. et al. (2018). Employees' intrapreneurial engagement Initiatives and its influence on organisational survival. *Business: Theory and Practice*, 19, pp.9–16.

Fernández-Olmos, M. and Ramírez-Alesón, M. (2017). How internal and external factors influence the dynamics of SME technology collaboration networks over time. *Technovation*, 64–65 (June), pp.16–27.

Hisrich, R. D. (1990). Entrepreneurship/intrapreneurship. *American Psychologist*, 45 (2), pp.209–222.

Hornsby, J. S., Kuratko, D. F. and Zahra, S. A. (2002). Middle managers' perception of the internal environment for corporate entrepreneurship: assessing a measurement scale. *Journal of Business Venturing*, 17 (3), pp.253–273.

Hughes, M. and Mustafa, M. (2017). Antecedents of Corporate Entrepreneurship in SMEs: Evidence from an Emerging Economy. *Journal of Small Business Management*, 55 (00), pp.115–140.

Jones, G. R. J. (2013). *Organizational Theory, Design, and Change*. seventh ed. Upper Saddle River,NJ: Pearson.

Kriewall, T. J. and Makemsom, K. (2010). Instilling the entrepreneurial mindset into engineering undergraduates. *The Journal of engineering entrepreneurship*, 1 (1), pp.5–19.

Martínez-León, I. M., Olmedo-Cifuentes, I. and Ramón-Llorens, M. C. (2018). Work, personal and cultural factors in engineers' management of their career satisfaction. *Journal of Engineering and Technology Management*, 47 (December 2017), pp.22–36.

Menzel, H. C., Aaltio, I. and Ulijn, J. M. (2007). On the way to creativity: Engineers as intrapreneurs in organizations. *Technovation*, 27 (12), pp.732–743.

Mohanty, R. P. (2006). Intrapreneurial Levers in Cultivating Value-innovative Mental Space in Indian Corporations. *Vikalpa: The Journal for Decision Makers*, 31 (1), pp.99–106.

Nandan, M., London, M. and Bent-Goodley, T. (2015). Social Workers as Social Change Agents: Social Innovation, Social Intrapreneurship, and Social Entrepreneurship. *Human Service Organizations Management, Leadership & Governance*, 39 (1), pp.38–56.

Ren, C. R. and Guo, C. (2011). Middle Managers' Strategic Role in the Corporate Entrepreneurial Process: Attention-Based Effects. *Journal of Management*, 37 (6), pp.1586–1610.

Saunders, M., Lewis, P. and Tornhill, A. (2016). *Research Methods for Business Students*. 7th ed.

Seshadri, D. V. R. and Tripathy, A. (2006). Innovation through Intrapreneurship: The Road Less Travelled. *Vikalpa: The Journal for Decision Makers*, 31 (1), pp.17–30.

Staub, S., Nart, S. and Dayan, H. (2019). The Role of Supportive Leader in Influencing Intrapreneurship and Innovation: A Study on the Printing Houses in Topkapi, Istanbul. *International Journal of Innovation and Technology Management*, 16 (04), p.1940008.

Williamson, J. M., Lounsbury, J. W. and Han, L. D. (2013). Key personality traits of engineers for innovation and technology development. *Journal of Engineering and Technology Management*, 30 (2), pp.157–168.

Yin, R. k. (2017). *Case Study Research and Applications: Design and Methods*. Sixth Edit. Thousand Oaks, California: SAGE Publications.

Zahra, S. A. (1991). Predictors and financial outcomes of corporate entrepreneurship: An exploratory study. *Journal of Business Venturing*, 6 (4), pp.259–285.

The 'Freeport' Dilemma in the Regional Innovation System of South West Wales

James Bourne, Gareth Huw Davies and Mike Williams
School of Management, Swansea University, Wales, UK
869752@swansea.ac.uk
g.h.davies@swansea.ac.uk
m.d.williams@swansea.ac.uk
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Abstract: This case study examines the potential benefits and barriers of the 'Freeport' initiative within the context of South West Wales and the impact it could have on the Regional Innovation system (RIS), while also achieving policy potential for Smart Specialisation. In addition, this paper adds to the existing cases relating to RIS Theory and how this initiative can facilitate in the activities of Knowledge Transfer (KT) and Technology Transfer (TT). Also, this further contributes to the existing literature relating to Regional Innovation policy in this specific region. Furthermore, it expands examination of Smart Specialisation, with a review of this post-industrial region in the emerging BREXIT context. Smart Specialisation is an EU policy, while the 'Freeport' initiative is a post BREXIT UK government led policy within a devolved region. It poses a question for its orchestration in a developing multi-level governance. Additionally, this supplements the literature around the 'Freeport' movement and how it can support a region such as South West Wales, which can open additional avenues for international trade. This examines the impact of University-Industry collaboration and its importance to regional development. The data comprises semi-structured interviews involving key stakeholders from industry, academia, and government. To conclude, there are many similarities between that of the Enterprise Zone (EZ) and the Freeport initiative, which questions if the constant progression of these initiatives takes away from the previous one and not allowing for them to have enough time and resources to make a notable and long-lasting difference. However, it was unanimously agreed of the importance of such initiatives like the Port Talbot Waterfront Enterprise Zone (PTWEZ) and the potential Freeports.

Keywords: Freeports, regional innovation systems, smart specialisation, knowledge transfer, technology transfer

1. Introduction

Now in the age of post BREXIT, the UK Government has reconsidered its international trade approach, which questions the evolution of the devolved region, including Wales. Since devolution in 1999 the Welsh Assembly Government's (WAG) main aims has been to develop Wales into a 'knowledge economy' Abbey, Davies, and Mainwaring (2008) and to carry out the interests of the collaboration between Universities and Industry (Perkmann & Walsh, 2007; Banal-Estañol, Macho-Stadler, & Pérez-Castrillo, 2018). More recently, Freeports have been on the agenda of UK government policy with the recent announcement of eight Freeports to go ahead in England, and at least one more in Wales and Scotland (Webb & Jzepa, 2021). The freeports announced in England are: East Midlands Airport; Felixstowe & Harwich; Liverpool City Region; Plymouth and South Devon; Solent; Teesside; Thames. These are depicted in the image below as Figure 1.

Figure 1: Depicts the eight freeports in red and the location of South West Wales in green

The main objectives set out by UK government for Freeports is to "create hotbeds of innovation" Webb and Jzepa (2021) and the desire to work with academic institutes and centres of excellence (GOV, 2020). For these objectives to be achieved, KT&TT must be considered and recognised, which Ankrah et al (2013) defined by "any activities aimed at transferring technology or knowledge to help either the company or university to further pursue its activities".

This case study paper then looks at the Region of South West Wales, which has significant interests in innovation, with the PTWEZ being a location of interest for this potential initiative. With limited research on Freeports, most of the literature looks at the conditions for success and its challenges associated with this (Susman & Schneider, 2008; Farole, 2011). This paper aims to supplement the field and explore how the concept may relate to region and its potential relationship to Smart Specialisation, which is defined by "a process addressing the missing or weak relations between R&D and innovation resources and activities on the one hand and the sectoral structure on the economy on the other" (Foray, David, & Hall, 2011; Morgan, 2017). Because of the unique nature of the data available to this study, this will provide insights from the perspectives of Academia, Industry and Government, fitting the triple helix model (Leydesdorff & Etzkowitz, 1998). To coincide with the potential arrival of a Freeport to South West Wales, is the completion date of June 2021 for the PTWEZ ending. This paper will set out to look what the future holds for the PTWEZ what configuration should follow this.

2. Freeports

Freeports, which are also called Free trade zones (FTZ) are defined by a geographical area which sits outside the legal customs territory of a nation (Jayawardena, 1983). More recently the UK government has defined this as: Goods can be imported, manufactured, or re-exported within the Freeport incurring no customs duties or taxes; these fees are only paid once the good enters the domestic market (Sunak, 2016). However, compared to the definitions by the world bank Akinci and Crittle (2008) define freeports as similar to FTZ, but define this being a large area and cover a wide range of activities to support economic development and trade. Freeports are not a new phenomenon, they have been around for thousands of years. They were first used by the Triremes of the ancient Mediterranean, which allowed respite from import tax for ships carrying various goods, such as wines and olive oils. Since then, freeports have multiplied consistently throughout the globe for many years, with approximately 50 Free Trade Zones (FTZ), employing 66 million people across 135 countries, while there is not one in the UK (Sunak, 2016).

Freeports exist because of their ability to reduce the barriers often associated with international trade, such as boundaries and differing regulatory regimes (Lavissière, Fedi, & Cheaitou, 2014). However, this raises one of the key arguments against this initiative, the displacement of jobs (Serwicka & Holmes, 2019; Webb & Jzepa, 2021). Concerns were raised by the Welsh Government (WG), because Freeports have been announced in England before agreeing with Wales and Scotland. This presents a lack of joint decision making between UK Government and the devolved regions (Webb & Jzepa, 2021). A GOV (2020) report details a step-by-step breakdown of how these freeports will be adapted to the UK. Most notably, they will be set up in a unique model to cover three objectives:

- Establish Freeports as national hubs for global trade and investment across the UK
- Promote regeneration and job-creation
- Create hotbeds for innovation

The boundary set out for the Freeport will range between 25-45km, where the main location should be near a port. Proposals outside of these boundaries will also be on a case-by-case basis (GOV, 2020; Webb & Jzepa, 2021). This has raised questions about how the devolved nations should react to this and the potential location of a Welsh Freeport. This paper sets to shine some more light on Freeports and the affects it may have on RIS of South West Wales, if the Welsh & UK government decides on South West Wales.

A key finding found in the consultation report by Webb and Jzepa (2021) concluded that respondents believed that including academic institutions to freeports were of great importance. While many local authorities highlighted the importance of linking in Freeports to the local ecosystem "like UKRI catapults" (GOV, 2020). The importance of Freeports has risen globally, directly impacting on Foreign Direct investment (FDI) invested in these zones (Farole, 2011).

While there are variations of Freeports globally, Lavissière and Rodrigue (2017) designed a model to best depict Freeports in its most versatile form. Though this model is comprehensive, it does not consider one of the main objectives, to provide a "hotbed for innovation" (Sunak, 2016). This proposes an evolution from the final prospective model by Lavissière and Rodrigue (2017) and that it should consider how it fits in to the collaboration of academic institutions, science parks and centres of academic excellence (GOV, 2020).

Data collected has been undertaken on the prospects of Freeports in the UK, with limited opinion on devolved regions, which this paper sets to answer. The table below fig 2. depicts the overview of Freeports policy levers in Wales, which are important aspects to consider when designing a prospectus for the Devolved regions.

Policy area	Wales
Customs	Customs policy is reserved by UK government, with few exceptions including sanitary and phytosanitary control, which are mainly devolved
Taxation	Some tax policy is reserved by UK government. However, some aspects, such as Business Rates and Stamp Duty and Tax, are devolved.
Planning	All planning policy is devolved
Regeneration	Regeneration policy is in part devolved
Innovation	Innovation policy is part-reserved by UK government, part-devolved. The Freeports innovation measures are reserved, except as stated otherwise.

Figure 2: Overview of Freeport policy lever in Wales, retrieved from (GOV, 2020)

The Freeport consultation report then raised the importance of planning these under local economic and infrastructure strategies (GOV, 2020; Webb & Jzepa, 2021). In a Welsh context, this should support the perspective of the Future Generations (Wales) Act (H. Davies, 2017) as well as recent WG policy prioritisation of Smart Specialisation (Foray, David & Hall, 2011; Pugh, 2014; Marques & Morgan, 2018; Morgan, 2015). Therefore, this sets out to look at the views of key stakeholders in Government, Academia, and Industry in South West Wales; to understand if this is a suitable location for a Freeport to be located, while also considering the local economic and infrastructure strategies that are already in place.

3. Freeports within a Regional Innovation System (RIS)

RISs were first developed by Cooke (1992) who defined it as a mapping of a regions innovation capacity. The RIS approach has signified the importance of geographical proximity for KT.

Due to complex nature and regional setting of Freeports and their proposed 'innovation hotbed role' they could be considered against the RIS (Cooke, 1992, 2004; M. McAdam & Debackere, 2018). They may present a factor for consideration within such models, to help maximise its potential and to achieve government's goals for innovation to occur. RIS has been a frequent topic in European policy objectives (EC, 2014; OECD, 2013, 2020). Therefore, the importance of Freeports within the RIS is essential to achieve its optimal potential. Wales has developed into a key centre of high quality, highly skilled workforce, with recent devolved policy agendas for decarbonisation, innovation centres and energy positive buildings to support start-ups and spinouts from academia (JLL, 2016; SBCD, 2020; WG, 2020).

The most suitable model that depicts the RIS is by Trippl and Tödtling (2007), whereby they recount all the key actors involved. For the RIS for South West Wales, will be broken down into its key components:

First, the key stakeholders involved in the knowledge generation and diffusion system are the three main universities, Swansea University, University of Wales Trinity St David (UWTSD), and University of South Wales (USW). They respectively have their various incubators and Technology Transfer Offices (TTO). AgorIP is the TTO for Swansea University and the incubator of significance is FLEXIS, which is partly based within the PTWEZ. Followed by SPECIFIC, which is based within Bay campus of Swansea University. Recently FLEXIS was part of an initiative to develop a "zero-carbon area demonstrator" to support clean living (Flexis, 2021). While SPECIFIC have demonstrated "active buildings which can generate, store and release their own heat and electricity from solar energy" (SPECIFIC, 2021).

Second, local knowledge flows and skills are the mechanisms and resources that are in place within the RIS to help with the collaboration of formal and informal links for KT (Tödtling, Lehner, & Trippl, 2006). The PTWEZ is a key stakeholder that was designed for the purpose of linking academia into industry. The Freeport initiative is also an example of performing KT&TT activities.

Third, Socio-institutional factors that describes how the various actors work together and the differing in cultures. Bourne, Davies, and Williams (2020), found that there are still cultural and structural differences associated with academia, industry, and government because of the "patent or publish" dilemma (R. McAdam, Miller, McAdam, & Teague, 2011). However, with the RIS, there are many examples of collaborations between academia and industry, most notably in the life sciences and engineering department (G. H. Davies et al, 2020).

Asheim and Isaksen (2002) concluded in their study of the importance of KT&TT when firms are within RISs, as this is one of the key drivers for companies to be within a certain location. Huggins and Kitagawa (2012) support these findings who state the importance of academic institutions in KT activities. This then supports the objectives set out in the Freeports policy of including academic institutions, to establish operating laboratories, testing facilities, translational research centres and business incubators to help drive new opportunities (GOV, 2020).

4. Approach

The case study paper is to question how the Freeport would be situated within RIS of South West Wales. This approach has been developed, drawing upon the approach pioneered by (Stake, 1995).

Research carried out for this paper comprised three parts. Bibliographic literature review, primary data collected from semi-structured qualitative interviews, and secondary data on the statistics on Freeports, comprising 12 interviews with key actors in the government, academia, and industry.

A rapid thematic form of coding was undertaken to synthesise the interviews carried out. Themes and codes identified were then analysed with the knowledge of the Freeports that have already been chosen and for what reason.

These results will be related to the policies of Smart Specialisation and RIS, to understand and give insights for policy implications. This will investigate how AgorIP can support the ongoing development of the PTWEZ, in relation to the potential Freeport agenda. Furthermore, this data can also act as a bridge between the two, to open new avenues for potential KT & TT to take place.

5. Findings and discussion

The results are presented in three sections reflecting the triple helix model, within the context of South West Wales (Etzkowitz & Leydesdorff, 2000). This method was based upon previous work by Bourne, Davies and Williams (2020) who discussion and analysis separated it into these three sections. These are a continuation of an initial data collection, that was set out to understand the drivers and barriers for successful KT&TT within the context of PTWEZ. Main themes were synthesised though semi-structured interviews of key stakeholders within academia, industry, and government (Bourne, Davies & Williams, 2020). This work sets to understand the evolution of the Enterprise Zone and how it might work in an international context. Presented below are quotes and themes emerged from the rapid thematic analysis.

5.1 Academia

Limited knowledge was held by academics regarding the Freeport initiative, where participants either knew nothing about the initiative, or they were quite familiar with it. In relation to the 'innovation hotbed' dimension of RISs, there was a consensus for a lack of joined up approach between the TTO in Swansea and the PTWEZ for the potential of spinouts and commercialisation.

> *"So there is external support and there is the enterprise zone that they do require support, but it's not that apparent really the whole embeddedness like that."*

Conversely, With the consensus for the future of the PTWEZ, it was agreed that proper investigation must be undertaken. However, there was an overall agreement that it can act as key component between the KT&TT activities. Also, this initiative has been seen to only be beneficial to the key stakeholders of the Triple helix in the area. Where an academic was quoted:

> *"The area, I do not know a lot, but it's quite nice to see so many companies happening in certain areas, as I say quite close as well to Swansea directly, this can only be a benefit. For the local community."*

There was limited discussion of tangible benefits associated with the PTWEZ. However, there was a level of belief in non-tangible benefits, including an overall social benefit to the surrounding region. Also, this supports the literature around the importance of creating the linkages between industry, academia and government that may not have been achieved without this (Bourne, Davies & Willams, 2020; Zhang, Chen, & Fu, 2019). Moreover, the basis for the PTWEZ naturally forms clustering of industries and companies within a region that can only be seen as beneficial, while also supporting the literature (Bramwell, Nelles, & Wolfe, 2008; Valero & Van Reenen, 2019).

In addition, this supports the idea of incorporating various stakeholders for when a freeport is formed to optimise innovation activities (GOV, 2020).

5.2 Government

Given the conditions and resources the PTWEZ had during its tenure, there was great admiration of what the board had done in the collaboration between these key stakeholders within the region. Where a government official was quoted saying:

> *"you know, I think that the enterprise zone has operated quite effectively as a mechanism for building trust between partners."*

Furthermore, this is supported through all the government officials' interviews, that they had achieved more than expected, given their budget of £40,000. When asked of what should take the EZ's place once it completes in June 2021, there was an agreement that an evolution of the EZ should occur, but only on the condition that more resources are given to the initiative. However, there was not a general agreement of what should take its place, whether that is a continuation of the PTWEZ, or a possible "Innovation District" quoted by a government official:

> *"It is too soon to stop it at this moment. Then I made that comment that nature hates a vacuum; something else will fill the void, but it may not be right."*

In Port Talbot the port was raised as an important stakeholder and resource to help support the strategic objectives set out by the PTWEZ.

> *"Associated British port, there is an opportunity there."*

This key stakeholder gives another argument to a Freeport being situated here. Port Talbot has a deep harbour port for bulk materials, which makes it unique to the markets that it can offer. Where government officials believe that strategically, Port Talbot is best situated to have a Freeport for the overall benefit of Wales.

However, there is still some trepidation regarding the Freeport debate, where WG have raised some issues regarding "Obstruction", which should be addressed before the WG begin deciding on where this Freeport should be. Furthermore, there is a desire for more analysis to understand the true benefits that these freeports can bring, where a government participant quoted:

> *"Clearly, and then in the right way, with the right policy approach and the right set of interventions and they could be a very useful tool for driving the economy of a region, but there are potential downsides if it's not done properly."*

Together with the academic respondents, the importance of including academic institutions was unanimous amongst industry participants, which backs reports by Sunak (2016) and GOV (2020), supporting the notion of the 'Innovation hot bed'. Coupled with the importance of involving key stakeholders such as ABP and St Modwen who have large amount of influence within the region. This adds to the port that is already there, which can be utilised with the EZ and supports the idea of a 'supercharged Freeport' which links a freeport and EZ such as the PTWEZ (Millett & Lassen, 2018).

Conversely, there was slight concern over the amount of analysis that has been carried out over the potential benefits of the Freeports, which echoes comments made in the report by Webb and Jzepa (2021) where WG highlighted the issues around the joined up approach between main government and the devolved regions. In addition, the hesitancy raised by government officials, relates back to the literature around displacement of jobs (Serwicka & Holmes, 2019; Webb & Jzepa, 2021).

5.3 Industry

An Industry participant was directly quoted in the potential for a Freeport to be in South West Wales and in Port Talbot, where they argued from a strategic point of view that to get the most out of a Freeport, the key stakeholders of academia, industry and government should be part of the process of this initiative. However, it comes back to potential political issues because of the Freeport being a UK government led initiative, compared to this being an initiative led by the devolved region of Wales, where they were quoted:

> *"We should be able to look and create an opportunity that is bringing together, academia, public sector, private sector, third sector, to a certain degree. To create something that is different and*

> *differentiated at port talbot, which also has sustainable import, export capability. So, I see, there is a potential there, but I see political problems."*

When describing the PTWEZ, participants emphasised the importance of academic institutions and how they collaborate with local industry. While taking advantage of Intellectual Property (IP) and spin outs coming out of the main universities around Swansea, that are Swansea University, UWTSD and USW, where an industry participant was quoted:

> *"One of the things that came out of our zoom meetings board meetings was that we should try and get someone from the University thinking about how the university can contribute to this process of creating wellbeing, wealth and opportunity."*

However, there was a great enthusiasm to collaborate with the TTO in Swansea University 'AgorIP' and their exciting model, which would maximise potential for commercialisation of IP and spin outs. But there seems to be a disconnect between what the university is doing and what the PTWEZ sees. This was argued that personnel changes within the university, meant it was hard to build momentum.

> *"To let me know who is currently looking for finance and who might be looking for finance that's coming out of research over the next 18 months or two years I need to know those things, and that has slowed down."*

IP is territorial in nature, which poses the question as to how that may manifest in the proposed innovation hotbed Freeport initiative. Also, the desire described from industry proposes the output of AgorIP for spin outs and commercialisation potential. This supports the objectives stated by Webb and Jzepa (2021) consultation report regarding using key stakeholders within a location, such as academic institutions. However, inherent issues associated with working with academia were raised and questioned regarding the joined-up approach between key stakeholders (R. McAdam et al, 2011; Mascarenhas, Ferreira, & Marques, 2018;). Similarly, industry respondents echoed, one of the main objectives from the Sunak (2016), which relates back to the opportunity of developing "hotbed for innovation".

Disagreement on the effectiveness of these area-based initiatives working, with a report carried out by WWC (2016) who found the EZ's didn't consider displacement In their evaluations, where analysis that did, often found displacement occurring.

6. Conclusion

In conclusion, this case study offers several insights for researchers and practitioners. First, there was unanimity over the importance of academic institutions being essential to the success of the government led initiatives such as the PTWEZ and Freeports, through KT & TT.

Following the completion of the PTWEZ, there was an opportunity noted for something to succeed it to promote innovation activity. This proposes the idea of an 'Innovation district' with the potential addition of a Freeport in the vicinity.

The above points should be considered in the complex policy dynamics acknowledged between main UK and WG that should be resolved to progress these policies. There are similarities between Freeports and EZ's, which asks if this is just the same idea but labelled as a new initiative. What differs is the Freeports added benefits for customs relief on international trade, that may bring displacement of jobs around the UK. However, since eight freeports have already been announced, it should be in WG's best interests to decide where a Freeport may go for the optimal benefit of the country. Otherwise, there is a potential for displacement to happen from Wales into England and a risk for new international business being situated elsewhere that can have a long term effect on the development of Wales.

References

Abbey, J., Davies, G., & Mainwaring, L. (2008). Vorsprung durch Technium : Towards a System of Innovation in South- west Wales. *Regional studies, 42*(2), 281-293. doi:10.1080/00343400601147281

Akinci, G., & Crittle, J. (2008). *Special economic zone: performance, lessons learned, and implication for zone development*. Retrieved from

Ankrah, S., Burgess, T., Grimshaw, P., & Shaw, N. (2013). Asking both university and industry actors about their engagement in knowledge transfer: What single- group studies of motives omit. *Technovation, 33*(2-3), 50-50. doi:10.1016/j.technovation.2012.11.001

Asheim, B. T., & Isaksen, A. (2002). Regional innovation systems: the integration of local 'sticky'and global 'ubiquitous' knowledge. *The Journal of Technology Transfer, 27*(1), 77-86.

Banal-Estañol, A., Macho-Stadler, I., & Pérez-Castrillo, D. (2018). Endogenous Matching in University-Industry Collaboration: Theory and Empirical Evidence from the United Kingdom. *Management Science, 64*(4), 1591-1608. doi:10.1287/mnsc.2016.2680

Bourne, J., Davies, G. H., & Williams, M. (2020). *Knowledge and Technology Transfer in the Port Talbot Waterfront Enterprise Zone.* Paper presented at the ECIE 2020 16th European Conference on Innovation and Entrepreneurship.

Bramwell, A., Nelles, J., & Wolfe, D. A. (2008). Knowledge, innovation and institutions: global and local dimensions of the ICT cluster in Waterloo, Canada. *Regional studies, 42*(1), 101-116.

Cooke, P. (1992). Regional innovation systems: competitive regulation in the new Europe. *Geoforum, 23*(3), 365-382.

Cooke, P. (2004). The regional innovation system in Wales. *Regional Innovation Systems. The Role of Governances in a Globalized World*, 245-263.

Davies, G. H., Flanagan, J., Bolton, D., Roderick, S., & Joyce, N. (2020). University knowledge spillover from an open innovation technology transfer context. *Knowledge Management Research & Practice*, 1-10.

Davies, H. (2017). The Well-being of Future Generations (Wales) Act 2015—A Step Change in the Legal Protection of the Interests of Future Generations? *Journal of Environmental Law, 29*(1), 165-175.

EC. (2014). *National/Regional Innovation Strategies For Smart specialisation (RIS3)*. European Commission

Etzkowitz, H., & Leydesdorff, L. (2000). The dynamics of innovation: from National Systems and " Mode 2" to a Triple Helix of university– industry– government relations. *Research Policy, 29*(2), 109-123. doi:10.1016/S0048-7333(99)00055-4

Farole, T. (2011). *Special economic zones in Africa: comparing performance and learning from global experiences*: The World Bank.

Flexis. (2021). Smart Energy for our future Retrieved from https://www.flexis.wales/research-item/?category_id=4

Foray, D., David, P. A., & Hall, B. H. (2011). *Smart specialisation from academic idea to political instrument, the surprising career of a concept and the difficulties involved in its implementation*. Retrieved from

GOV. (2020). *Freeports - Response to the consultation*. Retrieved from https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/924644/FINAL_-_200923_-_OFF_SEN_-_Freeports_Con_Res_-_FINAL.pdf

Huggins, R., & Kitagawa, F. (2012). Regional Policy and University Knowledge Transfer: Perspectives from Devolved Regions in the UK. *Regional studies, 46*(6), 817-832. doi:10.1080/00343404.2011.583913

Jayawardena, D. (1983). Free trade zones. *J. World Trade L., 17*, 427.

JLL. (2016). *Property Review - Port Talbot Waterfront Enterprise Zone*. Retrieved from

Lavissière, A., Fedi, L., & Cheaitou, A. (2014). *A modern concept of free ports in the 21st century: a definition towards a supply chain added value.* Paper presented at the Supply Chain Forum: an International Journal.

Lavissière, A., & Rodrigue, J.-P. (2017). Free ports: towards a network of trade gateways. *Journal of Shipping and Trade, 2*(1), 1-17.

Leydesdorff, L., & Etzkowitz, H. (1998). The triple helix as a model for innovation studies. *Science and Public Policy, 25*(3), 195-203.

Marques, P., & Morgan, K. (2018). The Heroic Assumptions of Smart Specialisation: A Sympathetic Critique of Regional Innovation Policy. In A. Isaksen, R. Martin, & M. Trippl (Eds.), *New Avenues for Regional Innovation Systems - Theoretical Advances, Empirical Cases and Policy Lessons* (pp. 275-293). Cham: Springer International Publishing.

Mascarenhas, C., Ferreira, J. J., & Marques, C. (2018). University– industry cooperation: A systematic literature review and research agenda. *Science and Public Policy, 45*(5), 708-718. doi:10.1093/scipol/scy003

McAdam, M., & Debackere, K. (2018). Beyond 'triple helix' toward 'quadruple helix' models in regional innovation systems: implications for theory and practice. *R&D Management, 48*(1), 3-6. doi:10.1111/radm.12309

McAdam, R., Miller, K., McAdam, M., & Teague, S. (2011). The development of University Technology Transfer stakeholder relationships at a regional level: Lessons for the future. *Technovation, 32*(1). doi:10.1016/j.technovation.2011.08.001

Millett, J., & Lassen, C. (2018). *Supercharged Free Ports - The ultimate boost for britian's economy*. Retrieved from http://www.infrastructure-intelligence.com/sites/default/files/article_uploads/Insights%20-%20Supercharged%20Free%20Ports.pdf

Morgan, K. (2015). Smart Specialisation: Opportunities and Challenges for Regional Innovation Policy. In (Vol. 49, pp. 480-482): Routledge.

Morgan, K. (2017). Nurturing novelty: Regional innovation policy in the age of smart specialisation. *Environment and Planning C: Politics and Space, 35*(4), 569-583.

OECD. (2013). *Regions and Innovation*.

OECD. (2020). *The Future of Regional Development and public investment in Wales* Retrieved from https://www.oecd-ilibrary.org/sites/e6f5201d-en/index.html?itemId=/content/publication/e6f5201d-en

Perkmann, M., & Walsh, K. (2007). University– industry relationships and open innovation: Towards a research agenda. *International Journal of Management Reviews, 9*(4), 259-281. doi:10.1111/j.1468-2370.2007.00225.x

Pugh, R. E. (2014). 'Old wine in new bottles'? Smart Specialisation in Wales. *Regional Studies, Regional Science, 1*(1), 152-157. doi:10.1080/21681376.2014.944209

SBCD. (2020). Regional green light for £58.7 million Neath Port Talbot programme. Retrieved from https://www.swanseabaycitydeal.wales/news/regional-green-light-for-587-million-neath-port-talbot-programme/

Serwicka, I., & Holmes, P. (2019). *What is the extra mileage in the reintroduciotn of 'free zones' in the UK*. Retrieved from https://blogs.sussex.ac.uk/uktpo/publications/what-is-the-extra-mileage-in-the-reintroduction-of-free-zones-in-the-uk/

SPECIFIC. (2021). Energy Techology Research & Demonstrations. Retrieved from https://www.specific.eu.com/

Stake, R. E. (1995). *The art of case study research*: sage.

Sunak, R. (2016). *The Free ports Opportunity*. Retrieved from https://www.cps.org.uk/files/reports/original/161114094336-TheFreePortsOpportunity.pdf

Susman, P., & Schneider, G. (2008). Institutional challenges in the development of the World's first worker-owned free trade zone. *Journal of Economic Issues, 42*(2), 489-498.

Tödtling, F., Lehner, P., & Trippl, M. (2006). Innovation in knowledge intensive industries: The nature and geography of knowledge links. *European Planning Studies, 14*(8), 1035-1058.

Trippl, M., & Tödtling, F. (2007). Developing Biotechnology Clusters in Non-high Technology Regions—The Case of Austria. *Industry and innovation, 14*(1), 47-67.

Valero, A., & Van Reenen, J. (2019). The economic impact of universities: Evidence from across the globe. *Economics of Education Review, 68*, 53-67.

Webb, D., & Jzepa, I. (2021). *UK Govenrment policy on freeports*. Retrieved from https://commonslibrary.parliament.uk/research-briefings/cbp-8823/

WG. (2020). *A manufacturing future for Wales: a framework for action*. (WG39698). Retrieved from https://gov.wales/sites/default/files/consultations/2020-09/manufacturing-future-wales-consultation-document.pdf

WWC. (2016). *Area Based Initiatuves: Enterprise Zones*. Retrieved from https:// whatworksgrowth.org/public/files/Policy_Reviews/16-01-04-Areabased-initiatives-EZ.pdf.

Zhang, Y., Chen, K., & Fu, X. (2019). Scientific effects of Triple Helix interactions among research institutes, industries and universities. *Technovation, 86*, 33-47.

Exploring Entrepreneurial Education Through Extra-Curriculum Activities

Vasiliki Chronaki
Athens University of Economics and Business, Athens, Greece
vxronaki@aueb.gr
DOI: 10.34190/EIE.21.107

Abstract: Entrepreneurial Education and the objective of fostering an Entrepreneurial Mindset have been extensively researched the last decades. So far, the main focus has been the end result of Entrepreneurial Education, namely venture creation, and more specifically venture creation through formal or core curriculum University education. Taking a different approach, this study explores the Entrepreneurial Education and the promotion of Entrepreneurial Mindset as well as of entrepreneurial competencies through extra-curriculum activities. More specifically, it uses the "Inter-Departmental Entrepreneurial Assignment" (IDEA) organized by the Athens University of Economics and Business (AUEB) as a case study, employing a quantitative method. IDEA is a semester - long extra-curriculum activity focused on Entrepreneurial Education, involving undergraduate students from different departments. Employing two distinct, complementary questionnaires, one pre and one post, we explore how Entrepreneurial Education influenced the students focusing on a set of specific entrepreneurial competences. More specifically, through this study we aim to gain a better understanding of how such extra-curriculum, University provided Entrepreneurial Education focused on students' entrepreneurial competencies, can influence the Entrepreneurial Mindset and the entrepreneurial way of thinking. Moreover, instead of venture creation, we focus on how Entrepreneurial Education may foster entrepreneurial competencies and a way of thinking that can be beneficial in all life aspects regardless the ultimate field of employment. Finally, this study may serve as the first step towards more research on different kinds of extra-curriculum activities and their impact, not only on entrepreneurial competences, but also on the cultivation of entrepreneurial emotions and an entrepreneurial way of living.

Keywords: entrepreneurial education, extra-curriculum, entrepreneurial competencies, entrepreneurial mindset

1. Introduction

Presently, as universities try to claim their place in governmental strategies aiming to stimulate the regional economic development, (Cohen et al. 2002) it is critical to further explore the concept of the Entrepreneurial University (EU), as it makes technology transfer, firm formation and regional development an academic mission (Etzkowitz, 2004). EUs have been extensively researched over the past decades (Webster et. al., 2000; Etzkowitz, 2013; Guerrero et.al., 2016; Fernández-Nogueira et.al., 2018). EUs and the ways for a Higher Education Institution (HEI) to turn into one, have attracted the interest of industry as well. The European Commission along with the Organisation for Economic Co-operation and Development (OECD) created the HEInnovate tool for self-reflection and change, to assist universities to recognize their entrepreneurial and innovative strengths and weaknesses. Thus, guiding them through their shift.

At the heart of the EU lies Entrepreneurial Education (EE). In the Entrepreneurship 2020 Action Plan (European Commission, 2013) it is stressed that "investing in entrepreneurship education is one of the highest return investments Europe can make," highlighting the importance of EE through the "Entrepreneurial Teaching and Learning" of the HEInnovate tool. Thorp & Goldstein (2013, p.21) specifically claim that "If entrepreneurial thinking can be included and integrated into the dialogue on the campuses of our great universities, these institutions can emerge as true engines of innovation – just what society expects of them."

The university student comes to mind while one considers the central beneficiary of EE. In order to develop entrepreneurial thinking, the student needs to first develop a set of Entrepreneurial Competencies (ECs). This can be achieved through EE, as its goal is to prepare students to practice entrepreneurship while developing their knowledge, skills, attitudes (Garavan et. al. 1994; Mwasalwiba 2010) and ECs (Lackeus 2015).

But what kind of EE is needed in order to provide the best possible outcome in terms of students' ECs? Universities around the world strive to include entrepreneurship in their core curriculum (Fernández-Nogueira et.al., 2018; Cuia et.al., 2018) whilst Extracurricular Activities (ECAs) focusing on EE emerge (Fernández-Nogueira et.al., 2018; Arranz et.al., 2017; Souitaris et.al., 2007). So far, ECAs are mostly perceived as activities including sports, or involving student organizations (Acar & Guduz, 2017; Selçuk, 2006). Generally, they can be defined as activities which "students perform voluntarily as a complement to (compulsory) education activities" (Roulin & & Bangerter, 2013).

Bearing in mind the emergence of new types of ECAs as well as the necessity to cultivate students' ECs, we conducted a case study research through organizing and implementing the Inter-Departmental Entrepreneurial Assignment (IDEA). IDEA constitutes an ECA offered once each semester to all undergraduate students by the Athens University of Economics and Business (AUEB). With a duration of four months, its primary focus lies on business ideas related to Green Entrepreneurship. Through this research we try to change the way an ECA is perceived by researchers and academics. We claim that any complementary project which is offered through an educational institution and enhances students' knowledge, mindset and confidence can be considered an ECA.

Academic value is added by investigating the mediating role of EE which comes in an ECA form and deepens the understanding of whether and how it might affect and cultivate students' ECs and their overall will to engage in entrepreneurial action. The research provides new insights for EE researchers, educators, and policy-makers. This paper is structured as follows. First, a literature review on EE and ECs is presented. Secondly, the methodology is described including thorough examination of the case under study and data collection protocol. Thirdly, results are presented followed by the conclusion providing key findings, limitations and suggestions for future researchers.

2. Literature review

2.1 EE and ECs: Relationship and definitions

Authors have generally proposed a relationship between EE and ECs. For example, Dyer (1994) suggested that specialised courses on entrepreneurship can provide someone with the necessary confidence to engage in venture creation. Robinson et. al. (1991) avowed that attitudes can be altered and modified by educators. Krueger & Brazeal (1994) recommended the improvement of perceived feasibility for entrepreneurship through EE by increasing students' knowledge, uplifting their confidence and self-efficacy. Furthermore, Sánchez (2011) recognized the positive relationship of University curriculum entrepreneurial training programmes with students' competencies and intentions for venture creation, in respect to self-efficacy, proactiveness, risk-taking and intention of self-employment. Additionally, González-López et.al. (2020) indicated that ECs are closely associated with the involvement in nascent entrepreneurship inclinations.

Drawing from the work of Tittel & Terzidis (2020), three definitions on ECs have been identified. The one we adopt comes from Bird (1995) who notes that "entrepreneurial competencies can be defined as underlying characteristics such as generic and specific knowledge, motives, traits, self-images, social roles, and skills which result in venture birth, survival, and/or growth". Man et al. (2002) claim that ECs are "considered a higher-level characteristic encompassing personality traits, skills and knowledge, and therefore can be seen as the total ability of the entrepreneur to perform a job role successfully". Mitchelmore & Rowley (2010) offer a more open definition according to which ECs are "a specific group of competencies relevant to the exercise of successful entrepreneurship".

Aside from literature, the "EntreComp" framework, was created by the European Commission. Its' goal is to provide a shared definition of entrepreneurship as a competence. It consists of 3 interrelated and interconnected competence areas each made up of 5 competencies, collectively comprising entrepreneurship as a competence. Moreover, it can be used for the definition of parameters to an individual's ECs.

Based on this framework and the proposed ECs, a literature review was conducted, concluding in eight ECs that have been mostly studied upon. Self-efficacy is the first EC under study (Krueger & Brazeal, 1994; Bandura, 1989; Scherer et.al., 1989). Moreover, we have Ambiguity Tolerance (Furnham & Ribchester, 1995; Geller, 1993), Knowledge of Cognition (Zaidatol et.al, 2013), Proactiveness (Bateman & Crant, 1993), Risk Taking/Propensity (Stewart & Roth, 2004; Busenitz 1999; Busenitz & Barney 1997), Alertness to Opportunity/Opportunity Recognition (Tang et.al. 2012), Dispositional Optimism/Optimism (Crane, 2014; Crane et.al., 2012) and Readiness for Entrepreneurship (Codurasa et.al., 2016)

2.2 ECs and how they are developed according to literature

The development of an individual's ECs has been mostly studied through core curriculum courses offered by a HEI, through partaking in an incubation or acceleration centre and through working in an organization.

Through a generalized view, Gieure et.al. (2020), concluded that the university's role in the creation of internal and external factors driving students towards venture creation is vital. They also noted that the university is where students develop their entrepreneurial spirit, or mindset, which is ignited when surrounded by environmental factors such as entrepreneurial training.

Regarding the development of ECs through core curriculum, multiple studies have been conducted. For example, Lobler (2006) proposed a framework for designing an entrepreneurial learning environment inside the HEI where students can govern their own learning process and thus have the ability to develop the ECs in their own manner. Cuia et.al. (2019), aiming to evaluate the impact of EE on the entrepreneurial mindset of college students, recognized four components, or ECs: alertness to opportunity, risk propensity, ambiguity tolerance, and dispositional optimism.

Incubation and acceleration centres are considered vital in the development of ECs, entrepreneurial mindset and venture creation. Etzkowitz (2013), while discussing the transformation of a HEI through training individuals to shaping organizations, explained that such a transformation occurs through structures such as incubators. Several studies on the impact of higher education on entrepreneurial intention point out that business incubators, information centres and financial aid, fuel entrepreneurial intention (Fayolle et.al, 2006; Souitaris et.al., 2007; Liñan, 2008).

ECs development through organizations has been also studied in literature. In their contribution, Wiklunda & Shepherdb (2005) observe that businesses may be assisted from adopting an ''entrepreneurial strategic orientation'' which is a combination of the three dimensions: innovativeness, proactiveness, and risk taking. Stevenson & Jarillo (1990), defined entrepreneurship as "a process by which individuals-either on their own or inside organizations-pursue opportunities without regard to the resources they currently control".

3. Methodology

3.1 Case study: IDEA case

The IDEA case was used to explore whether and to what extent an ECA focused on entrepreneurship is sufficient to cultivate students' ECs.

The idea for an interdepartmental course focusing on entrepreneurship was born in terms of the first Train-the-Trainers (TtT) pilot workshop organized by the EU-funded Project "entreTime." The course was held by a diverse team of three professors, two of which had never before been engaged with entrepreneurship. The case under examination, is organized each semester, lasts four months, and is open to all undergraduate AUEB students while being oriented towards the development of business ideas around Green Entrepreneurship. It does not belong to the core curriculum as a compulsory course, and is hence considered an ECA.

AUEB is a leading Greek University in the domain of Economics, Business, Entrepreneurship, Commerce, Management, and Innovation, encompassing a variety of departments ranging from Management Science and Technology, to Accounting and Finance. However, in several of the departments, the curriculum lacks entrepreneurship-related courses. The program offers new, as well as complementary knowledge, in addition to hands-on experiential implementation of previous knowledge. It allows students to learn by doing and put in practice what they have learned in theory. Therefore, it is considered a form of EE, as defined by Jones & English (2004). They claimed that EE is "the process of providing individuals with the ability to recognize commercial opportunities and the insight, self-esteem, knowledge and skills to act on them".

Thirty students were selected and divided into six teams according to the criteria defined and examined in their application form.

Researchers were continuously involved in the organization and development of the case under study, therefore conducting a field research. Their involvement was significant in designing the IDEA, building the application questionnaire, selecting the students, carrying out the project, gathering data, and validating results.

The selection and data convergence were conducted in a triangulating fashion. Triangulation refers to the use of multiple methods or data sources in qualitative research to develop a comprehensive understanding of

phenomena (Patton, 1999). Triangulation has also been viewed as quantitative research strategy in order to test validity by converging information from different sources.

In our case, data from informal interviews, direct observation and questionnaires were gathered. The findings from all methods lead to similar conclusions, presented in the results part of this paper, therefore validating the finding that an ECA as implemented by a HEI can indeed affect and cultivate students' ECs.

3.2 Data collection protocol

Researchers observed and interviewed students more than once a week. Notes were kept during every meeting, as well as after the project's completion, highlighting important quotes and behaviours and validating the overall process and results.

For the questionnaire data, one pre and one post questionnaire were disseminated to students. The first was used for student selection and assessment. It consisted of demographic questions such as full name, age, department of studies as well as 26 items that comprised questions on a 1-5 Likert Scale. Based on literature, eight ECs were chosen to be included and examined upon; Self-efficacy for which the Entrepreneurial Self-Efficacy measure developed by De Noble et al. (1999) was used, Ambiguity Tolerance using the adaptation performed by Cuia et.al. (2019) on the original work by Geller et.al. (1993), Knowledge of Cognition, while adopting the measurement from Pihie et.al. (2013), Proactiveness, using the ten-item version of the Proactive Personality Scale by Bateman & Crant (1993), Risk Taking/Propensity for which the "Risk Orientation Questionnaire", and specifically its pre-test version by Rohrmann (1997) as explained in the work of Seibert et.al. (2001) was used, Alertness to Opportunity/Opportunity Recognition, was measured by excerpting the scale developed by Tang et al. (2012), Dispositional Optimism/Optimism was measured using Crane's (2014), 11-item survey instrument based on the Life Orientation Test-Revised instrument validated by Scheier et.al. (1994) and Readiness for Entrepreneurship, for which the tool proposed by Codurasa et.al. (2016) was used.

The questionnaire, which also served as an application form, helped the research team define the state of the existing ECs in students willing to partake in IDEA, as well as select them and divide them into teams. We set the teams based on criteria related to their departments, gender and complementary ECs.

The second questionnaire, which was disseminated after the IDEA was completed, was/ constituted an industry-based questionnaire. The team behind HEinnovate offered the Entrepreneurial Potential and Innovation Competences (EPIC) course assessment tool, which allows measure effectiveness of entrepreneurship courses. While focusing on ECs, Entrepreneurial Mindset & Enterprising Behaviours and Entrepreneurial Intentions and Attitudes, we were able to assess the students viewing of themselves in regards to these areas before and after their participation.

4. Learning outcomes/results

There are several worth mentioning results and learning outcomes from this case study. Broadly, these results can be separated into three main categories. Namely, issues related to participation motivation (both for students and professors); issues centred around the process and methodology of organizing and developing the program; issues focusing on the teaching model applied. Finally, an additional separated category concerns the outcomes that emerged, either as a result of direct observation and informal interviews, or as the result of the questionnaire.

4.1 Participation motivation

Starting from the question of why a student would like to participate and building upon the Self-Determination-Theory of Deci & Ryan (2000) where it is stated that "People perform an action either because it is interesting or enjoyable (i.e. intrinsic/internal motivation) or because it may lead to positive outcomes (i.e. extrinsic/external motivation)", we value students' motivation of participation as internal or external. In the IDEA case, internal motivation could stem from interest for something unknown or deepening already existing knowledge, becoming part of a closed group or participating in an activity alongside friends and colleagues. External motivation could come from the end result of socializing and forming relationships, being awarded for participation, or having an already formed entrepreneurial idea that one hopes to get further developed. One more positive motivating factor, as expressed by participants, was that since the beginning of their college life,

although they wanted to partake in a project on entrepreneurship, none was offered by the University on an early basis and for individual students, rather than already formed entrepreneurship teams, that wanted to learn more and engage in it.

In this pilot round of implementation professors were asked to have more than an informative role. After the course was completed, we asked them to give additional grades to students participating through their class. This created an obstacle in the organization process. Many professors came across ethical or bureaucratic barriers, while it also seemed to create an external motivator for participating students that was undesirable in our case.

4.2 Team division and research team

Team division and the way it was conducted played a crucial role in the projects results and success. Departmental complementarity enabled students to understand fields other than their own and gain informal education while engaging in activities proposed by their teammates that they wouldn't otherwise have. Complementarity of ECs also seemed to bring important results. For example, including a student with high Risk Tolerance in a team were all others did not have this competence as developed, helped them "break out of their shell". In some cases, even, including different gender and sexual orientation students in the same team – while being unable to know the latter in the beginning of the project – and highlighting the importance of diversity and acceptance, seemed to positively change students' mindset and attitudes towards diversity.

The presence of the primary research team and the enrolment of a coach for each team also brought positive results. Teams had the freedom to contact their coach whenever they felt unsure, while they also had a standard meeting once a week. Based on the direct observation and informal interviews conducted, through this process, students felt that their needs were seriously considered and "not just being pushed into a project and then left for good", which boosted their confidence and their belief that "someone actually believed in them".

4.3 Teaching model and final outcomes

The IDEA project primarily followed a hybrid model of teaching as it incorporated elements both from two out of the three proposed models of teaching, the "demand" and the "competence" by Béchard & Grégoire (2005).

Béchard and Grégoire (2005) identified three 'archetypical' teaching models: the supply model, the demand model and the competence model, as well as two hybrid teaching models one of which applies in our case. The supply model focuses on pedagogical methods adopting a behaviourist paradigm, in terms of the "transmission and reproduction of knowledge and application of procedures" (Béchard & Grégoire, 2005, p.111). The demand model focuses on pedagogical methods adopting a subjectivist paradigm, involving personal association and focus in terms of using "exploration, discussion and experimentation" (Béchard & Grégoire, 2005, p.111). The competence model focuses on pedagogical methods adopting an interactionist theoretical paradigm, in terms of hands-on problem solving of real-life situation and where "teaching is conceived as a strategic intervention to allow for – and influence – how students organize the resources at their disposal (e.g. knowledge, abilities) into competences that can be mobilized for action" (Béchard & Grégoire, 2005, p.115–116).

In terms of associating the case with the "demand" model, specific attention was given on the affective knowledge students gain such as beliefs about self, emotions, moods and behavioural control mechanisms. Our methods emphasized on activities of exploration and discussion, as they were encouraged to search and explore the given knowledge and information through any source possible such as the internet, and further discuss their findings with their coaches and mentors. Activities on experimentation such as simulations and other adaptive forms of their idea or solution were also encouraged.

As far as the "competence" model is concerned, students were allowed to organize the resources at their disposal into competencies mobilized for action. The content of the courses was defined by actual, real-life problems and situations that work as trigger points for the final outcome of each team. Students were given the tools and way of thinking so later on in their life it can serve as a tool to approach any problem reasonably while using all resources such as data and network available.

It is important to note that from the six teams formed in the pilot IDEA, four chose to continue working on their entrepreneurial idea and create their own venture.

Regarding the questionnaires, although when completing the first application, students thought high of their ECs, while completing the EPIC questionnaire, there seemed to be an increase in all areas of focus. For example, on the matter of Self-Awareness and Self-Efficacy students rated themselves with a 6.8 on average before the IDEA was conducted and an 8.1 after its completion, while for Opportunity Recognition, the before average was 5.5 and the after 7.7.

5. Conclusions

This research was conducted to assess the impact of EE, that comes in an ECA form, on students' ECs. To address the objective, a case study was designed to explore this relationship. Our key findings showed that firstly, ECAs focused on EE, positively affect the development of students' ECs. Secondly, such activities also positively affect students' entrepreneurial mindset and entrepreneurial intention. Finally, students that participate in such an ECA are likely to engage immediately into venture creation.

The core theoretical contribution of this research is the highlighted impact of EE that comes in a form of ECA on specific ECs of university students. This study expands the understanding of an ECA as well as how it can be successfully implemented for the aforementioned impact to occur.

The research highlighted a dynamic mechanism of EE impact on entrepreneurial outcomes in respect to ECs, mindset and venture creation. Also, by considering the variables of the research as well as the specific case under study, it shed light on the fact that EE through ECAs, as a learning experience, can provide, to some extent, emotional inspiration and sense of belonging. This answered not only whether, but also how, EE through ECAs affects students in higher education settings.

The impact of EE through ECAs on students ECs within the framework of university education was also addressed. Although the positive impact of such EE on student's entrepreneurial mindset and intention was identified, future research can use similar cases to examine their impact on them.

This study examined the effect of EE on ECs whilst considering the role of ECAs in a specific setting and with a specific teaching model. Future research could build on this to explore the effectiveness of different teaching models and pedagogical approaches.

The data used within this research was collected from one university and only in the course of one round of implementation of the case under study. This allowed for a generalization of findings, but future research could look at the effectiveness of such ECAs in multiple universities and perhaps while using multiple rounds of implementation that could be used comparatively.

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References

Arranz, N. et al. (2017) The effect of curricular and extracurricular activities on university students entrepreneurial intention and competences, Studies in Higher Education, 42(11), 1979–2008.

Bandura, A. (1989) Regulation of cognitive processes through perceived self-efficacy, Developmental Psychology, 25(5), 729–735.

Bateman TS, Crant JM. (1993) The proactive component of organizational behaviour, Journal of Organizational Behavior; 14,103-118.

Bird, B. (1995), Towards a theory of entrepreneurial competency, Advances in Entrepreneurship, Firm Emergence and Growth, 2(1), 51–72.

Busenitz, L. W. (1999) Entrepreneurial risk and strategic decision making: It's a matter of perspective, Journal of Applied Behavioral Science, 35(3), 325–340.

Busenitz, Lowell, W. and Barney, Jay B., (1997) Differences between entrepreneurs and managers in large organizations: Biases and heuristics in strategic decision-making, Journal of Business Venturing, 12, issue 1, p. 9-30.

Codurasa, A. Saiz-Alvarezb, J.M. and Ruizd, J. (2016) Measuring readiness for entrepreneurship: An information tool proposal, Journal of Innovation & Knowledge 1, 99–108.

Cohen, W. M. Nelson, R. R. and Walsh, J. P. (2002) Links and impacts: The influence of public research on industrial R&D, Management Science, 48(1), 1–23.

Crane, F. G. (2014) Measuring and enhancing dispositional optimism and entrepreneurial intent in the entrepreneurial classroom: A Bahamian study, Journal of the Academy of Business Education Fall, 94, 104.

Crane, F. G. (2014) Measuring and enhancing dispositional optimism and entrepreneurial intent in the entrepreneurial classroom: A Bahamian study, Journal of Academy of Business and Economics, 15, 94–104.

Crane, F. G., Blunden, R., & Meyer, M. H. (2012) Dispositional optimism and entrepreneurial intent: An exploratory cross-cultural investigation, International Review of Entrepreneurship, 10(3), 115–126.

Cuia, J. Sunb, J. and Bellc R. (2019) The impact of entrepreneurship education on the entrepreneurial mindset of college students in China: The mediating role of inspiration and the role of educational attributes, The International Journal of Management Education.

De Noble, A. Jung, D. and Ehrlich, S. (1999) Entrepreneurial Self Efficacy: The Development of a Measure and Its Relationship to Entrepreneurial Action, Frontiers of Entrepreneurship Research. Wellesley. MA: Babson College. 73-87.

Dyer, W. G. (1994) Toward a theory of entrepreneurial careers, Entrepreneurship Theory and Practice, 19 (2), 7–21.

entreComp Framework: https://ec.europa.eu/jrc/en/publication/eur-scientific-and-technical-research-reports/entrecomp-entrepreneurship-competence-framework

Etzkowitz, H. (2004) The evolution of the entrepreneurial university, Int. J. Technology and Globalisation, Vol. 1, No. 1.

Etzkowitz, H. (2013) Anatomy of the entrepreneurial university, Social Science Information, 52(3) 486–511.

Etzkowitz, H. et al. (2000) The future of the university and the university of the future: evolution of ivory tower to entrepreneurial paradigm, Research Policy 29 2000. 313–330.

European Commission (2013) Entrepreneurship 2020 Action Plan: Reigniting the Entrepreneurial Spirit in Europe, Brussels: European Commission.

Fayolle, A. Gailly, B. and Lassas-Clerc, N. (2006) Assessing the Impact of Entrepreneurship Education Programmes: A new Methodology, Journal of European Industrial Training 30 (9): 701–20.

Fernández-Nogueira, D. et al. (2018) The entrepreneurial university: A selection of good practices, Journal of Entrepreneurship Education Volume 21, Issue 3.

Furnham, Adrian, and Ribchester, T. (1995) Tolerance of ambiguity: A review of the concept, its measurement and applications, Current psychology 14.3, 179-199.

Garavan, T. N. and Cinneide, B. O. (1994) Entrepreneurship education and training programmes: A review and evaluation-part 1, Journal of European Industrial Training, 18(8), 3–12.

Geller, G. et al. (1993) Measuring physicians' tolerance for ambiguity and its relationship to their reported practices regarding genetic testing, Med Care. 31(11):989-1001.

Gieure, C, Benavides-Espinosa, M., and Roig-Dobón, S. (2020) The entrepreneurial process: The link between intentions and behavior, Journal of Business Research, Volume 112, Pages 541-548.

González-López, M.J., Pérez-López, M.C. & Rodríguez-Ariza, L. (2020) From potential to early nascent entrepreneurship: the role of entrepreneurial competencies. International Entrepreneurship and Management Journal.

Guerrero, M. et al. (2016) Entrepreneurial universities: emerging models in the new social and economic landscape, Small Bus Econ 47, 551–563.

Jones, C., & English, J. (2004). A contemporary approach to entrepreneurship education, Education + Training, 46(8/9), 416–423.

Krueger, N. F. and Brazeal, Jr.D.V. (1994) Entrepreneurial potential and potential entrepreneurs, Entrepreneurship Theory and Practice, 19, 91–104.

Lackeus, M. (2015) Entrepreneurship in education—What, why, when, how, entrepreneurship 360. background paper.

Liñán, F. (2008) Skill and Value Perceptions: how do They Affect Entrepreneurial Intentions?, International Entrepreneurship and Management Journal 4 (3): 257–72.

Lobler, H. (2006) Learning entrepreneurship from a constructivist perspective, Technology Analysis & Strategic Management 18(1): 19–38.

Man, T. W. Y., Lau, T., & Chan, K. F. (2002) The competitiveness of small and medium enterprises. A conceptualization with focus on entre preneurial competencies, Journal of Business Venturing, 17(2), 123–142.

Mitchelmore, S., & Rowley, J. (2010) Entrepreneurial competencies: A literature review and development agenda, International Journal of Entrepreneurial Behavior and Research, 16(2), 92–111.

Patton, M.Q. (1999) Enhancing the quality and credibility of qualitative analysis, Health services research 34.5 Pt 2 (1999): 1189.

Pihiea, Z.A.L. Bagherib, A. and Sanic, Z.H.A. (2013) Knowledge of cognition and entrepreneurial intentions: Implications for learning entrepreneurship in public and private universities, The 9th International Conference on Cognitive Science, Procedia - Social and Behavioral Sciences. 174 – 181.

Renn, Ortwin, and Rohrmann B., eds. (2013) Cross-cultural risk perception: a survey of empirical studies, Vol. 13. Springer Science & Business Media.

Robinson, P. B. et al. (1991), An attitude approach to the prediction of entrepreneurship, Entrepreneurship Theory and Practice, 15(4), 13–31.

Rohrmann, B. (2002) Risk attitude scales: Concepts and questionnaires, Melbourne: University of Melbourne 12.

Roulin, N. and Bangerter, A. (2013) Extracurricular activities in young applicants' resume´s: What are the motives behind their involvement?, International Journal of Psychology, Vol. 48, No. 5, 871–880.

Sánchez J.C. (2011) University training for entrepreneurial competencies: Its impact on intention of venture creation, Int. Entrep. Management Journal, 7:239-254.

Scherer, RF. et al. (1989) Role Model Performance Effects on Development of Entrepreneurial Career Preference, Entrepreneurship Theory and Practice, 13(3):53-72.

Scheier, M., Carver, C., and Bridges, M. (1994) Distinguishing optimism from neuroticism (and trait anxiety, self-mastery, and self-esteem): A re-evaluation of the life orientation test, Journal of Personality and Social Psychology, 67(6), 1063–1078.

Seibert, S. E., Kraimer, M. L., & Crant, J. M. (2001) What do proactive people do? A longitudinal model linking proactive personality and career success, Personnel Psychology, 54(4), 845–874.

Souitaris, V. Zerbinati, S. and Al-Laham, A. (2007) Do Entrepreneurship Programmes Raise Entrepreneurial Intention of Science and Engineering Students? The Effect of Learning, Inspiration and Resources, Journal of Business Venturing 22: 566–91.

Stevenson, Howard, H., and Carlos Jarillo, J. (1990) A Paradigm of Entrepreneurship: Entrepreneurial Management, Strategic Management Journal, vol. 11, pp. 17–27.

Stewart, Wayne & Roth, Philip. (2001) Risk Propensity Differences Between Entrepreneurs and Managers: A Meta-Analytic Review, The Journal of applied psychology. 86. 145-53.

Tang, J. T., Kacmar, K. M. M., & Busenitz, L. (2012) Entrepreneurial alertness in the pursuit of new opportunities, Journal of Business Venturing, 27(1), 77–94.

Thorp, H. and Goldstein, B. (2013) Engines of innovation: The entrepreneurial university in the twenty-first century, (book), 1-178.

Wiklunda, J. Shepherdb, D. (2005) Entrepreneurial orientation and small business performance: a configurational approach, Journal of Business Venturing 20, 71–91.

Start-up Pitching and Gender: How Gender is Constructed at the Pitching Stage

Linh Duong
Åbo Akademi University, Faculty of Social Sciences, Business and Economics, Finland
linh.duong@abo.fi
DOI: 10.34190/EIE.21.105

Abstract: The gender gap in venturing worldwide opens a door to explore different aspects and attributes of diversity in the world of entrepreneurship. Although there have been a growing number of gender studies in entrepreneurship, gender is mainly considered a control, or a demographic variable, to compare men and women. However, gender scholars argue that the gender gap in financial funding does not happen merely because of the entrepreneur's biological sex, but rather because of gendered assumptions and practices that are constructed socially and culturally. This doctoral research tackles the gender gap in entrepreneurship by focusing on gender ideologies that influence and perpetuate individual-level practices within the field. Access to financial capital by pitching the business idea to investors has been one of the important elements of entrepreneurship. The pitch narratives and conversations incorporate many gendered assumptions and practices. Thus, the main research question is how gender is constructed in startup pitch sessions. This is ethnography research with a wide variety of data collected at the pitch. Ethnographic data from entrepreneurial organizations in Finland are used for the empirical design. In addition to that, interviews with both investors and entrepreneurs will provide insights into the ideal entrepreneur image. This research contributes to a more holistic understanding of gender in the entrepreneurship world. Also, by uncovering gender biases in the characteristics of an ideal entrepreneur this research supports the diversity in entrepreneurship.

Keywords: gender difference, entrepreneurship, social structure, pitch, start-up

1. Background of the study

Within the field of entrepreneurship, gender sticks with the idea that male is the norm and female is the "other" (Marlow, 2020). Specifically, in Europe, almost 91% of capital raised goes to all men teams and 7.5% goes to mixed teams, which leaves only 1.7% for all women teams (Atomico report, 2020). Indeed, the gender gap is visible and recognizable (Kanze et al., 2017). Gender difference in entrepreneurship has been studied from various angles, yet gender has been treated more as a demographic variable rather than as a socially constructed attribute (Koveshnikov, Piekkari & Tienari, 2018). Besides, there has been not much research attention for start-up pitching context (Balachandra et al., 2019), where potential investors and entrepreneurs' gender stereotypes intertwine with each other.

Consequently, there is still a need to explore gender differences in entrepreneurship from the social structure perspective. I apply the concept of gender as a social structure (Risman, 2014) to explore how gender is constructed and performed at start-up pitches. It is at the pitch that the entrepreneurs send different signals to communicate the quality of the venture to prospective investors. The focus of this paper is on early-stage start-ups, including also pre-seed and seed firms. In the early stage of business creation, start-up firms need external funding sources to survive and develop, thus it is essential to meet and make good impressions with investors (Brooks et al., 2014). For the research design, I choose the ethnography approach with empirical data includes observation, field notes, and pitch recordings. Through the signaling approach, it could unfold if there are masculine traits that exist and are performed at the pitching sessions.

2. Objectives and research questions

The first objective of this paper is to explore what are the signals the entrepreneurs send to the investors, and how the investors respond. Second, I want to unfold if the gender aspect is embedded in the signals. And third, the overarching objective of this paper is to explore how gender is constructed at start-up pitches. I apply hegemonic masculinity (Connell, 2005) as the theoretical framework and signaling theory (Leland & Pyle, 1977) as the lens to analyze masculine patterns performed at the pitch.

Following the objectives, the main research question is: *How gender is constructed in start-up pitch sessions?*

To reply to this, the empirical work will be conducted based on three sub-questions:

- 1. What type of signals are sent, received, and responded to from the entrepreneurs and the investors at the pitching sessions?
- 2. How gender is embedded in the signals between entrepreneurs and investors?
- 3. What are the entrepreneurial masculinities performed at start-up pitches by the entrepreneurs and the investors?

3. Literature review

3.1 Gender is a social structure– a feminist view of gender

The majority of gender studies in management and entrepreneurship regards gender as a demographic variable, which relates to the biological, genetic distinction that categorizes a person as a man or a woman. A person's gender, however, is understood as social practices and representations associated with femininity and masculinity (Acker, 1992). Thus, gender is socially constructed and refers to what is regarded as masculine or feminine (Ahl, 2006). Masculinity and femininity, in turn, are also socially constructed. Gender stereotypes are generalizations about what men and women would behave and are often internalized individuals (Wood & Eagly, 2012). For example, women are believed to hold such qualities as nurturance, caring, and support in the relationship, while men are attached to decision, growth, taking charge, and being in control (Hentschel et al., 2019; Nelson & Kolb, 2009).

In specific, the (re)production of gender structure is integrated into three dimensions: the individual gendered selves, the interactional level where men and women might face different experiences, and the institutional dimension where norms and systems are gendered (Risman, 2004). In this study, I view gender as a social structure to explore how gender is constructed in entrepreneurship in the context of start-up pitching. This direction follows suggestions that feminist theory could be used to encourage different perspectives on gender issues in entrepreneurship (Marlow, 2020). Specifically, I choose the interactional level as the central angel to invest in as it aligns with the pitching context. It is at the pitch that the entrepreneurs send different types of signals to communicate the quality of their venture to the investors (Alsos & Ljunggren, 2017).

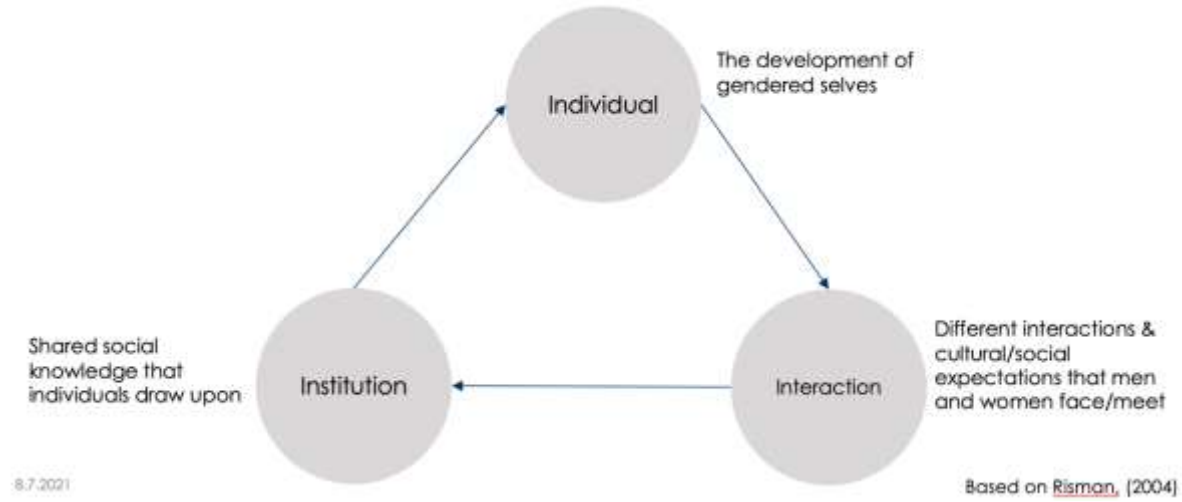

Figure 1: Gender as a social structure framework (Based on Risman, 2004)

3.2 Hegemonic masculinity

The concept of hegemonic masculinity was introduced by Connell (1987) and later was revised and reformulated by Connell & Messerschmidt (2005), which expanded the relation of hegemonic masculinity not only to women but also among men. Hegemonic masculinity is understood as a social process that is performed by participants within a society to legitimize certain dominant masculinity patterns, and thus provide biases for male hierarchical gender structure concerning women and other marginalized masculinities (Connell & Messerschmidt, 2005). It means that hegemonic masculinity is not a natural, intrinsic state; instead, it is relative

and subject to changes according to gender ideologies that fit the current state of the society (Giazitzoglu & Down, 2017).

Concerning entrepreneurship, the hegemonic masculinity concept is the potential to explain gender differences from individual behaviors' perspective, which is affected by social orders and ideologies about gender stereotypes of what is men's work and what is women's work (Hechavarria & Ingram, 2016). Few studies have applied hegemonic masculinity in entrepreneurship, which sets a good foundation for this study to build upon with the context of pitching. For example, Giazitzoglu and Down (2017) studied men entrepreneurs during their routine Friday night gatherings in a local pub to define how they perform masculinities. Arguably, gender ideologies can perpetuate the behaviors of individuals as well as affect different experiences men and women might face when interacting with people. If gender distinctions and relations are produced, reproduced, and redefined through social interaction (Tienari & Nentwich, 2002), it would be interesting to study start-up pitches with a gendered discourse lens.

3.3 Signaling theory

Signaling theory has gained popularity in entrepreneurship studies to explore the relationships between entrepreneurs and investors (Alsos & Ljunggren, 2017). Signals are known as information sent from the signalers to the receiver, and signaling is the process of sending, receiving, interpreting, and responding to signals and feedback between entrepreneurs and investors (Alsos & Ljunggren, 2017). With its development, signaling theory has expanded and can be understood as a social process. Specifically, signaling can be viewed as a social process, as narrative, communication, and subjective interpretation involve (Connelly et al., 2011). In the signaling process, individuals' interpretation and observation of signals are important, and at times, investors tend to look for a specific set of signals from entrepreneurs (Connelly et al., 2011).

On one hand, entrepreneurs have access to extensive information about their venture that outsiders do not have access to (Leland & Pyle, 1977). Investors thus do not have as much information as entrepreneurs. Thus, signals are used to communicate what the entrepreneurs want to send out, and also what they assume the investors want to hear. It could be argued that signals that are sent by the entrepreneurs can determine the quality of the venture, especially the quality of the team, advisors, reputation, and track record, as well as the commitment and existing investments (Alsos & Ljunggren, 2017). On the other hand, investors interpret the signals into their perceived meaning, then send feedback to entrepreneurs. As the signaling process can be understood as a social process, it is reasonable to assume that gender aspects could affect what signals and how the signals are sent and interpreted during the signaling process, which in this study, at pitching sessions (Alsos & Ljunggren, 2017). Consequently, using signaling theory could help to discover gendered patterns that are (re)produced by the entrepreneurs and the investors.

4. Methodology and research design

I apply the ethnography approach in this paper. The data would range from observations, field notes, and recordings of the pitches. Besides, observation data of pitching training sessions and interviews could be possible as the communication with some summer start-up accelerator organizations in Finland is going on. From September 2020 to May 2021, I have collected some information and data to prepare for the pilot study. There have been 7 semi-structured, open interviews and 6 pitching sessions where I participated to observe or got access to attend. This study's data will be collected from two entrepreneurial accelerators that launch summer start-up incubator programs and one organization that have pitching sessions for angel investors in May-August 2021. Finland has a strong state feminist tradition and is one of the social welfare states, which has been addressed as a way to promote equality in society. Finnish women were the first in the world to get full voting rights. The public image of Finland as the happiest country in the world has sugarcoated it as an attractive, welcoming, and equal society. In fact, studies have dictated how the welfare state as the strategy has both weakened and strengthened patriarchy in Finland (see e.g. Elomaki & Kantola, 2018 and Sandberg 2018). In entrepreneurship, the last decade has seen tremendous growth with the number of start-ups have been rising steadily, leading it to become the country with the most venture capital investments in Europe in 2019 (Pääomasijoittajat 2019). Despite all of that, women entrepreneurs only account for 30%, while women at the top management teams of private equity-backed companies are 20% and hold 13% of the board seats of these companies (Pääomasijoittajat 2020). All of this information suggests that there are gender issues in Finland that need more research attention to unfold.

5. Analysis and discussions

The data is analyzed with the NVivo12 program. The codes are categorized based on previous signaling studies, which summarizes that there are five types of main signals from entrepreneurs: venture, entrepreneur, team, investors, and partnership (Alsos & Ljunggren, 2017); and that key signaling constructs from the sender's side are honesty, reliability, observability, and fit (Connelly et al., 2011). Additionally, the collected data was also coded openly according to the pitch structure and the pitcher's information. The analysis process follows the thematic approach, trying to define common themes and patterns (Braun and Clarke, 2006). It means that after the first coding process, where open codes are created, the data will be going through the axial coding process to define themes and topics. At the moment, I am processing the analysis of the open coding phase for the pilot data, comprising public pitches in last summer from the two accelerators I will partner up with, and the interviews I conducted.

Specifically, in this proposal, I discuss some findings from the interviews. First, there is a lack of role models for female entrepreneurs to look up to. Consequently, they pick up the male role models, especially those that encourage women to join, and at the same time, they have the pressure to be at the pitch. For example, these quotes can describe this point: *"It takes a lot of gut to be there. You don't feel 100% fit there because of your gender"* (Interview 1), and *"When female founders prepare the pitch, if they're nervous, you can really see it. And it shows on stage"* (Interview 4). Additionally, female entrepreneurs think that they have received different feedback than male entrepreneurs, and the feedback is *"scratching the surface and is not very encouraging"*. For instance, they got feedback to change the logo color, or the presentation's main color, as *"it looks too feminine".*

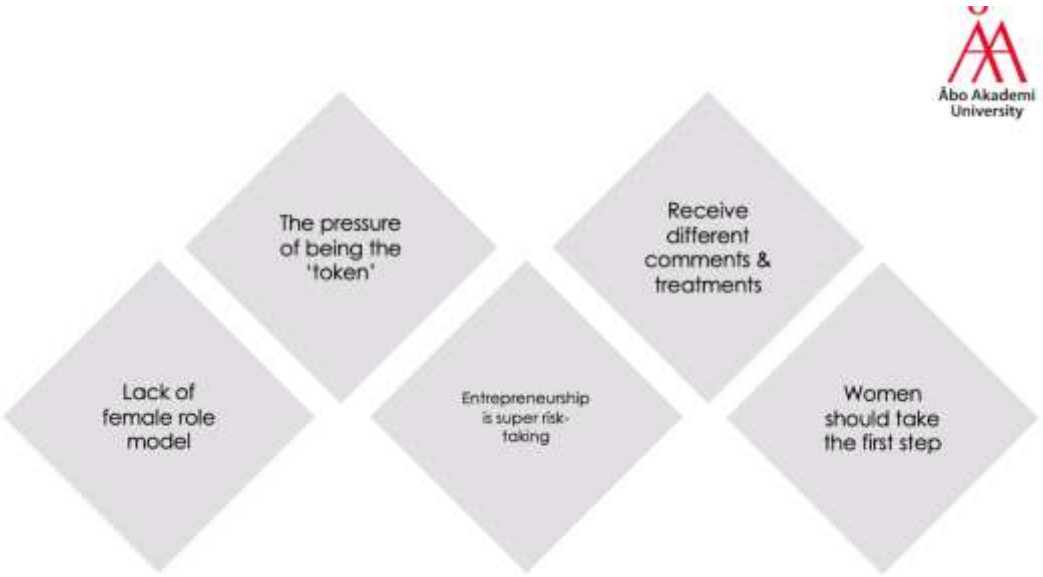

Figure 2: Gender issues at startup-pitches from the interviews

Overall, female entrepreneurs feel like they have to *"act like a blade runner",* who try to gain a reputation and fighting against gender segregation. All interviewed people acknowledge that the entrepreneurship field is super risk-taking, and since men are supposedly more prone to take the risk, they fit better in the field. This can be understood as the pressure of being the "token".

6. Conclusion and future work

Preliminary findings echo the point that gender difference happens not merely because of the entrepreneur's biological gender, but rather because of the gender roles and stereotypes that promote certain types of masculinities (Balachandra et al. 2019; Marlow, 2020). Pitching is commonly viewed as a neutral concept where entrepreneurs present their business and ask for investment and advice, yet this study has proved that pitching is a gendered space. In summer 2021, I will collect observational data and interview data, which will further elaborate on the findings. Hopefully, it will unfold different layers of masculine traits that are performed at the pitch. The plan is to analyze and develop the study in Fall 2021 as part of my Doctoral thesis. This research yields various scientific contributions and practical contributions. First, it contributes to the burgeoning research stream on women in entrepreneurship. There has been little research attention on how gender is shaped in

entrepreneurship from the social construction approach, which I hope to explore in this paper. It contributes to signaling theory by looking into the social elements of signals, and the possible relation between the quality and the frequency of signals (Connelly et al., 2011). Furthermore, by acknowledging the social structuralist lens, this study's findings contribute to the ongoing discussion that entrepreneurship is a gendered space, where masculine patterns are more naturally practiced (Marlow & Swail, 2014). On a societal level, this is an important topic that supports the diversity of entrepreneurship and encourages involving stakeholders in the field to be aware of biases that they might carry on when participating in entrepreneurial activities. Through that, we can do more to break the norms of the entrepreneurship ecosystem.

References

Acker, J. (1990) "Hierarchies, Jobs, Bodies: A Theory of Gendered Organizations", *Gender and Society*, Vol. 4, No. 2.

Acker, J. (1992) "Gendering organizational theory", In A. Mills & P. Tancred (Eds), *Gendering Organizational Analysis* (pp.248-260), London: Routledge.

Atomico report. (2020) "The State of European Tech", [online], https://2020.stateofeuropeantech.com/

Alsos G. and Ljunggren, E. (2017) "The Role of Gender in Entrepreneur-Investor Relationships: A Signaling Theory Approach", *Entrepreneurship Theory and Practice*, pp. 1042-2587.

Ahl, H. and Marlow, S. (2012) "Exploring the dynamics of gender, feminism and entrepreneurship: Advancing debate to escape a dead end?", *Organization*, Vol. 19, No. 5, pp. 543–562.

Balachandra, L., Briggs, T., Eddleston, K. and Brush, C. (2019) "Don't Pitch Like a Girl!: How Gender Stereotypes Influence Investor Decisions", *Entrepreneurship Theory and Practice*, Vol. 43, No. 1, pp. 116-137.

Braun, V. and Clarke, V. (2006) "Using thematic analysis in psychology", *Qualitative Research in Psychology*, Vol. 3, pp. 77–101.

Brooks, A., Huang, L., Kerney, S., and Murray, F. (2014) "Investors prefer entrepreneurial ventures pitched by attractive men", *PNAS,* Vol. 111, No. 12, pp. 4427-4431.

Connell, R. W. and Wood, J. (2005) "Globalization and business masculinities", *Men and Masculinities*, Vol. 7, No. 4, pp. 347–364.

Connelly, B.L. and Certo, S.T. and Ireland, R.D. and Reutzel, C.R. (2011) "Signaling theory: A review and assessment", *Journal of Management,* Vol. 37, No. 1, pp. 39–67.

Giazitzoglu, A. and Down, S. (2017) "Performing entrepreneurial masculinity: An ethnographic account", *International Small Business Journal: Researching Entrepreneurship*, Vol. 35, No. 1, pp. 40–60.

Hechavarria, D. M. and Ingram, A. E. (2016) "The entrepreneurial gender divide: Hegemonic masculinity, emphasized femininity and organizational forms', *International Journal of Gender and Entrepreneurship*, Vol. 8, No. 3, pp. 242–281.

Hentschel, T., Heilman, M.E. and Peus, C.V. (2019) "The Multiple Dimensions of Gender Stereotypes: A Current Look at Men's and Women's Characterizations of Others and Themselves", *Frontiers in Psychology*.

Kanze, D., Huang, L., Conley, M., and Higgins, E. (2017) "Male and Female Entrepreneurs Get Asked Different Questions by VCs – and It Affects How Much Funding They Get", *Harvard Business Review.*

Koveshnikov, A. and Tienari, J. and Piekkari, R. (2018) "Gender international business journals: A review and conceptualization of MNCs as gendered social spaces", *Journal of World Busines*s, Vol. 54, pp. 37-53.

Leland, H.E. and Pyle, D.H. (1977) "Information asymmetries, financial structure, and financial intermediation", *The Journal of Finance*, Vol. 32, No. 2, pp. 371–387.

Malmström, M., Voitkane, A., Johansson, J. and Wincent, J. (2018) "When stereotypical gender notions see the light of day, will they burst? Venture capitalists' gender constructions versus venturing performance facts", *Journal of Business Venturing Insights*, Vol. 9, pp. 32–38.

Marlow, S. and Swail, J. (2014) "Gender, risk and finance: Why can't a woman be more like a man?", *Entrepreneurship and Regional Development: An International Journal*, Vol. 26, No. 1-2, pp. 80-96.

Marlow, S. (2020) "Gender and entrepreneurship: past achievements and future possibilities", *International Journal of Gender and Entrepreneurship*, Vol. 12, No. 1, pp. 39–52.

Messerschmidt, J. W. (2019) "The Salience of Hegemonic Masculinity", *Men and Masculinities*, Vol. 22, No. 1, pp. 85–91.

Pääomasijoittajat – Finnish Venture Capital Association (2019) "Finnish Startups Attract the Most Venture Capital Investments in Europe", [online], https://paaomasijoittajat.fi/en/finnish-startups-attract-the-most-venture-capital-investments-in-europe/

Pääomasijoittajat – Finnish Venture Capital Association (2020) "Study: A Wide Gender Gap in Startup & Growth Company Leadership in Finland", [online], https://paaomasijoittajat.fi/en/study-a-wide-gender-gap-in-startup-growth-company-leadership-in-finland/?fbclid=IwAR3G3UVWF3fouQjEguli9_fgGSMWTv5lKjWCMJ5fhpRAxPIuze3BzgH5DGw

Risman, B. (2004) "Gender as a Social Structure: Theory Wrestling with Activism", *Gender and Society*, Vol. 18, No. 4, pp. 429-450.

Tienari, J. and Nentwich, J. (2012). 'The "doing" perspective on gender and diversity'. In MA. Danowitz, E. Hanappi-Egger, and H. Mensi-Klarbach (eds), *Diversity in Organizations*, pp. 109-136. Palgrave Macmillan.

Innovative Approaches to Recruiting: Using Social Media to Become the Employer of Choice for Generation Z

Dagmar Halová and Michal Müller
Palacký University Olomouc, Czech Republic
dagmar.halova01@upol.cz
michal.muller@upol.cz
DOI: 10.34190/EIE.21.093

Abstract: Generation Z is currently entering the labour market. Even though we are in a period affected by the economic impacts of the COVID-19 pandemic, employer brand is still a topical theme. Therefore, especially in critical periods of time, businesses need quality human resources to help them manage this critical situation. Young employees belonging to Generation Z can come up with new approaches and innovations that may help businesses survive unforeseen situations that the current economic situation may bring about, both now and in the future. Especially in the context of many companies needing to come up with new online sales tools and technical equipment upgrades due to the pandemic, along with restrictive government measures, recruiting from a generation characterized by their commitment to modern technology is an important part of their future strategy. The aim of this paper is to compare the expectations of Generation Z on the labour market and their approach to searching for job positions with the approach of employers recruiting Generation Z, based on how they work with their brand and their use of social media. This paper is based on the results of pre-research for a dissertation thesis. Online questionnaires with mostly open questions were created to ask Generation Z and entrepreneurs. Extended personnel marketing has been applied to create questions corresponding with thematic analysis. Comparing answers from both groups of participants (Generation Z and entrepreneurs) allows us to suggest a labour market strategy for both. Specifically, we aim to correct key employer shortcomings when communicating with Generation Z where their needs are insufficiently recognized, as well as overcoming distrust in their abilities caused by a lack of experience at the beginning of their careers. Generation Z representatives also need to choose appropriate communication strategies to avoid intergenerational conflicts and they need to know ways to properly integrate into a team that is shaped by different generational values.

Keywords: Generation Z, employer brand, employer of choice, social media, recruiting

1. Introduction

In this paper we consider Generation Z to be those people born between 1995 and 2010. This means the oldest of them have already finished their studies and are already on the labour market, and many more will be in this situation very soon. A better understanding of the needs and expectations of Generation Z should help employers to find quality human resources among this younger generation.

The current crisis caused by the COVID-19 pandemic has accelerated the adoption of distance work, an important fact that the current global talent management must respond to. The tendency for rapid IT growth and the ability to work from anywhere has led to great talent mobility. Today, employers compete for talent from around the world (Haak-Saheem 2020). Innovative approaches to recruiting are essential, as the most successful workers can be employed from the other side of the world if there is no quick and effective communication within the local labour market. Yet even when the current COVID-19 pandemic is over, trends of globalization, virtual teams, and using technology at work will continue. The advantages of global virtual teams will be useful for companies during regular times. These new trends are favoured among the younger generations (Stone & Dulebohn 2019). Of course, that does not mean the older generations cannot come up with new ideas, but companies should be able to take advantage of multigenerational diversity at the workplace, and the various points of view given by different generations is one of these advantages (Sifatu et al. 2020).

Since we understand innovation as new, useful behaviour based on social learning to solve a novel problem (Carr et al. 2016) using social media in recruitment can be considered an innovative approach to gaining new talents for a company. Using social media in everyday life is natural for Generation Z (McCrindle & Wolfinger 2014) and this paper aims to research the options for using social media as a tool to recruit new staff.

The aim of this paper is to compare the expectations of Generation Z on the labour market and their approach to searching for job positions with the approach of employers recruiting Generation Z, based on how they work with their employer brand and use of social media.

2. Theoretical background

2.1 Generation Z

Generations are defined by characteristics like common experiences with historical events, trends, or developments at a similar age rather than by date of birth (McCrindle and Wolfinger, 2014; Reeves and Oh, 2008). However, for research purposes it is useful to define a generation by a span of time (Duffy et al. 2019). As this definition is not unified among authors, this paper simply accepts the statement that members of Generation Z were born between 1995 and 2010 (Bencsik et al. 2016). Existing studies have described Generation Z from many points of view. We can talk about a general agreement that Generation Z has been shaped by technology (Bencsik & Machova 2016; Nichols & Wright 2018), is globally connected (McCrindle & Wolfinger 2014) and is used to using social media (Törőcsik et al. 2014).

HR leaders need to be prepared for this new generation coming to the workplace and so should adapt their policies and strategies for this new workforce and take advantage of this new generational diversity at the workplace (Chillakuri & Mahanandia 2018). When searching for new employees from Generation Z, it is necessary to understand this generation's work values and how they make decisions when choosing a job. Family plays a significant role when Generation Z decides on their future career (Goh & Lee 2018; Walmsley et al. 2020). Job satisfaction and career prospects appeared to be more important than salary range (Goh & Lee 2018), although salary becomes more important depending on the cost of living in specific regions (Walmsley et al. 2020). Nevertheless, job satisfaction includes knowledge of company values, vision, and strategic goals, as well as instant feedback or work-life balance (Chillakuri 2020). It also seems important to be open with information about the position and to provide training for new employees (Goh & Lee 2018; Chillakuri 2020). Information about skill development and training is crucial when job candidates from Generation Z search for details about a job position (Tato-Jiménez et al. 2019). Generation Z is also known for being highly aware of political and environmental issues (Goh & Jie 2019). For this reason, employers should publish details about their sustainability related benefits (Tato-Jiménez et al. 2019).

After spending huge efforts to hire someone from Generation Z it is also important to ensure there will not be undesirable turnover. Lack of trust is typical for Generation Z and it may become a significant managerial issue. To avoid these negative effects, employers should invest in socialization and generating a trusting work climate (Lazányi & Bilan 2017). Another problem may be that young job applicants have unrealistic expectations (Rodriguez et al. 2019). This seems to be a challenge that HR managers should be prepared for, so they can avoid high turnover among new hires.

Finally, it is natural for Generation Z to search for information on the internet via social media (Dabija et al. 2017). Generation Z has been born into a world using digital technologies and almost all of them use social networking sites, preferring a smartphone to connect to this type of media (Korombel & Ławińska 2019). An interesting way of marketing is social advertising which was investigated in the context of Generation Z and emotional management (Kemp et al. 2020).

2.2 Employer brand and social media in recruiting

The concept of employer brand comes from Ambler and Barrow (1996), who have formulated a theory for combining HR and brand marketing. They point to a relationship between the quality of products and services and the quality of employees – they influence each other. Ambler and Barrow (1996) define employer brand as *'the package of functional, economic and psychological benefits provided by employment, and identified with the employing company'* and they claim that employer brand is an important factor in employee loyalty and in the ability to hire new people to the company. Employer branding is a concept that integrates recruitment, staffing, training and development, and career management activities, and can lead an organization to a global human resources strategy (Backhaus & Tikoo 2004). Nevertheless, it is necessary to point out that the key condition for employer branding to have positive effect is trustworthy communication that includes consistency, clarity, and credibility (Wilden et al. 2010).

Personnel marketing seems to be a tool suitable for search, recruiting and keeping suitable labour force (Strenitzerová 2016). Wickham and O'Donohue (2009) came up with extending the marketing mix to HR. Shortly described, they understand Product as a range of inducements offered to employees, Price as the value that an

employee is expected to deliver to a company/pay for job inducements, Place as the location of a workplace, Promotion as the message delivered to employees, Process includes the whole employee life cycle, People means the staff influencing the value in the employment relationship, and Physical Evidence includes workplace environment and organizational culture. There are even more approaches for applying a marketing mix to human resources. One of them is called 4P and is divided between the employer and the employee points of view, where Product is vacant post/human work; Price means employee time, education, and qualification/payment; Place is the working place for both sides; Promotion is announcing new hires/work applications (Lvovna & Viktorovich 2017). The 12P for personnel marketing mix was introduced by Mishyna et al. (2019), where Product = Workforce; Price = Salary; Place = rotation of personnel; Promotion = image of the employer; People = consumers of marketing information; Personnel = Personnel marketing human resources; Package = Corporate symbolism; Purchase = methods and tools for attracting staff; Public Relation = public information about policies and programs; Process = process of marketing personnel; Physical Premises = social responsibility; Profit = facilitating staff growth in company profits.

Applying an extended personnel marketing mix is one way to become employer of choice (Wickham & O'Donohue 2009). This status may be reached by understanding job seekers needs and preferences and this helps managers effectively attract and retain talent (Mohanty 2019).. When recruiting from Generation Z, social media may be an appropriate tool (Bejtkovský 2018). Mičík and Mičudová (2018) describe a positive impact when using social media for personnel marketing to attract Millennials. As Generation Z is considered to be even more influenced by social media than Millennials, it suggests a huge potential in these communication channels for recruiting Generation Z. Social media means a new way of communicating with job candidates that allows an employer to interact with potential employees and to establish a dialogue with them (Aggerholm & Andersen 2018). Job applicants who search for job information on career websites find social media profiles of an organization important (Eger et al. 2018). Using social media has a positive impact on job seekers when relevant information is provided (Carpentier et al. 2019). Increasingly, new technologies, social media included, provide employers an opportunity to attract job applicants from around the world (Rodríguez-Sánchez et al. 2019).

3. Methods

To reach the aims of this paper the following research questions were set:

R1: What does Generation Z expect from a career?

Participants were asked about their requirements from job positions, such as their preferences between fixed or flexible working hours and salary. They were also asked to evaluate how various factors are important in their decision making when choosing a job. In addition, participants were asked if they prefer to be employed or to be entrepreneurs.

R2: Do employers target Generation Z for specific job positions?

One key factor of a successful marketing campaign is defining a target group. In personnel marketing, the target group should be based on employee value proposition. On the other hand, it is illegal to discriminate job candidate by age.

R3: How does Generation Z use social media in comparison with entrepreneurs?

Participants were asked to answer questions on why and how often they use social media. Questions included Facebook, Instagram, and LinkedIn as the most used social media in the Czech Republic (Michl 2019). Finally, participants were asked if they use social media to search for information about job positions.

Since communication via social media is natural for Generation Z it seems to be logical for employers to use social media to attract them. Entrepreneurs were asked if they have tried using social media to hire Generation Z and if they have, how they did it.

Online questionnaires including closed questions, multiple choice, and scales were used by Generation Z to answer R1 and R3. To answer R2 and R3 by entrepreneurs, online questionnaires following an extended marketing mix by Wickham and O'Donohue (2009) were made and the LinkedIn and Facebook social networks

were used to find participants. As these questionnaires were part of pre-research, they were created using a qualitative approach and included mostly open questions. A thematic analysis method was applied so that more detailed research including quantitative methods can follow this paper.

This paper is pre-research for a dissertation thesis. Questionnaires were sent to a testing sample of respondents from Generation Z and entrepreneurs. 150 respondents took part in the questionnaire survey of Generation Z. 20 respondents were excluded from the analysis because they did not meet the basic age criterion to determine that they belonged to Generation Z. 4 entrepreneurs were willing to fill in a questionnaire with open questions. They run their businesses in the fields of finance, healthcare, cryptocurrencies, and information technology. The number of participants is equivalent to 5% of participants that are intended to be studied in the main research of dissertation thesis.

4. Research results

15.38% of respondents are men (n = 20) and 84.62% are women (n = 110). The mean age is 22.91 years (σ = 1.84, σ2 = 3.39). The frequency of individual answers, including the year of birth, is shown in the Figure 1. Regarding education, 60% of respondents had completed secondary school and passed the final exams, 29.23% have a bachelor's degree, 5.38% have a master's degree, 3.08% have an associate degree, 1.54% finished education after primary school, and 0.77% marked 'other'.

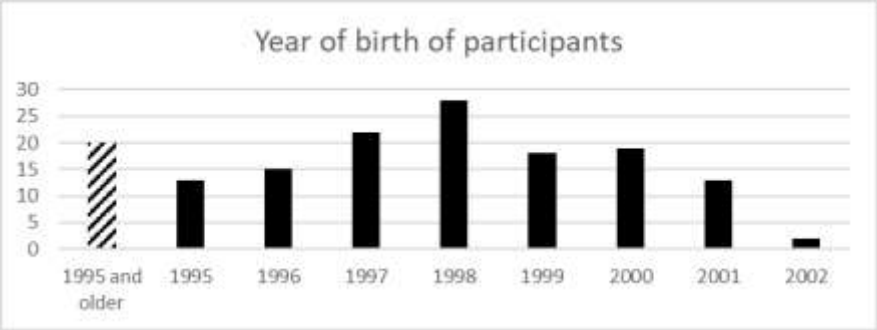

Figure 1: Year of birth of participants

R1: What does Generation Z expect from a career?

The answers to any preferences after graduation were as follows: 69.3% of representatives from Generation Z want to be employed, 21.54% chose a combination of employment and entrepreneurship, 2.31% of respondents want to be self-employed as an entrepreneur, 3.08% of respondents answered that they did not know, and 3.85% marked 'other'.

In terms of preferences for fixed or flexible working hours, most respondents (54.62%) prefer partially fixed working hours. 23.85% prefer flexible working hours, 19.23% prefer fixed and regular working hours, and 1.54% prefer fixed working hours based on shifts. The 'other' option was marked by a single respondent.

Participants from Generation Z were asked to rank the importance of factors when choosing employment. As the weighted average in Figure 2 shows, the most important factors were salary amount, relationships among colleagues, and career growth. Opportunities for further education, working in a field they studied, benefits for employees, and working close to home were also important factors. Less important for Generation Z are opportunities to gain foreign experience, the possibility to work from home, and opportunities for business trips. Only one person marked 'other'.

R2: Do employers target Generation Z for specific job positions?

All entrepreneurs agreed they target Generation Z for specific job positions. Compared to responses by Generation Z, entrepreneurs mostly mentioned good relationships, friendly organizational culture, and attractive salary conditions as a benefit for working for them. Entrepreneurs also consider innovative approaches in their field and a promising future in the company as advantages.

Entrepreneurs mentioned they use tools like workshops, mentoring, and coaching for adapting new employees which may be important as Generation Z responded they value opportunities for further education. Three entrepreneurs also responded that there is a specific person in top management responsible for taking caring of employees.

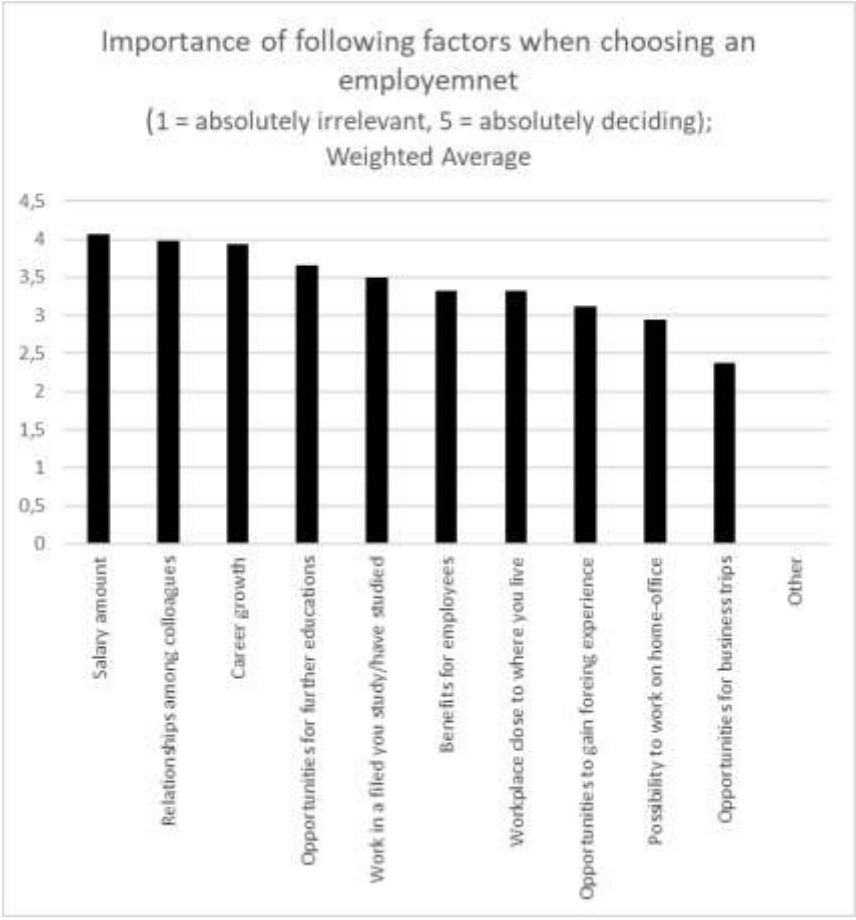

Figure 2: Importance factors for Generation Z when choosing employment

R3: How does Generation Z use social media in comparison with entrepreneurs?

The next part of the questionnaire for Generation Z asked questions about using social media. Figure 3 shows how often Generation Z use each type of social media. It is obvious that Instagram and Facebook are the most favourite of them; Generation Z uses them both several times a day. On the other hand, LinkedIn is used very rarely. Compared to entrepreneurs, who all use LinkedIn, three of them also use Facebook and Instagram to promote their business.

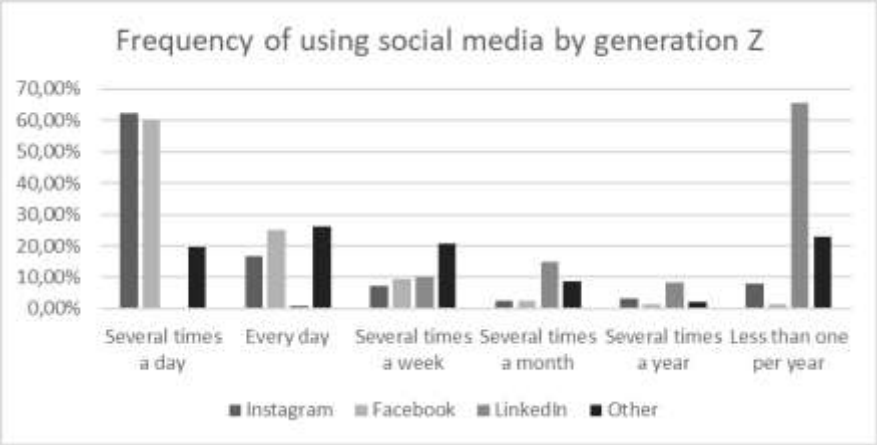

Figure 3: Frequency of social media use by Generation Z

Generation Z uses Instagram mostly to follow celebrities and interesting organizations and for checking up on their friends. This might be an opportunity for entrepreneurs to attract Generation Z with interesting company profiles on Instagram. All entrepreneurs responded that they use social media to promote their goods and services, two of them also use social media for recruiting. The main purpose Generation Z uses Facebook is to communicate with friends, engage in communities connected to their hobbies, and they also need it for their studies. If Generation Z uses LinkedIn, it is used to find job offers. The 'other' option was used quite often when answering this question. Further research should find out what other social media Generation Z uses. Detailed data is shown in Figure 4.

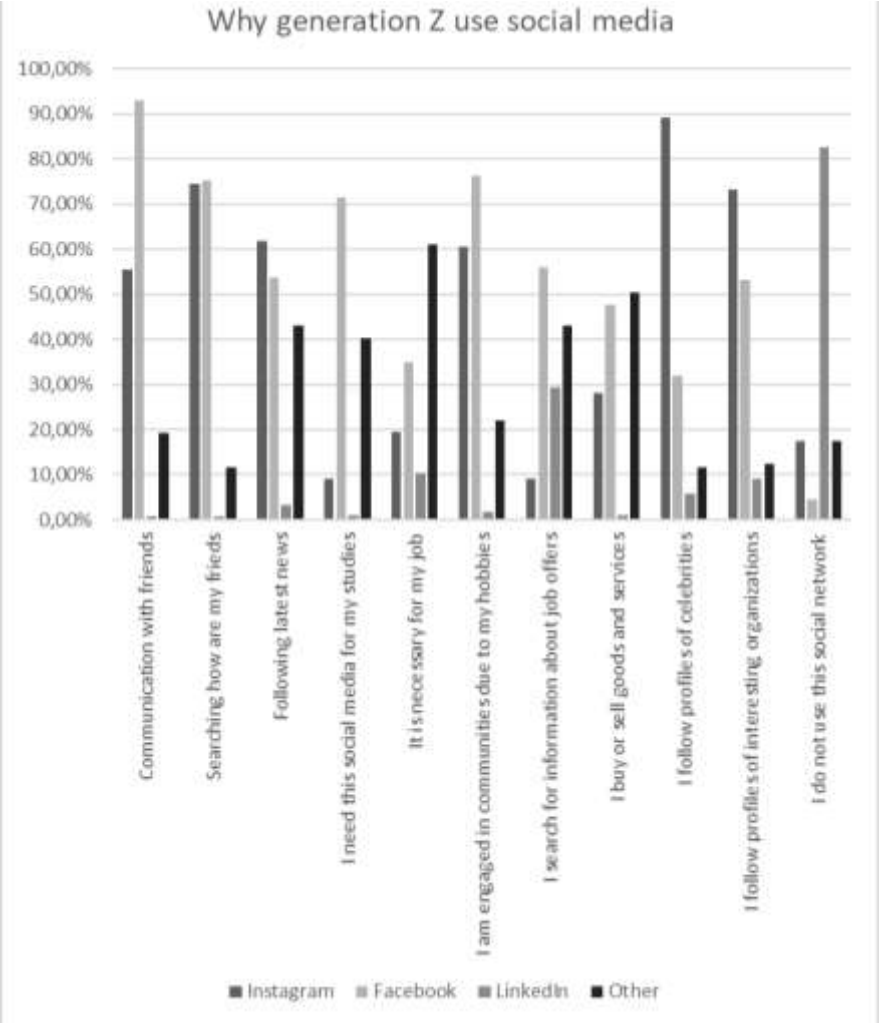

Figure 4: Why Generation Z uses social media

Important information arose from questions focused on the awareness of job offers on social media. 64.62% of respondents had not heard that there are posts with job offers on Instagram, of which 31.54% do not think they would make use of them in the future. 12.31% of Generation Z representatives that know of them do not find them interesting, 15.38% of the respondents might make use of them in the future. Only 6.82% of respondents follow job offers on Instagram.

Even greater ignorance concerns the Career app on Facebook. 73.85% of respondents had never heard of the app, of which 42.31% found this tool interesting and would like to know more about it. 11.54% of respondents are willing to use the app. Only 6.15% of respondents actively use it and one actually found a job. This sample of Generation Z is much more familiar with Facebook groups with job offers. 43.08% of respondents follow a group with job offers and another 8.46% have already found a job or a part-time job through Facebook groups. 20% of respondents intend to look for work through Facebook groups in the future. 15.38% of respondents had not heard of groups with job offers and half of them do not think they would make use of them in the future.

Similar ignorance is associated with the Work app on LinkedIn. 87.68% of respondents had not heard of this app, of which 20% of respondents consider it interesting. 15.68% of respondents are willing to use the app in the future. 11.54% of respondents monitor the job offers in the app. Only one person responded to a job offer through this app.

Similarly, as shown in Figure 5, social media is not a popular source of information among Generation Z job applicants. Facebook was preferred over many other possible sources of information.

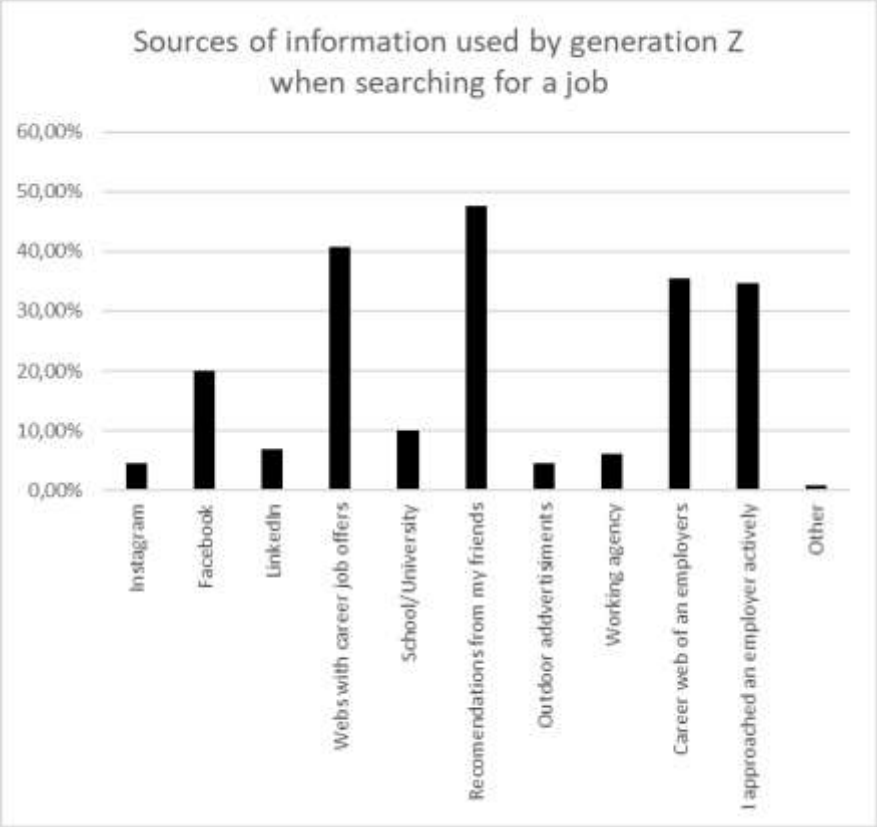

Figure 5: Sources of information used by Generation Z when searching for a job

5. Discussion and conclusion

The results of this pre-research show that there are factors where Generation Z and entrepreneurs meet each other. Generation Z has mentioned relationships among colleagues as the second most important factor and all entrepreneurs pointed out that this is their biggest advantage. Salary was the most important criteria for Generation Z and it seems entrepreneurs realize that. Yet there were also factors that were not mentioned by both sides. Since a high percentage of Generation Z (21,54%) would like to combine employment and entrepreneurship, follow up research should ask entrepreneurs if they are ready, or even if they are willing, to hire Generation Z as freelancers for some projects. Similar attitudes among entrepreneurs to flexible working hours should be researched as only one of them mentioned this benefit. On the other hand, entrepreneurs mentioned their innovative approach and promising future of the company as the main advantages of their companies so further research should ask if these factors are interesting for Generation Z. Employee education should also be researched. All the entrepreneurs have developed a system of education for new employees, some of them also mentioned access to continuous educations programs. As further education is important for Generation Z, it should be explored in detail if their needs actually correspond to existing educational systems within companies.

The second part of the questionnaires concentrated on social media usage. Generation Z mostly uses Instagram and Facebook, they access these social media networks several times a day, mostly to communicate with friends and to follow celebrities and organizations. The results of this pre-research indicate that although using social media is natural for Generation Z, these young people are not used to searching for a job within these communication channels. The only exceptions are specialized groups on Facebook.

All entrepreneurs responded that they use social media to promote their goods and services. Secondly, they also use it for recruitment. Three of them use Instagram, Facebook, and LinkedIn, the fourth one uses only LinkedIn for business. However, Generation Z does not intentionally use social media to search for a job, so entrepreneurs must find ways to attract job applicants for their business via social media. They need to create interesting content that would catch Generation Z's attention so they would find it interesting to follow the company's social media profiles. Further research should find out if there is a way to connect employers and Generation Z on social media. It seems the potential of these communication channels has not yet been fulfilled.

This research has several limitations. It is important to realize that any results of generational research cannot be generalized as we should be aware of ageism (Blauth et al. n.d.) and we must admit that every person is an individual and a person belonging to one generation by date of birth may better associate with older or younger generations (Nichols & Wright 2018) (Reeves & Oh 2008). On the other hand, it is useful to admit that generational differences do exist, and a better understanding of this topic may help managers to better deal with multigenerational issues.

Further research will continue with an extended sample of respondents from Generation Z as well as entrepreneurs. The results of this pre-research will be also used to better design questions for Generation Z and entrepreneurs will be asked for an interview to gain a deeper point of view. Although the results of this study cannot be generalized due to the small sample (of both Generation Z and of employers), this preliminary research helped to identify key areas for further research. In the context of future research, it will be particularly important to verify whether ignorance of many social networking tools focused on finding a job is characteristic of the entire population of Generation Z, or which demographic factors influence this ignorance.

Acknowledgements

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References

Aggerholm, H. and Andersen, S. (2018) "Social Media Recruitment 3.0.", Journal of Communication Management, Vol. 22, No. 2, pp 122-137. https://doi.org/10.1108/JCOM-11-2017-0131 .

Ambler, T. and Barrow, S. (1996) "The employer brand", Journal of Brand Management, Vol. 4, No. 3, pp 185- 206. https://doi.org/10.1057/bm.1996.42.

Backhaus, K. & Tikoo, S. (2004) "Conceptualizing and researching employer branding", Career Development International, Vol. 9 No. 5, pp 501-517. http://www.emeraldinsight.com/doi/10.1108/13620430410550754.

Bejtkovský, J. (2018) "Promotion as a variable of HR marketing in selected corporations in the Czech Republic in the context of digitization", Acta Universitatis Agriculturae et Silviculturae Mendelianae Brunensis, Vol. 66, No.6, pp 1393-1405.

Bencsik, A., Juhász, T. and Horváth-Csikós, G. (2016) "Y and Z Generations at Workplaces", Journal of Competitiveness, Vol. 6, No. 3, pp 90-106. https://doi.org/10.7441/joc.2016.03.06

Bencsik, A. and Machova, R. (2016) Knowledge Sharing Problems from the Viewpoint of Intergeneration Management. In Proceedings of the European Conference on Management, Leadership. Sonning Common: Academic Conferences & Publishing International Ltd., pp 42-50.

Blauth, C., McDaniel, J., Perrin, C. and Perrin, P.B. (2011) Age-Based Stereotypes: Silent Killer of Collaboration and Productivity [online] https://www.coursehero.com/file/32860025/age-based-stereotypespdf/.

Carpentier, M., Van Hoye, G. and Weng, Q. (2019) "Social Media Recruitment: Communication Characteristics and Sought Gratifications", Frontiers in Psychology, Vol. 10, No. 1669, pp 1-12. https://doi.org/10.3389/fpsyg.2019.01669.

Carr, K., Kendal, R. and Flynn, E. (2016) "Eureka!: What Is Innovation, How Does It Develop, and Who Does It?", Child Development, Vol. 87, No. 5, pp 1505-1519. https://doi.org/10.1111/cdev.12549.

Dabija, D.-C., Babut, R., Dinu, V. and Lugojan, M.I. (2017) "Cross-generational Analysis of Information Searching Based on Social Media in Romania", Transformations in Business & Economics, Vol. 16, No. 2, pp 248-270.

Duffy, B., Thomas, F., Shrimton, H., Whyte-Smith, H., Clemence, M. and Abboud, T. (2019) Ipsos Thinks: Beyond Binary: The lives and choices of Generation Z. Ipsos Mori.

Eger, L., Mičík, M. and Řehoř, P. (2018) "Employer branding on social media and recruitment websites: symbolic traits of an ideal employer", E+M Ekonomie a Management, Vol. 21, No. 1, pp 224-237. https://doi.org/10.15240/tul/001/2018-1-015.

Goh, E. & Jie, F. (2019) "To waste or not to waste: Exploring motivational factors of Generation Z hospitality employees towards food wastage in the hospitality industry", International Journal of Hospitality Management, vol. 80, pp 126-135. https://linkinghub.elsevier.com/retrieve/pii/S0278431918304602.

Goh, E. and Lee, C. (2018) "A workforce to be reckoned with: The emerging pivotal Generation Z hospitality workforce", International Journal of Hospitality Management, Vol. 73, No. 1, pp 20-28. https://doi.org/10.1016/j.ijhm.2018.01.016.

Haak-Saheem, W. (2020) "Talent management in Covid-19 crisis: how Dubai manages and sustains its global talent pool", Asian Business & Management, Vol. 19, No. 3, pp 298-301. https://doi.org/10.1057/s41291-020-00120-4.

Chillakuri, B. (2020) "Understanding Generation Z expectations for effective onboarding", Journal of Organizational Change Management, Vol. 33, No. 7, pp 1277-1296. https://doi.org/10.1108/JOCM-02-2020-0058.

Chillakuri, B. and Mahanandia, R. (2018) "Generation Z entering the workforce: the need for sustainable strategies in maximizing their talent", Human Resource Management International Digest, vol. 26, No. 4, pp 34-38. https://www.emerald.com/insight/content/doi/10.1108/HRMID-01-2018-0006/full/html.

Kemp, E., Cowart, K. and Bui, M. (2020) "Promoting consumer well-being: Examining emotion regulation strategies in social advertising messages" Journal of Business Research, Vol. 112, pp 200-209. https://doi.org/10.1016/j.jbusres.2020.03.010.

Korombel, A. and Ławińska, O. (2019) "Building Relations with Generation Z as a Challenge for Social Customer Relationship Management Faced by Modern Enterprises: A Case of Generation Z Students", International Journal of Supply Chain Management, Vol. 8, No. 4, pp 1019-1025. http://ojs.excelingtech.co.uk/index.php/IJSCM/article/view/3360/1860.

Lazányi, K. and Bilan, Y. (2017) "Generetion Z on the labour market – do they trust others within their workplace?", Polish Journal of Management Studies, Vol. 16, No. 1, pp 78-93. https://pjms.zim.pcz.pl/resources/html/article/details?id=158095.

Lvovna, S. and Viktorovich, V. (2017) "Creating a Competitive Workplace in the Modern World", The Turkish Online Journal of Design, Art and Communication, 7(APRLSPCL), pp 1196 - 1207. http://www.tojdac.org/tojdac/VOLUME7-APRLSPCL_files/tojdac_v070ASE246.pdf [Accessed 2019-05-12].

McCrindle, M. and Wolfinger, E (2014) The ABC of XYZ: understanding the global generations 3., Sydney: UNSW Press.

Mičík, M. and Mičudová, K. (2018) "Employer Brand Building: Using Social Media and Career Websites to Attract Generation Y", Economics and Sociology, Vol. 11, No. 3, pp 171-189. http://www.economics-sociology.eu/?606,en_employer-brand-building-using-social-media-and-career-websites-to-attract-generation-y.

Michl, P. (2019) "Infografika: Sociální sítě v Česku v roce 2019", Focus [online]. https://www.focus-age.cz/m-journal/aktuality/infografika--socialni-site-v-cesku-v-roce-2019__s288x14828.html.

Mishyna, S., Mishyn, O. and Parkhomenko, N. (2019), "Innovative methods and tools for personnel international marketing development", Economic Studies, Vol. 28, No. 1, pp 33-49.

Mohanty, S. (2019) "Becoming an Employer of Choice in the Infrastructure and Construction Sector", International Journal of Innovative Technology and Exploring Engineering, Vol. 8, No. 11S, pp 576-589. https://www.ijitee.org/wp-content/uploads/papers/v8i11S/K109609811S19.pdf.

Nichols, T. and Wright, M. (2018) "Generational Differences: Understanding and Exploring Generation Z", In Southwest Academy of Management Proceedings: Annual Meeting. Albequerque: Southwest Academy of Management, pp 198-206. https://img1.wsimg.com/blobby/go/afe6804d-0aa2-47b7-8e88-69a53343cee6/downloads/Proceedings%202018-4.pdf?ver=1586382967901.

Reeves, T. and Oh, E. (2008) "Generational Differences" In Handbook of Research on Ecucational Communations and Technology. Abingdon: Lawrence Erlbaum Associates Taylor & Francis Group, pp 295-303

Rodriguez, M. et al. (2019) "Managing the Next Generation of Sales, Gen Z/Millennial Cusp: An Exploration of Grit, Entrepreneurship, and Loyalty", Journal of Business-to-Business Marketing, Vol. 26 No. 1, pp 43-55. https://www.tandfonline.com/doi/full/10.1080/1051712X.2019.1565136.

Rodríguez-Sánchez, J., Montero-Navarro, A. and Gallego-Losada, R. (2019) "The Opportunity Presented by Technological Innovation to Attract Valuable Human Resources", Sustainability, Vol. 11, No. 20, pp 1-17. https://doi.org/10.3390/su11205785.

Sifatu, W.O., Sjahruddin, H., Fajriah, Y., Dwijendra, N.K.A. and Santoso, A. (2020) "Innovative work behaviors in pharmacies of Indonesia: Role of employee voice, generational diversity management and employee engagement", Systematic Reviews in Pharmacy, Vol. 11, No. 2, pp 725-734.

Stone, D. and Dulebohn, J. (2019) The Only Constant in HRM Today Is Change: A volume in: Research in Human Resource Management 1 ed., USA: Information Age Publishing Inc.

Strenitzerová, M. (2016) "HR marketing in terms of HR managers and employees - application e-marketing tools", Marketing Identity, vol. 4, No. 1/2, pp 463-473.

Tato-Jiménez, J., Buenadicha-Mateos, M. and González-López, Ó. (2019) "Evolution and Sustainability of Benefits Offered to Employees in On-Line Recruitment", Sustainability, Vol. 11, No. 16, pp 1-17. https://www.mdpi.com/2071-1050/11/16/4313.

Törőcsik, M., Szűcs, K. and Kehl, D. (2014) "How Generations Think: Research on Generation Z", Acta Universitatis Sapientiae Communicatio, Vol. 1, No. 1, pp 23-45. http://www.acta.sapientia.ro/acta-comm/C1/comm1-3.pdf.

Walmsley, A., Cripps, K. and Hine, C. (2020) "Generation Z and hospitality careers", Hospitality & Society, vol. 10, No. 2, pp 173-195. https://www.ingentaconnect.com/content/10.1386/hosp_00019_1.

Wickham, M. and O'Donohue, W. (2009) "Developing Employer of Choice Status: Exploring an Employment Marketing Mix", Organization Development Journal, Vol. 27, No. 3, pp 77-95. https://doi.org/10.1108

Wilden, R., Gudergan, S. and Lings, I. (2010) "Employer branding: strategic implications for staff recruitment", Journal of Marketing Management, Vol. 26, No. 1-2, pp 56-73. http://www.tandfonline.com/doi/abs/10.1080/02672570903577091.

How do High-Tech Software SMEs in China Manage Risks and Survive in Today's Complex Environment?

Yanzhi Huang, Bidyut Baruah and Tony Ward
University of York, UK
yh1576@york.ac.uk
bidyut.baruah@york.ac.uk
tony.ward@york.ac.uk
DOI: 10.34190/EIE.21.101

Abstract: Small and medium-sized enterprises (SMEs) are the backbone of the national economy in China. However, the average life expectancy of Chinese SMEs is only 3.7 years with more than half of the SMEs failing to survive beyond their first five years. And in 2020, the outbreak of COVID-19 has further aggravated the pressure among SMEs to survive. As a result of this pandemic, many Chinese SMEs struggled with their risk management approaches. Some had to lay off employees, cut salaries and even suspend operations in exchange for a chance of survival. The ongoing pandemic has raised many questions about the risk management strategies and the resilience of SMEs. Some researchers even questioned the effectiveness of some of these risk-management strategies. There is now a crucial need to understand the importance of effective risk management strategies so as to attain a competitive advantage in an unpredictable market. However, there are very limited studies that shed light on the risk management of Chinese SMEs, especially in the high-tech market and in the complex times of COVID-19. How do successful Chinese SMEs sustain and survive in such competition in the high-tech market? What strategies do they apply to manage risks and how effective are these strategies? How do they respond to changes in the market to retain and drive their organizational sustainability and survival? This paper explores some of these gaps by using case studies of 10 successful SMEs from the Chinese High-tech market. Using interviews with the founder-entrepreneurs from these SMEs, the paper discusses how these SMEs approach different risk management strategies including that of COVID-19. The paper will also explore the crucial role played by the founder-entrepreneurs in the decision-making process of risk management.

Keywords: risk management, Chinese SMEs, high-tech software market, founder-entrepreneurs, COVID-19

1. Introduction

SMEs play a significant role in the economic development of China. More than 97% of Chinese companies are SMEs which contribute to about 60% of GDP and 80% of work opportunities (Srisathan, Ketkaew and Naruetharadhol, 2020). In recent years, the Chinese government has emphasized on the development of high-tech industries and as part of that introduced a series of regulations and policies to support the growth of high-tech SMEs (Chen, Liu and Zhu, 2018). This led to a rise in the number of high-tech SMEs in China. By the end of the year 2020, the number of high-tech SMEs in China was over 200,000, which contributed to the overall improvement in China's innovation capabilities (National Bureau of Statistics, 2021). However, despite showing good potential, the high-tech SMEs faces some serious challenges on a regular basis. The average life expectancy of Chinese SMEs is only 3.7 years with more than half of the SMEs failing to survive beyond their first five years. The spread of COVID-19 in 2020 has highly influenced the market environment further threatening SMEs' growth and survival (National Bureau of Statistics, 2021). Compared with other industries, high-tech SMEs need a higher initial investment to build and sustain their R&D capabilities, which could potentially expose them to financial risks, especially during the start-up stages (Xiao and Ramsden, 2016). The ongoing pandemic has also raised many questions about the risk management strategies and the resilience of SMEs. In this context, having a good risk management strategy has become very critical for any SME's overall development and success. However, there are very limited studies on the risk management approaches adopted by Chinese high-tech SMEs. This paper addresses some of these gaps by using 10 successful case studies of Chinese high-tech software SMEs. The objective of this paper is to identify and discuss some of the main risks that SMEs face during their operation and how they utilize strategies to address these risks. The paper will also explore the influential role of founder-entrepreneurs in the process of risk management. This is one of the first studies to explore the risk management strategies adopted by some of the Chinese SMEs during COVID-19.

2. Research background

2.1 Chinese high-tech software SMEs' survival and growth

High-tech service market has gradually become one of the most important areas which significantly influence the Chinese national economy (Ministry of Industry and Information Technology of the People's Republic of China, 2021). As an important sector of the overall high-tech service industry, the software industry has also grown rapidly in recent years. As shown in figure 1, according to a recent report from the Ministry of Industry and Information Technology (2021), by the end of the year 2020, China had over 40,000 software companies which contributed 8.16 trillion yuan towards the software business revenue (for the overall year). Although the growth has been relatively slower than before due to COVID-19, the overall Chinese software industry has still shown some resilience in terms of growth rate.

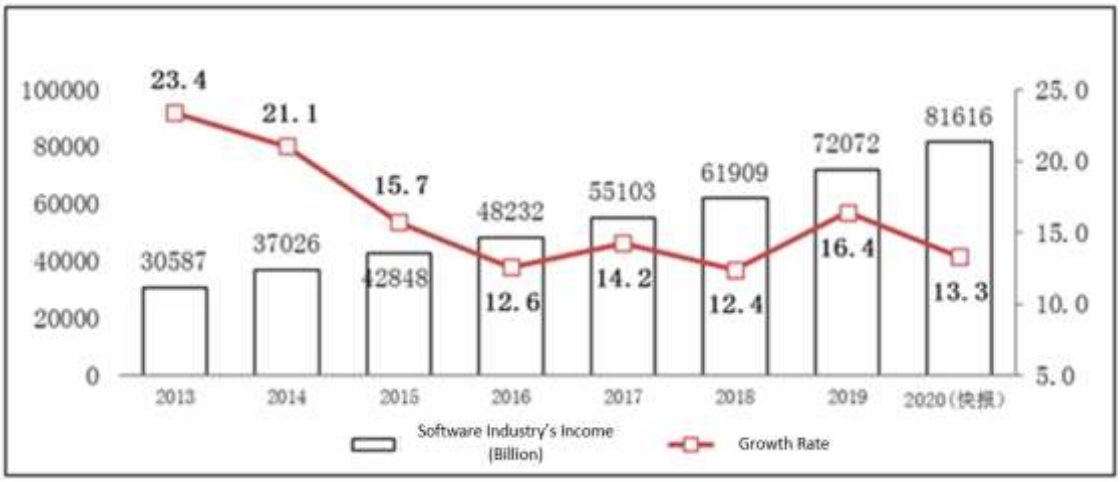

Figure 1: A yearly growth depiction of the Chinese Software Industry (Ministry of Industry and Information Technology of the People's Republic of China, 2021)

China is the first country to experience the major waves of COVID-19 and its impacts can be seen in the overall software industry. As figure 2 shows, the business revenue growth rate of the Chinese software industry is negative in the first season of 2020. Although the Chinese government was quick to implement a series of effective measures to control the spread of COVID-19 and reduce its impact on the national economy, the overall development rate is still lower than that of 2019 (Ministry of Industry and Information Technology of the People's Republic of China, 2020).

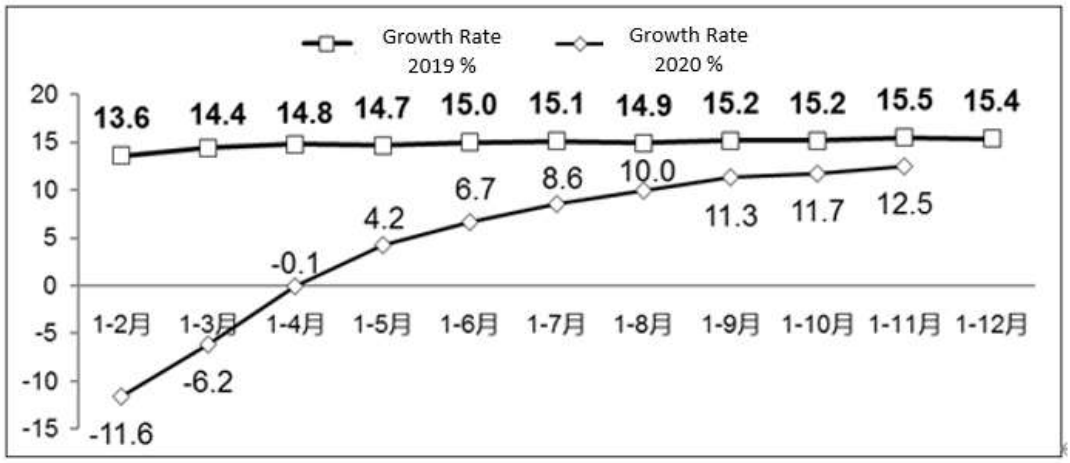

Figure 2: Software business revenue growth from 2019 to January-November 2020 (Ministry of Industry and Information Technology of the People's Republic of China, 2020)

Compared with large organizations, SMEs are more vulnerable and easily affected by such changes and risks in the market environment due to their limited resources (Lu *et al.*, 2020). In general, the average income of software SMEs tends to be higher than other sectors. However, due to their specific business characteristics,

software SMEs need to adopt stronger innovation strategies to remain competitive and relevant so as to face the rapid market changes and technological development (He and Li, 2005; Choras *et al.*, 2020). Gumusluoglu and Ilsev (2009) noted that the high-tech SMEs are competing in a fierce environment where the product update rate is very fast and there are a large number of competitors along with highly unpredictable market demands. For these SMEs, maintaining innovation and creativity and mastering the latest technological capabilities are critical towards their success and survival. However, these strategies might require a higher initial investment which could expose these software SMEs to greater risks especially at the start-up phases (Choras *et al.*, 2020). In this context, having good risk management capabilities becomes very crucial for their survival.

2.2 Risk management in Chinese SMEs

Risk management is a systematic process, which aims to identify and control uncertainty in the company's operations through a series of actions such as assessment, evaluation, elimination, and minimization (Conroy and Soltan, 1998). Radner and Shepp (1996) emphasized how risk management helps enterprises to set suitable business strategies thereby sustaining competitions in today's dynamic and unpredictable environment. Some studies even argued that risk management is more important for SMEs than large organizations. Smit and Watkins (2012) pointed out that many SMEs and large enterprises are competing in the same market environment facing similar challenges. However, due to the limitations of the SMEs, they have more pressures in terms of surviving any substantial risks.

However, research shows that many SMEs do not have clearly defined risk management strategies. Due to their simple management structure and limited resources, most SMEs do not have designated or specific department/position for managing risks (Zeng, 2018; Alquier and Tignol, 2006). In a lot of the situations, the founder-entrepreneurs of these SMEs have to take the responsibility of risk management and decision making when faced with market uncertainties (Huang, Baruah and Ward, 2021). Richbell, Watts and Wardle (2006) noted how in most SMEs, the founder-entrepreneurs tend to be the owner of the company. Being the leader of the company, they occupy the highest power in terms of controlling the company's development and building business plans. Hence, their personal understanding and evaluation of risks will directly influence the company's direction, further affecting day-to-day operational development and structure (Lloyd-Reason and Mughan, 2002). But researchers such as He and Li (2005) and Jiang and Li (2010) have highlighted that there is a lack of risk awareness among many Chinese SMEs and their founder-entrepreneurs. For Tang and Tang (2016), one of the significant advantages among SMEs is their ability to respond faster to market changes and demands than large organizations. Richbell, Watts and Wardle (2006) pointed out that for founder-entrepreneurs, it is therefore necessary to have certain risk management skills so as to develop effective strategies on time, make the best out of the situations and lead the company towards success. But as Jiang and Li (2010) observed, in many circumstances, the founder-entrepreneurs' prediction of the market tends to be too optimistic or flawed. Sometimes their focus is only on the opportunities of the market ignoring some of the vital risks and in many circumstances, they are unwilling to invest in risk management strategies so as to avoid adding further financial pressures to their business.

During the pandemic in 2020, many Chinese SMEs were unprepared and hence, struggled with their risk management strategies. Some had to lay off employees, cut salaries and even suspend operations in exchange for a chance of survival. The ongoing pandemic has raised many questions about the risk management strategies and the resilience of SMEs. There is now a crucial need to understand the risks SMEs face and the importance of effective risk management strategies so as to attain a competitive advantage in an unpredictable market. However, there are very limited studies that shed light on the risk management of Chinese SMEs, especially in the high-tech market and in the complex times of COVID-19. Prior to this pandemic, most researchers seemed to have focused mainly on large organizations in western countries. How do successful Chinese SMEs sustain and survive in such competition in the high-tech market? What strategies do they apply to manage risks and how effective are these strategies? How do they respond to changes in the market during COVID-19 to retain and drive their organizational sustainability and survival? These are some of the gaps this paper will address.

3. Research methodology

For this particular study, the researcher mainly focused on the risk management in Chinese high-tech software SMEs, and how they deal with market risks in their day-to-day operations. Using case studies gave them the advantage to focus on specific examples so as to present an in-depth analysis of their successful strategies and risk management approaches.

Using a qualitative research approach, semi-structured interviews were conducted with founder-entrepreneurs from 10 high-tech software SMEs in China. The cases for this study were selected according to the following criteria:

- The background of the company involves software design, development or operation;
- The company has less than 250 employees and with an annual income not exceeding one billion RMB;
- The company has been in operation in the market for over 3 years with relatively good financial and market performance. Their experience from the market competition and challenges will ensure rich data on risk management strategies to this study.

The semi-structured interviews were conducted following a consistent interview guide where the initial questions explored the background and day-to-day operations of the company. The follow-up questions focused on the role of the founder-entrepreneurs, their work experience and entrepreneurial motivations and how these influence their risk management attitude and strategies. The interview questions also discussed how founder-entrepreneurs perceived risks and the associated challenges in the context of their companies and their response to COVID-19 related challenges.

The interviews were conducted in Chinese, following which the first step was to translate the interview recordings into an English transcript. In order to avoid any potential bias that could have incurred during the translation process, the researcher commissioned another person for proof reading (somebody who was proficient in both Chinese and English and had no association with this research project). Following the translation, the researcher reviewed the interview transcripts using NVivo which is a qualitative data analysis tool for thematic analysis. Each transcript was analysed on a case-by-case basis to identify key themes such as risks faced by the companies and their risk management strategies. After the thematic analysis, the 10 cases were compared in order to understand the overall picture of risk management among successful Chinese software SMEs.

4. Risk management of Chinese high-tech software SMEs

4.1 Risks faced by Chinese high-tech software SMEs

High-tech Software SMEs during their operation face various risks, which can be highly challenging. Based on the analysis in this study, there are two categories of risks: external and internal risks.

External risks are the risks and challenges emerging from the external environment and market, such as economic situation, competitors, and industry development. Because of the smaller scale, SMEs can be influenced easily by external factors than larger organizations (Zeng, 2018). The changing economic environment and market demands highly challenge the viability of SMEs. Many participants in the interview pointed out that in recent years, the negative market environment of China is one of the significant factors which hindered the growth among software SMEs. This includes the changes brought in by COVID-19. Another external risk mentioned frequently by the participants is the strong competition in the market. Software SMEs face competition from large organizations as well as companies of similar sizes, which limits their chances of survival. Also, some of the unclear/underdeveloped law and regulations in China also contribute as an external risk further bringing unfair competition and difficulties for software SMEs. The pandemic in 2020 no doubt has been the biggest external risk for any business and industry. Many participants mentioned how the first half of 2020 can be regarded as the darkest period since the foundation of their companies due to the influences of COVID-19. However, most participants still showed a relatively positive attitude noting how the spread of COVID-19 has further strengthened Chinese people's dependence on digital and online services. There has been an increase in the use of digital and online services in the market which has brought more potential market opportunities for some of these SMEs.

Internal risks are identified as internal factors, such as the entrepreneur's abilities, company resources, which might cause some uncertainties and potential losses. In the interviews, many participants mentioned that the impact of internal risks is not as frequent as external factors. Because of the critical role played by the founder-entrepreneurs, their personal characteristics can highly affect the company's growth. Many participants held the opinion that lacking certain management skills has been one of their main internal risks for software SMEs. For a lot of these founder-entrepreneurs due to the nature of their business, they not only need to master software skills, but they also need to have a certain understanding of their business context. Many participants

during the interviews acknowledged how they sometimes felt that their capabilities didn't perfectly support the management or pace of development of their enterprise. Another internal risk frequently mentioned in this study was the limitation of the resources. Many participants noted that the lack of resource is a big problem they face during the company's general operation and management.

4.2 Strategies used for risk management

For high-tech software SMEs, to sustain successfully in the market, the importance of having good risk management strategies is very significant. Any risks and business errors may seriously affect the company's cash flow, thereby further affecting the company's R&D process and its operations. Some participants in this study believe that the main objective with risk management is to avoid the occurrence of risks in the first place. Many felt that once there is an occurrence of a risk event, they may not have much power in terms of controlling or managing it. Hence, they might become susceptible to it negative consequences. The following are some of the risk management strategies used by the participating SMEs in this study:

- Market Direction

Choosing a market direction is one of the most important strategies in risk management. This can help a company to fundamentally reduce a large part of the possibilities of risks. Participant 9 emphasized that as founder-entrepreneur, finding a specific track for their company's growth was the most important factor. If they focus in the right direction, they might face fewer competitors or risks, and at the same time, their likelihood of success might increase significantly. This participant runs a company which focuses on some enterprises to provide workflow technical supports and BPM (Business Process Management) services. They have stable cooperation with some government organizations and famous organizations and is doing well in the current market. However, a successful company like this also had to face some big challenges during its start-up stages. Participant 9 explained how his company had to undergo important business transformations to find their market focus and he believes that this is the key reason for their company's success today.

Participant 10 argued that avoiding competition with large organizations can reduce a lot of the financial pressures faced by SMEs. He said that usually, as software SMEs, they would prefer not to deal with mature markets as this would involve a lot of competitors. He explains *'As the founder-entrepreneur, if I insist on competing with large companies, the final result may be fatal'.*

- Investors and Effective Collaborations

Effective collaboration with investors and customers can be another effective strategy for risk management. For participant 6, this has been a useful strategy to minimize potential loss. As a software SME, their risk tolerance is usually limited. Hence, when starting new projects which would require high initial investment, they would consider collaboration with other companies to share the benefits and risks. Participant 6 explained that during such collaboration, their resources and capabilities can be mutually used to effectively improve the overall project. At the same time, if a project fails, they can share the losses thus making the impact more affordable without highly influencing the company's stability. A similar strategy is also being used by participant 8. As a company providing services to other enterprises, they sometimes will bring on board their customers as collaborators. They would usually choose long-term customers who are familiar with the company's operations and recognize their capabilities and might show interest in collaboration. Once a collaborative relationship is set up, the company will have a stable customer flow along with more financial and technical support. It can give them greater power to expand their business and occupy better market share. However, regardless of such collaboration and distribution of power, founder-entrepreneurs should retain control over important matters including decision making and management of their SMEs. In this context, participant 3 comments *'I need the support of my partners, but I must make sure that my company share is much larger than them'.* Participant 1 supported this by adding that if the founder-entrepreneur fails to handle their relationship with their shareholders and collaborators, it might affect their company's development and, in some cases, could even threaten their survival.

- Market Evaluation

Evaluation of the market is one of the most important strategies for avoiding potential risks and losses in companies. In most SMEs, the responsibility of risk assessment is individually taken by their founder-entrepreneurs, and these are usually based on market trends, their company's capabilities and potential of their projects.

Participant 2 cited *'If we can clearly define the market trend, we are more likely to make a correct decision and avoid potential losses'.* As a software SME, they can achieve success in the competitive market only if they can provide the products or services which can effectively fulfil customers' needs. As part of that, it is important to do market research to analyse the customers' demands. However, due to resource constraints, in most cases, they can only rely on customers' feedback and reports from other industries to understand the market situation. Participant 7 also emphasized the necessity of market evaluation for risk management of SMEs. He explained that *'If the initial market research shows that there are already some strong competitors in the market that provide products similar to ours, we might consider giving up this project'*. He believed that, as an SME, looking for market gaps and trying to fill these up is an effective way to survive in today's competitive market.

For participant 4, the main purpose of market assessment is to predict future trends in the industry. As an SME, they don't have much influence on the market so as to change consumer needs and their consumption habits. In order to reduce the risks and increase the company's survival rate, it is therefore, essential to follow the market trends. As the founder-entrepreneur, participant 4 therefore tries to control her company's degree of innovation and how they bring new products out in the market.

Apart from having an understanding of the market, founder-entrepreneurs should also evaluate their company's risk tolerance and project potential to make appropriate judgment. Identifying their company's capabilities can help entrepreneurs to take measures to control risks within a manageable parameter. Participant 2 pointed out that he assesses business risks based on the company's operating conditions. If the company has sufficient financial resources to bear any potential losses that could be brought in by market risks, he will define the risk as 'acceptable'. Participant 3 had a similar view *'Having a clear understanding of ourselves is very important'.* He said that they will decide to go ahead with a project, only if they have enough money and the ability to drive and support it. For them, survival in the market is the most important thing. If the risk of a project is too high which could impact the company's stable cash flow or even threaten its operation, most founder-entrepreneurs would choose to stop going forward with such projects so as to ensure the safety of their company.

- Timely Adjustment

One of the obvious advantages of SMEs is their flexible management structure. Due to their small sizes, it is easier for SMEs to adjust their direction to adapt with market changes. For founder-entrepreneurs, seizing this advantage to formulate appropriate risk management strategies can help the company show a better performance. In the interviews, participants expressed that during the project work, regular summary and timely adjustment can help the company avoid further losses, which is also an important strategy for risk control. Participant 9 mentioned how running an SME is like sailing in the sea, founder-entrepreneurs should always pay attention to the market changes and adjust the direction on time. This will help in leading their company to survive in the ocean of the market and attain ultimate success.

Participant 10 explained how they would conduct series of preliminary tests to gather customer feedback with any of their new projects. This will help in predicting the market performance of their products based on the feedback. If the prediction results indicate potential success, only then they would decide to continue with the development of the product. Participant 10 also mentioned that, during the project operation, they will often communicate with customers to clarify their recommendations, assessments and changes in demand. He stated that this strategy can help them keep abreast of market changes. In this way, they can adjust their business at the lowest cost to avoid potential losses in future.

Participant 8 similarly shared his experience of the importance of timely project adjustments. In June 2019, his company decided to put out a new mobile application to provide online marketing services. He and his group spent over 3 months investing more than 400 thousand Yuan in this project. However, the market feedback was not very positive, much lower than their expectations. This led him to abandon this project so as to avoid further risks. He explained that after this experience, he realized the importance of controlling early investments. He emphasized that software SMEs should be cautious in the process of project development. If one identifies any important changes in the market environment, timely adjustments will potentially avoid bringing any further risks.

5. Responding to COVID-19

For any country and industry, the outbreak of COVID-19 is undoubtedly a big setback that greatly influences people's normal lives and national economic development. Compared with large organizations with relatively

higher risk tolerance and more resource accumulation, the impact of COVID-19 on SMEs is more severe. During the interviews, participants discussed how the pandemic had highly changed the overall market environment. In this context, participant 2 noted *'In an overall negative market environment, people's purchase and consumption intentions would highly decrease. For us, the decline of market demand would directly influence our income and revenue, and further increase our financial pressures'*. He believed the financial challenge is one of the biggest problems brought by COVID-19.

Another main problem that was frequently discussed by the participants is the change in work mode. Because of the spread of COVID-19, most businesses had to be temporarily shut down in the first few months of 2020. During that period, all work-related communication were only limited to online mode, and many businesses had no or very limited opportunity to communicate face-to-face with customers and employees. Participants claimed that this change in work mode greatly reduced their work efficiency. *'To be honest, we weren't totally prepared for this change'* participant 1 said, he still believes that online work is just a phased measure, it is a helpless choice under the pandemic. He emphasized the importance of working atmosphere and said that at this stage, working in a physical office is still the best approach for most SMEs.

In order to deal with the problems and minimize the losses caused by COVID-19, participants used a series of risk management strategies. Focusing on the decrease of the market demand, some participants decided to shift their attention from opening new market to existing client's maintenance. Participant 5 stated *'In the current situation, we will cherish the cooperative relationship more with our existing clients.'* In the first half of 2020, their client numbers were much lower than their expectations. He clearly understood that in a negative market, it is difficult to attract new co-operators or clients, he said '*So, we decided to build deeper connections with our original clients'.* He asked his employees to make more contacts with their existing clients in order to deepen their understanding of their demands and individual requirements. They provided specific or bespoke services based on the requirements of their clients and their products and services. He said that although this strategy cannot help the company achieve rapid growth, it can ensure that the company obtains a stable and healthy cash flow.

Compared with large organizations, financial pressures seem to plague SMEs and hinder their development. For companies without sufficient financial accumulation or reserved budget, this pandemic has been fatal in terms of their chances of survival in the market. For many, reducing cost has become a necessary measure to help sustain during the crisis. Two main cost-reducing methods were cited by the participants during the interview: layoffs and pay cuts. '*If we have any other choices, I would not make this decision*', participant 4 said helplessly. In the first half of 2020, the financial performance of her company was not good, so, she had to use a series of measures to reduce the company's operating costs. *'To ensure the survival of the company, we had to let some employees go and temporarily adjust salaries of others in order to reduce labour costs*' she explained. Although this kind of personnel adjustment will lead to brain drain, it seemed to be one of the most efficient ways to reduce costs.

The negative impacts of COVID-19 are significant, but during the interviews, some participants showed a very positive attitude and believed that COVID-19 has even brought some benefits to their company's long-term development. Participant 8 said *'It is no doubt that the COVID-19's outbreak has slowed down our company's growing speed, but I still believe that as long as we can continually improve our market competitiveness, we will never fail by the external environment change'.* Based on this opinion, he led his team to conduct a series of research and bring some adjustments to their company's software products during the pandemic. They moved their focus from some of their external works such as marketing to product improvement and research. Due to this effective strategy, they were able to finish a new product's design and its testing in the first season of 2020, which was a lot earlier than the initial timeline they had set.

6. Conclusion

Today some of the successful SMEs have founder-entrepreneurs who work tirelessly to build an effective risk management strategy for their company. Unlike large organizations which have dedicated departments or positions responsible for risk management, many Chinese SMEs rely mostly on their founder-entrepreneurs to take these actions. They need to make decisions for their company based on their own judgement and personal experiences and in the process bear the sole responsibility of any possible consequences. The COVID-19 pandemic has been a challenging time for a lot of these SMEs and their founder-entrepreneurs. This study

interviewed founders-entrepreneurs from 10 successful Chinese high-tech software SMEs to understand the main risks they face in the current environment and the kind of risk strategies they use to respond to the market challenges.

The analysis showed that most participants in this study clearly acknowledge the importance of risk management for their company's development. They also build a series of strategies to avoid potential risks. Factors such as education background, work experiences, age and personalities significantly influence their evaluation of the market risks. But as founder-entrepreneurs, they have strong control over the decision-making process and help generate a quicker response to market challenges including that of COVID-19. Many participants in this study believe that in the current competitive market, flexibility is one of the most important advantages for SMEs. Successful software SMEs need to have a certain understanding of risks and proactive measures in place to tackle market challenges. In the current unpredictable environment, Chinese SMEs and their founder-entrepreneurs should work on their resilience and risk tolerances and build their capabilities so as to address any form of risks effectively in future.

This paper will serve as a reference for some of the managers and entrepreneurs with their roles with risk management. COVID-19 is a big threat but also a good opportunity for some SMEs. After being exposed to such calamities, it can be assumed that many will work on their risk awareness and management strategies in the upcoming years. Perhaps, this will also encourage more SMEs to prioritize and invest time in risk strategies and management measures.

However, it should be acknowledged that this study still has some limitations. Firstly, this study only focuses on the Chinese high-tech software market, considering the special characteristics of this industry, the research finding of this study may not be fully applicable to SMEs in other sectors. The study is based on 10 cases of Chinese software SMEs, further studies should look at a larger sample size to quantify the findings.

References

Alquier, A. M. B. and Tignol, M. H. L. (2006) "Risk management in small- and medium-sized enterprises", *Production Planning and Control*, Vol.17, No. 3, pp 273-282 doi: 10.1080/09537280500285334.

Chen, X., Liu, Z. and Zhu, Q. (2018) "Performance evaluation of China's high-tech innovation process: Analysis based on the innovation value chain", *Technovation.* No. 74–75, March, pp 42–53. doi: 10.1016/j.technovation.2018.02.009.

Choras, M. *et al.* (2020) "Measuring and improving agile processes in a small-size software development company", *IEEE Access*, Vol. 8, pp 78452–78466. doi: 10.1109/ACCESS.2020.2990117.

Conroy, G. and Soltan, H. (1998) "ConSERV, A project specific risk management concept", *International Journal of Project Management*, Vol. 16, No. 6, pp 353–366. doi: https://doi.org/10.1016/S0263-7863(98)00012-X.

Gumusluoglu, L. and Ilsev, A. (2009) "Transformational leadership, creativity, and organizational innovation", *Journal of Business Research*, Vol. 62, No. 4, pp 461–473. doi: https://doi.org/10.1016/j.jbusres.2007.07.032.

He, J. and Li, S. (2005) "The Research on Developmental Status of High-tech SMEs in China", *Journal of Hebei software Institute.* Vol. 7, No. 1, pp 1–5. doi: 1673-2022(2005)01-0001 — 05.

Huang, Y., Baruah, B. and Ward, A. (2021) "How Chinese High-tech SMEs are coping with COVID-19 related risks?", *9th International OFEL Conference on Governance, Management and Entrepreneurship - Building Resilient Boards: Facing Emerging Challenges in Corporate Governance*. Dubrovnik, Croatia: OFEL international conference, pp. 63–78.

Jiang, L. and Li, X. (2010) "Discussions on the Improvement of the Internal Control in SMEs", *International Journal of Business and Management*, Vol. 5, No. 9, pp 214–216. doi: 10.5539/ijbm.v5n9p214.

Lloyd-Reason, L. and Mughan, T. (2002) "Strategies for internationalisation within SMEs: The key role of the owner-manager', *Journal of Small Business and Enterprise Development*, Vol. 9, No. 2, pp 120–129. doi: 10.1108/14626000210427375.

Lu, Y., Wu, J., Peng, J., and Lu, L. (2020) "The perceived impact of the Covid-19 epidemic: evidence from a sample of 4807 SMEs in Sichuan Province, China", *Environmental Hazards*, Vol. 19, No. 4, pp 323–340. doi: 10.1080/17477891.2020.1763902.

Ministry of Industry and Information Technology of the People's Republic of China. (2021) "*2020 Statistical Bulletin of the Software and Information Technology Service Industry".* [Online], China Statistics., Available at: https://www.miit.gov.cn/gxsj/tjfx/rjy/art/2021/art_f6e61b9ffc494c099ea89faecb47acd2.html [Accessed 7 April 2021].

National Bureau of Statistics of China, 2019. "*2019 China Statistical Yearbook,* Beijing: China Statistics Press". [Online], China Statistics, Available at: http://www.stats.gov.cn/tjsj/ndsj/2019/indexch.htm [Accessed 7 April 2021].

National Bureau of Statistics, 2021. "*The Director of the National Bureau of Statistics answers reporters' questions on the operation of the national economy in 2020".* [Online], China Statistics, Available at: http://www.stats.gov.cn/ztjc/zthd/lhfw/2021/lh_hgjj/202102/t20210219_1813626.html [Accessed 10 April 2021].

Radner, R. and Shepp, L. (1996) "Risk vs. profit potential: A model for corporate strategy", *Journal of Economic Dynamics and Control*, Vol. 20, No. 8, pp 1373–1393. doi: 10.1016/0165-1889(95)00904-3.

Richbell, S. M., Watts, H. D. and Wardle, P. (2006) "Owner-managers and business planning in the small firm", *International Small Business Journal*, Vol. 24, No. 5, pp 496–514. doi: 10.1177/0266242606067275.

Smit, Y. and Watkins, J. A. (2012) "A literature review of small and medium enterprises (SME) risk management practices in South Africa", *African Journal of Business Management*, Vol. 6 No. 21, pp 6324–6330. doi: 10.5897/ajbm11.2709.

Srisathan, W. A., Ketkaew, C. and Naruetharadhol, P. (2020) "The intervention of organizational sustainability in the effect of organizational culture on open innovation performance: A case of thai and Chinese SMEs", *Cogent Business and Management*, Cogent, Vol. 7, No. 1. doi: 10.1080/23311975.2020.1717408.

Tang, Z. and Tang, J. (2016) "The Impact of Competitors–Firm Power Divergence on Chinese SMES' Environmental and Financial Performance", *Journal of Business Ethics*, Vol. 136, No. 1, pp 147–165. doi: 10.1007/s10551-014-2518-8.

Xiao, L. and Ramsden, M. (2016) "Founder Expertise, Strategic Choices, Formation, and Survival of High-Tech SMEs in China: A Resource-Substitution Approach", *Journal of Small Business Management*, Vol. 54, No. 3, pp 892–911. doi: 10.1111/jsbm.12230.

Zeng, H. (2018) "Research on SMEs' Internal Risk Control from the Perspective of Risk Management", *Accounting Learning*, Vol. 12. [Online], Available at: http://www.cnki.com.cn/Article/CJFDTotal-CKXX201812174.htm [Accessed 10 April 2021].

Artificial Intelligence Applied to Customer Relationship Management: An Empirical Research

Cristina Ledro
Department of Management and Engineering, University of Padova, Italy
cristina.ledro@phd.unipd.it
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Abstract: Customer Relationship Management (CRM) involves collecting and intelligently using data to build a consistently superior customer experience and enduring customer relationships. Companies using CRM systems have been invested by the opportunities offered by Artificial Intelligence (AI), which has become essential for businesses to survive. In a market where customers are becoming highly sophisticated and search for unique experiences, academics and practitioners claim that AI is the next step in the evolution towards a novel and more efficient CRM. Despite there is an emergent need to clarify how AI-driven applications can transform CRM and be an essential ingredient of a successful modern CRM business process, the literature lacks an analysis on how AI would transform CRM fundamentals considering all CRM strategic processes. Moreover, there is a lack of scientifically validated frames and best practices for the implementation of AI in CRM, as well as empirical evidence about the enabling factors, challenges, and barriers. Therefore, this study explores how companies strategically develop an AI application in CRM, advancing knowledge relating to the impact of AI in marketing strategy. This study aims to build a realistic understanding on how the implementation of AI applications in CRM occurs and change the CRM strategic processes. Besides, we expect to find interesting insights on which organizational capabilities drive the success of the implementation of AI applications in CRM, and to explore the enabling factors, challenges, and barriers that can be used to establish a well-defined AI-driven transformation setting. This is explored through the lens of resource-based view theory. To achieve the research purpose, we are performing a qualitative multiple case study, particularly suitable for how questions and to understand a real-life company phenomenon in its natural setting, on companies using CRM systems that have implemented an AI-driven application to improve customer management. At this moment, the research is in the phase of defining the case study protocol and cases selection.

Keywords: Artificial Intelligence, integration, customer relationship management, CRM, marketing, strategy

1. Introduction

Customer Relationship Management is a strategic approach that involves collecting and intelligently using customer data to build a consistently superior customer experience during the entire customer journey (Lemon and Verhoef, 2016; Payne and Frow, 2005). CRM aims to find, attract new customers, build, and maintain long-term relationships with customers. Thus, CRM is about the understanding of human behaviour and interests (Anshari *et al.*, 2019).

In the digital era, the large volume and different formats of data being generated faster than ever have led to the development of new technologies, including the increase of computational processing capacity and the development of new Artificial Intelligence techniques (Brynjolfsson and McAfee, 2017). Following Kumar, Ramachandran, and Kumar (2020), we consider artificial intelligence as a generic term referring to a technology that can imitate humans and carry out tasks in an intelligent way.

Both companies developing CRM systems and companies using CRM enjoyed advances in AI technologies, which have become essential to survive in the CRM realm. Indeed, in markets where companies must offer exceptional experiences to their customers to remain competitive, modelling that includes contextual, geolocation, social, and perhaps even emotional data would overwhelm normal CRM systems. Thus, new CRM systems require massive amounts of data to be crunched in real-time and would be almost useless without AI (Pearson, 2019).

Since AI has the potential to draw its own conclusions through learning, it provides CRM users with an increasingly accurate analysis. AI-powered tools applied to CRM provide actionable insights that teams can use to anticipate, plan, and take advantage of upcoming opportunities, by delivering real-time predictions and recommendations, with the help of captured data of customers (Libai *et al.*, 2020; Mishra and Mukherjee, 2019). As an example, in 2016, SalesForce launched Einstein, an AI tool integrated with Salesforce's CRM. Einstein is helpful to deliver predictions and recommendations with the help of captured data of customers. Indeed, Einstein incorporates disparate data sources, including economic trends, weather patterns, social media conversations, past sales records, with CRM data gathered from sales, e-commerce activities, emails, IoT

generated data and social networks, to provide users with a more accurate analysis as it continues to learn (Mishra and Mukherjee, 2019).

Academics claim that AI is the next step towards a novel and more capable CRM (Kumar, Ramachandran, and Kumar, 2020; Lokuge, Sedera, Kumar, Ariyachandra, and Ravi, 2020; Vignesh and Vasantha, 2019). This is also evident from a managerial point of view. In 2017, IDC, in collaboration with Salesforce released a report on the economic impact of using AI for CRM activities, showing that, out of about 1000 global companies analysed, 28% of them already use AI and 41% planned to do so in the next two years, boosting this business to an estimated $1.1 trillion revenues by the end of 2021.

Despite the growing interest on AI applications in CRM, companies still do not know its actual potential and struggle with a general understanding of how AI integration can make a meaningful impact and generate value. It is a common experience that popular culture leads to imagining applications of AI in CRM to a business organization is a buzzword, rather than considering it as an essential ingredient of a successful modern business process. The stakeholders are required to upgrade their ideas and to enrich them by learning how the application of AI in CRM would transform sales, IT, marketing, and services by effectively automating tasks (Chatterjee *et al.*, 2019). Indeed, in most cases, AI solution applied to CRM is meant to improve efficiency, save costs and time, or offer valuable products and services (Mishra and Mukherjee, 2019), but experts actually working on it rarely comprehend the full value that AI could provide to organizations (Veeramachaneni, 2016). The current lack of knowledge about the applications of this technology in the CRM context has prevented firms from fully implementing and extracting business value from them (Mishra and Pani, 2020).

All in all, there is an emergent academic and managerial need to explain how AI applications can transform CRM and be an essential ingredient of a successful modern CRM business process (Chatterjee *et al.*, 2019). Despite the growing attention to this phenomenon, studies on AI applied to CRM activities are still in their infancy.

2. Literature review

To analyse the state of the art of the literature on Artificial Intelligence applied to CRM and identify gaps and research opportunities, we performed a literature review. To identify the articles focused on the theme under investigation, we performed a search using keywords related to AI in CRM.

The search was performed in the Scopus database in November 2020 (see Figure 1). We obtained 1032 documents. By filtering the initial dataset only to documents belonging to the engineering, business, management, and accounting areas, in English, and only article or review types, and by excluding duplicates, a total of 212 articles were retrieved. These documents range from 1989 (1 article) to 2020 (68 documents available in November). Data about the number of articles per year shows how the AI topic applied to CRM is very recent and is growing rapidly (see Figure 2).

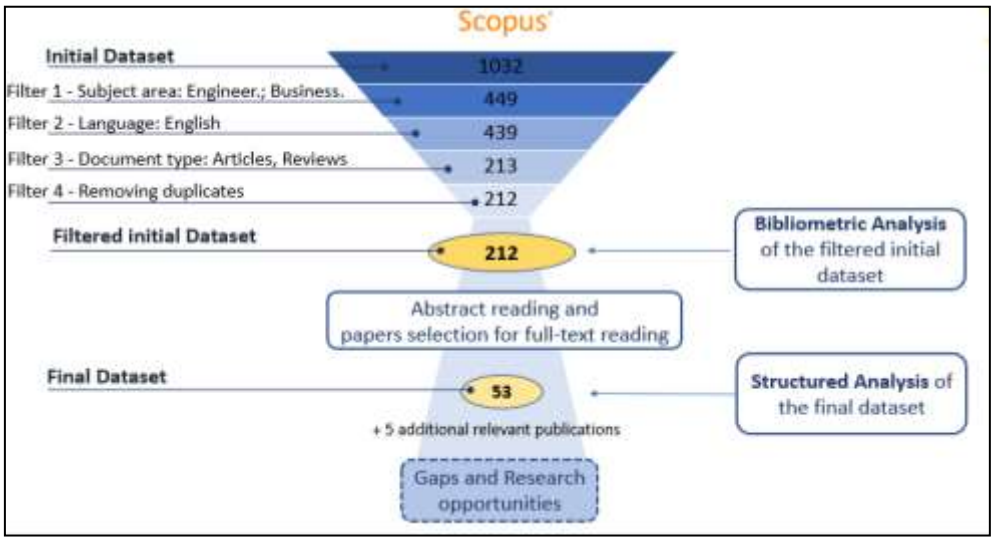

Figure 1: Literature review methodology: search and selection of documents considered for this study

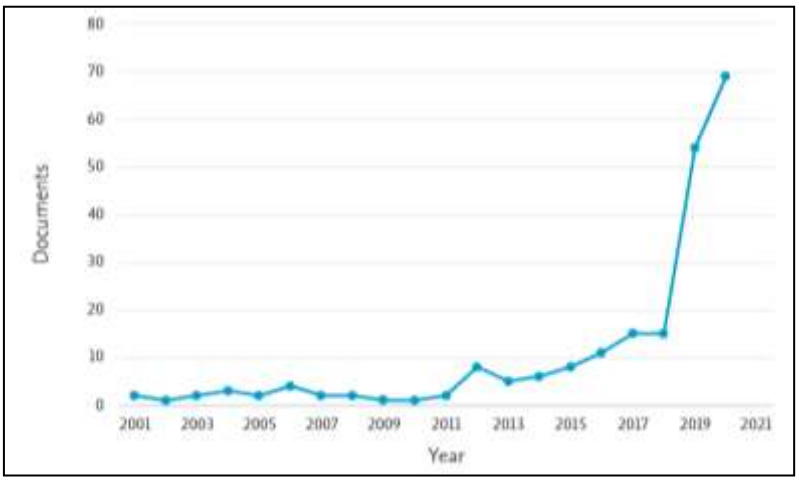

Figure 2: Temporal distribution of the filtered initial dataset

For the final dataset selection, we performed a bibliometric analysis of the filtered initial dataset by overviewing the main subfields of research and the emerging trends around AI applied to CRM without subjective bias (see Figure 1). For the bibliometric analysis, we used VOSviewer, which is a program for constructing and graphically displaying bibliometric maps in an easy-to-interpret way (van Eck and Waltman 2010). We used it to aggregate papers through bibliographic coupling and to construct maps of keywords based on co-occurrence data (van Eck and Waltman 2010).

Applying bibliometric techniques and mapping the relevant features of the studies with the greatest impact in the field (e.g., article purpose, research questions/hypotheses, methodology, context, theoretical background, gaps in the literature, key findings, type of involved technology), we identified three main research streams that have characterized the recent development of this quite fragmented literature.

The first subfield of research considers CRM as an information system for accumulating data on business prospects and customers and focuses on the information management of Big Data and their impact on CRM.

A second subfield of research is focused on the technological development of specific AI/ML-enabled systems/techniques/models to support business activities and practices related to CRM.

A third subfield of research looks at the AI-CRM integration from a broader strategic point of view, rather than the study of specific technological applications. This subfield is focused on AI applied to CRM strategic processes, considering CRM as a tool that guides the strategy through actionable insights, rather than as a mere database. The third subfield is interest in the AI-CRM integration from a more generic point of view, rather than the study of specific applications, with a customer-centric vision.

The shift in perspective from technology development to strategy development reflects the growing interest in conducting a renewed examination of how technology interacts with CRM strategy. The third subfield contains the most recent papers of the sample, which start to debate AI considering the challenges, benefits, and advantages it can provide to CRM processes, taking also into consideration the required organizational, cultural, and strategic changes. Indeed, AI has led to a global disruption, and, as a result, CRM business models and strategic approaches are changing (Mazzei and Noble, 2019). However, this literature is still in its infancy and there are some areas that need further research: how AI applications may affect CRM capabilities and requirements, which strategic and operational changes will result from the adoption of AI in CRM (Wang and Hajli, 2017), how the organizational change due to AI-CRM integration affects employees as well as customers (Kumar, Ramachandran, and Kumar, 2020) and how their actions in turn influence the success of CRM projects are all overlooked areas.

Then, with the bibliometric analysis results in mind, for the full text reading, we selected papers dealing with the third subfield of research. Thus, articles' abstracts were reviewed one by one, and the final selection of papers was based on the following exclusion criteria:

- Criterion 1) article focuses on the technological development of specific AI/ML-enabled systems/techniques/models to support business activities and practices related to CRM.
- Criterion 2) article with a functional or technical point of view, rather than a strategic or operational point of view.
- Criterion 3) article deals with partner relationship management, supplier relationship management, etc.
- Criterion 4) article in which CRM has a different meaning (e.g., cause-related marketing).

After abstract reading and full text reading, the final dataset was reduced to 53 papers (see Figure 1). References cited in these papers were used as secondary sources, leading to the inclusion of 5 additional relevant publications.

Finally, we performed a structured analysis of the final dataset that led us to identify gaps and research opportunities. We systematically reviewed 58 articles of the final dataset, mapping different dimensions. In particular, to frame articles in relation to the CRM strategic processes, we mapped the relevant literature into Payne and Frow's framework (2005), which identifies the following CRM five core processes: strategy development, value creation, multichannel integration, information management and performance assessment. Payne and Frow's framework (2005) is a comprehensive, cross-functional, process-oriented CRM strategy framework that positions CRM at a strategic level (Basit *et al.*, 2018; Rababah, 2011). It aims to help companies avoid the potential problems associated with a narrow technological definition of CRM and realize strategic benefits. Besides, it clearly highlights the interfunctional relationships between the different processes. Thus, it is the CRM business model that better suits the purpose of this study.

3. Gaps and research questions

From this structured literature review of the final dataset, meant to deeply analyse the literature regarding AI applied to CRM strategic processes, we found that the number of empirical research studies about the application of AI to CRM is limited, reflecting the novelty of the theme. Indeed, despite there is an emergent need to clarify how AI applications can transform CRM, there is a lack of scientifically validated approaches to support companies in developing a strategy for the implementation of AI in CRM.

Besides, studies that clarify the role of AI in transforming the main strategic processes of a CRM are few and scarce of empirical research. Some recent studies explore how Big Data have impacted CRM (Del Vecchio et al., 2020; Abu Ghazaleh and Zabadi, 2020; Zerbino et al., 2018; Yi 2018; Kunz et al. 2017), while other contributes explore the impact of specific AI-enabled tools, such as IoT, chatbots, AI agents, text and voice analysis, on marketing (Klaus and Zaichkowsky, 2020) and CX (Hoyer et al., 2020; Sujata, et al., 2019; Sujata, et al., 2019; Wilson-Nash, et al., 2020).

Almost all contributions that address the AI topic are not focused on CRM. The few studies focusing on how AI and CRM might interplay directly are mainly conceptual and explorative (Hopkinson and Singhal, 2018; Libai *et al.*, 2020). Authors investigated more generically the influence of AI on marketing (Campbell et al. 2020; Kumar, Ramachandran, and Kumar 2020; Marinchak, Forrest, and Hoanca 2018; Kumar et al. 2019),, service (Zaki, 2019) and sales (Costa *et al.*, 2020). Most of the studies investigate the impact that AI might have in one or a few CRM processes, with particular interest in the value co-creation process, while processes such as strategy development and performance assessment are very little explored. Only a few papers consider several processes (Campbell *et al.*, 2020; Kumar *et al.*, 2020; Zaki, 2019), but none of these focus directly on AI and CRM together.

Finally, lots of studies investigate the impact and benefits of the implementation of AI in CRM (Costa *et al.*, 2020; Libai *et al.*, 2020; Kumar *et al.*, 2020), while few look at the enabling factors.

All in all, we identified the following gaps and research opportunities:

- 1) Lack of scientifically validated approaches to support companies in developing a strategy for the application of AI in CRM (Chatterjee et al. 2019)
- 2) Lack of a comprehensive analysis on how AI would transform CRM fundamentals considering all CRM strategic processes (Libai et al., 2020; Lokuge et al., 2020).
- 3) Lack of research studies about the enabling factors of the application of AI in CRM (Zerbino et al. 2018).

- 4) Implications for firms, customers, and other entities who are involved in the integration of AI in existing CRM applications are overlooked (Kumar *et al.*, 2020).

From these gaps, we shaped our research purpose and research questions.

Our research is explorative and aims to examine how companies strategically develop an AI application in CRM that specifically addresses the following research questions:

- RQ1: How does the implementation of AI applications in CRM strategic processes occur?
- RQ2: How does the implementation of AI applications change the CRM strategic processes?
- RQ3: Are there any enabling factors for the implementation of AI in CRM?

4. Methodology

To achieve our research aim, we chose to perform a qualitative multiple case study with an explorative aim, particularly suitable for how questions and to understand a real-life company phenomenon in its natural setting (Yin, 2017). According to Yin (1994), multiple case studies provide a better basis for theory building because having multiple cases allows for a comparison, which can lead to a stronger theory.

The unit of analysis will be an AI application in CRM.

We chose a retrospective and longitudinal orientation, consistently with the temporal orientation of the research questions. To follow a literal replication logic (Yin, 2014), the initial number of cases should be 3/4. We chose a sampling strategy of maximum variation for obtaining different cases that exhibit important common patterns that cut across variations (Patton, 1990). Selecting cases that are different has the potential to increase the strength of the results as well as capture the core experiences and central, shared aspects of the cases (Patton, 1990).

Through this qualitative multiple case study, we want to understand how the implementation of AI applications in CRM occurs, adopting a retrospective and longitudinal perspective, which are the changes in the CRM strategic processes and the enabling factors. The aim is to report on emerging patterns that cut across the cases of AI applications in CRM, however different they may be.

Therefore, the selection criteria for the qualitative multiple case study analysis are the following:

- Successfully implemented CRM systems before 2019,
- Different sectors (B2B and B2C), Market and know-how,
- Different CRM software providers
- Different AI application: Different purposes and models.

We are looking for companies that have implemented CRM systems (Salesforce, HubSpot, Oracle, etc.) and that have integrated AI models to improve the management of customer relations, i.e., to enhance not only operational marketing effectiveness but also, for instance, customer segmentation, targeting, CLV prediction (e.g., predict conversion opportunities, predict who will renew a policy), and customer retention (e.g., automatic recommendations systems).

5. Discussion and conclusion

This study intends to explore how companies strategically develop an AI application in CRM, advancing knowledge relating to the impact of AI in marketing strategy. The aim is to build a realistic understanding of how the implementation of AI applications in CRM occurs and change CRM fundamentals considering all CRM strategic processes. Therefore, this study will provide a scientifically validated approach for the implementation of AI in CRM. In doing so, the study will establish if and how an AI application in CRM can be developed following a strategic framework. Besides, we expect to find interesting insights on which organizational capabilities drive the success of the implementation of AI applications in CRM, and to explore the enabling factors, benefits, challenges, and barriers that can be used to establish a well-defined AI-driven transformation setting. This is explored through the lens of resource-based view theory.

This study answers the recent call of Lokuge, Sedera, Kumar, Ariyachandra, and Ravi (2020) to revisit CRM fundamentals considering the advances in digital technologies, and to engage in emerging topics such as the use of AI-based technologies and the extraction of business value from them. In doing so, we have paved the way for a holistic understanding of modern CRM strategy and implementation.

Besides, our contribution supports the academic opinion of considering CRM as a real business strategy and philosophy and not as a mere technological implementation.

Through the bibliometric analysis and literature review, we analysed and displayed the evolution of the conceptual structure of the field, providing clarity to the nascent fragmented literature about AI in CRM.

Through the systematic analysis of relevant literature, we updated and enrich Payne and Frow's CRM strategy framework and concepts considering recent developments in the CRM and managerial fields. Our aim was not to conduct a review of CRM strategic processes. Instead, our focus was on the broader implications of the effects of AI on CRM. Thus, from the summarization of the relevant literature, we performed an assessment of how AI applications might impact each CRM process's different activities. From the results of the assessment, we developed an original framework that summarizes how AI impacts on CRM strategic processes. In this way, we offer a contribution to understanding how AI can shape the CRM processes of strategy development, value co-creation, omnichannel integration, performance assessment, and information management, mapping the literature through a structured review and offering a foundation for advance knowledge on artificial intelligence in the context of customer relationship management and beyond.

In conclusion, this study will be among the first to examine the impacts of AI on CRM from a strategic point of view using a cross-functional and process-based perspective, thus making a strong contribution in an area that is still little explored.

References

Abu Ghazaleh, M. and Zabadi, A.M. (2020), "Promoting a revamped CRM through Internet of Things and Big Data: an AHP-based evaluation", *International Journal of Organizational Analysis*, Vol. 28 No. 1, pp. 66–91.

Anshari, M., Almunawar, M.N., Lim, S.A. and Al-Mudimigh, A. (2019), "Customer relationship management and big data enabled: Personalization & customization of services", *Applied Computing and Informatics*, Vol. 15, No. 2, pp. 94–101.

Basit, A., Tahir, A., Khan, M. and Arshad, M. (2018), "Customer Relationship Management Model from Strategic Approach: A knowledge Management Perspective", *International Journal of Research Science & Management*, No. March, available at:https://doi.org/10.5281/zenodo.1185589.

Brynjolfsson, B.Y.E. and McAfee, A. (2017), "Artificial intelligence for real", *Harvard Business Review*, Vol. July No. 1, pp. 1–31.

Campbell, C., Sands, S., Ferraro, C., Tsao, H.-Y.J. and Mavrommatis, A. (2020), "From data to action: How marketers can leverage AI", *Business Horizons*, Vol. 63 No. 2, pp. 227–243.

Chatterjee, S., Ghosh, S.K., Chaudhuri, R. and Nguyen, B. (2019), "Are CRM systems ready for AI integration?: A conceptual framework of organizational readiness for effective AI-CRM integration", *Bottom Line*, Vol. 32, No. 2, pp. 144–157.

Costa, R., Dias, Á., Pereira, L., Santos, J. and Capelo, A. (2020), "The impact of artificial intelligence on commercial management", *Problems and Perspectives in Management*, Vol. 17 No. 4, pp. 441–452.

Hopkinson, P.J. and Singhal, A. (2018), "Exploring the use of AI to manage customers ' relationships", *Academy of Marketing 2018*, No. July.

Hoyer, W.D., Kroschke, M., Schmitt, B., Kraume, K. and Shankar, V. (2020), "Transforming the Customer Experience Through New Technologies", *Journal of Interactive Marketing*, available at:https://doi.org/10.1016/j.intmar.2020.04.001.

Klaus, P. and Zaichkowsky, J. (2020), "AI voice bots: a services marketing research agenda", *Journal of Services Marketing*, Vol. 34, No. 3, pp. 389–398.

Kumar, V., Rajan, B., Venkatesan, R. and Lecinski, J. (2019), "Understanding the role of artificial intelligence in personalized engagement marketing", *California Management Review*, Vol. 61 No. 4, pp. 135–155.

Kumar, V., Ramachandran, D. and Kumar, B. (2020), "Influence of new-age technologies on marketing: A research agenda", *Journal of Business Research*, available at:https://doi.org/10.1016/j.jbusres.2020.01.007.

Kunz, W., Aksoy, L., Bart, Y., Heinonen, K., Kabadayi, S., Ordenes, F.V., Sigala, M., *et al.* (2017), "Customer engagement in a Big Data world", *Journal of Services Marketing*, Vol. 31 No. 2, pp. 161–171.

Libai, B., Bart, Y., Gensler, S., Hofacker, C.F., Kaplan, A., Kötterheinrich, K. and Kroll, E.B. (2020), "Brave New World? On AI and the Management of Customer Relationships", *Journal of Interactive Marketing*, available at:https://doi.org/10.1016/j.intmar.2020.04.002.

Lokuge, S., Sedera, D., Kumar, S., Ariyachandra, T. and Ravi, V. (2020), "The next wave of CRM innovation: Implications for research, teaching, and practice", *Communications of the Association for Information Systems*, Vol. 46, pp. 560–583.

Marinchak, C.M., Forrest, E. and Hoanca, B. (2018), "Artificial intelligence: Redefining marketing management and the customer experience", *International Journal of E-Entrepreneurship and Innovation*, Vol. 8 No. 2, pp. 14–24.

Mazzei, M.J. and Noble, D. (2019), "Big Data and Strategy : Theoretical Foundations and New Opportunities", *Strategy and Behaviors in the Digital Economy*, available at: https://doi.org/DOI: 10.5772/intechopen.84819.

Mishra, A.N. and Pani, A.K. (2020), "Business value appropriation roadmap for artificial intelligence", *VINE Journal of Information and Knowledge Management Systems*, available at: https://doi.org/10.1108/VJIKMS-07-2019-0107.

Mishra, N. and Mukherjee, S. (2019), "Effect of artificial intelligence on customer relationship management of Amazon in Bangalore", *International Journal of Management*, Vol. 10 No. 4, pp. 168–172.

Rababah, K. (2011), "Customer Relationship Management (CRM) Processes from Theory to Practice: The Pre-implementation Plan ofCRM System", *International Journal of E-Education, e-Business, e-Management and e-Learning*, Vol. 1 No. 1, available at: https://doi.org/10.7763/ijeeee.2011.v1.4.

Sujata, J., Aniket, D. and Mahasingh, M. (2019), "Artificial intelligence tools for enhancing customer experience", *International Journal of Recent Technology and Engineering*, Vol. 8 No. 2 Special, pp. 700–706.

Sujata, J., Nikita, M. and Shubham, S. (2019), "Applications of chatbots in marketing: Use cases, impacts, challenges and drivers", *International Journal of Advanced Trends in Computer Science and Engineering*, Vol. 8 No. 1.6 Specia, pp. 195–200.

Del Vecchio, P., Mele, G., Passiante, G., Vrontis, D. and Fanuli, C. (2020), "Detecting customers knowledge from social media big data: toward an integrated methodological framework based on netnography and business analytics", *Journal of Knowledge Management*, Vol. 24 No. 4, pp. 799–821.

Veeramachaneni, K. (2016), "Why You're Not Getting Value from Your Data Science", *Harvard Business Review*.

Vignesh, R. and Vasantha, S. (2019), "Significant developments of artificial intelligence in indian ecommerce industry in 2019", *International Journal of Scientific and Technology Research*, Vol. 8 No. 12, pp. 2746–2748.

Wang, Y. and Hajli, N. (2017), "Exploring the path to big data analytics success in healthcare", *Journal of Business Research*, Elsevier Inc., Vol. 70, pp. 287–299.

Wilson-Nash, C., Goode, A. and Currie, A. (2020), "Introducing the socialbot: a novel touchpoint along the young adult customer journey", *European Journal of Marketing*, available at: https://doi.org/10.1108/EJM-07-2019-0555.

Yi, Z. (2018), "The application of clustering in customer management based on big data", *IPPTA: Quarterly Journal of Indian Pulp and Paper Technical Association*, Vol. 30 No. 8, pp. 718–722.

Zaki, M. (2019), "Digital transformation: harnessing digital technologies for the next generation of services", *Journal of Services Marketing*, Vol. 33 No. 4, pp. 429–435.

Zerbino, P., Aloini, D., Dulmin, R. and Mininno, V. (2018), "Big Data-enabled Customer Relationship Management: A holistic approach", *Information Processing and Management*, Vol. 54 No. 5, pp. 818–846.

Investing in Healthcare Enterprises in the Non-Metropolitan Areas: Incentives, Reflections, and Innovative Ideas

Ilias Makris and Sotiris Apostolopoulos
Dept. of Accounting and Finance, University of Peloponnese, Kalamata, Greece
i.makris@uop.gr
sotirisapostolo@gmail.com
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Abstract: Qualitative research was conducted with semi-structured interviews. Fifteen health /welfare/social care enterprises were selected from various parts of non-metropolitan areas of Greece and the sample was selected by using the Convenience Sampling strategy. Interviews were conducted in Greek with the owners-entrepreneurs of these units. The survey was conducted in May and June 2020, and the duration of the interviews was forty minutes. The content of the semi-structured interviews was classified into three thematic sections. The first section was referred to the reasons and incentives that led to the investment. The second section was referred to the concerns that took part during the design of the investment. The third section was referred to the existence or non-existence of innovative ideas. Research has shown that incentives to invest in healthcare were not the same for all enterprises. Among the incentives mentioned were the opportunity created by the degradation in medical equipment of public units, the apparent profitability, the locality in relation to the knowledge about the shortcomings of the area, and the possibility of financing such actions through financial programs. Consideration was developed during the planning of the investment whether there would be high-level and qualified scientific staff in the non-metropolitan areas to operate these enterprises and whether the state and the insurance funds would be creditworthy in their payments on the contracts that would be signed. Those companies in this field that have embarked on innovative projects have had positive results.

Keywords: healthcare enterprises, innovation, investments in health, non-metropolitan areas

1. Introduction

The healthcare system of Greece presents many peculiarities, as well as particularities. While there is healthcare coverage for the entire population of the country in public structures this has not hindered and still does not hinder the development of healthcare companies (Apostolopoulos et al, 2020; Siskou et al, 2008). While theoretically there are regional hospitals, healthcare centers, and rural clinics close to the citizens of non-metropolitan areas to meet the needs of the residents, the residents of non-metropolitan areas, and, especially, the rural ones, in percentages that exceed 50% choose to use and receive healthcare services of the respective private sector services (Tountas et al, 2011). These contradictions have aroused research interest and research has shown that regional hospitals, healthcare centers, and rural clinics are since their foundation understaffed in medical and nursing staff, but, also, quite degraded regarding medical equipment and building infrastructure (Economou et al, 2017; Mitropoulos et al, 2016).

Another peculiarity is the concentration of the majority of private and public healthcare units in the large urban centers, while in the non-metropolitan areas shortages are observed in both healthcare professionals and facilities (Economou et al, 2017). This creates inequalities in the sector of healthcare, especially in areas remotely located from the large urban centers (Vardiampasis et al, 2014). In addition, it leads the citizens of these areas to seek the coverage of their health needs in the private healthcare sector (Tountas et al, 2011). The degradation of healthcare structures in non-urban centers was also reflected in the research of Pantelidis et al, (2019) and Oikonomou et al (2016).

An important peculiarity of the Greek healthcare system is recorded by the fact that the private healthcare sector did not develop in parallel with the public sector. From the establishment of the National Healthcare System in 1983 until 1991, the Greek state did not grant licenses for the establishment of private clinics, resulting in a small and weak private healthcare sector. After 1991 the legal framework changed, new healthcare units were established by individuals, service contracts were signed between the private healthcare sector and the insurance funds (Papatheodorou & Mousidou, 2011). In Greece, no particular privatizations took place in the healthcare sector, as was observed in other European countries. That, however, did not prevent the private healthcare sector from developing, mainly as a result of the weaknesses and distortions of the public healthcare sector (Siskou et al, 2008; Tountas et al, 2005).

The inhabitants of the non-metropolitan areas of Greece due to the above peculiarities, seem to trust more the private healthcare sector. The research of Tountas et al, (2011) showed that the residents of non-urban centers trust more the private healthcare benefits, which are even more popular among them (Tountas et al, 2011). This led them to prefer the coverage of health needs by the private healthcare sector to a large extent (Souliotis et al, 2019).

2. Literature review

The literature review presents research gaps in the provision of healthcare services in non-metropolitan areas. The research of Farmer et al, (2012) showed that upgrading the provision of healthcare services for residents of non-urban areas can be improved with further research for which the ideas from various science fields will have a decisive role. The research of Dixon & Welch, (2000) came to the same conclusion showing that if we want to better understand the complexity of the provision of healthcare services to residents of non-metropolitan areas, many more aspects need to be explored.

There are also research gaps in the issue of healthcare businesses in non-metropolitan areas. A bibliographic study by Apostolopoulos et al (2020) examining rural healthcare businesses in European countries found that in most countries the rates of privatization of healthcare sectors were slow so that rural healthcare companies were not saturated in terms of research. An additional examination of the degree of trust of rural residents that influences their choice to turn to private healthcare providers over public providers was shown by the research of Ozawa & Walker (2011). Something similar was reflected in the research of Tuan et al, (2005) which showed that private healthcare companies successfully compete with public healthcare centers in the countryside however the quality of the healthcare services provided needs further research and evaluation. The research of Konde-Lule et al (2010) showed that our knowledge of private healthcare providers in non-urban areas is limited and more knowledge is needed on how the public and private sectors can work together to improve the health of residents and meet existing challenges. Nevertheless, the relationship between responsible innovation in healthcare that supports goals such as good health, and wellness, has also been little researched (Lehoux, et al, 2018). Balas & Chapman (2018) point out that new scientific knowledge and innovations in healthcare are slow to spread and often providers rush to adopt clinical innovations based on a single trial. The need to promote innovations in the field of healthcare that contribute to its sustainability was reflected in the research of Lehoux, et al (2019). Citizens that participated in the research of Dafny & Mohta (2017) rank healthcare systems among the top areas in need of innovation. Smart technology and innovation are strategies that increase the scope and facilitation of behavioral change in health and healthcare (Redfern, 2017). Przybilla et al (2018) believe that digital innovation creates great potential for improving healthcare that has not been largely deployed.

In Greece, there is a lack of research focused on the healthcare companies of non-metropolitan areas relative to the incentives for installation and the innovations that they develop. This gap is being filled by this primary survey that examines the point of view of healthcare investors in non-metropolitan areas.

3. Methodology

3.1 Research methods-method selection

Based on the bibliographic trends, we chose qualitative research as it has been proven superior for entrepreneurship issues in recent decades (Gartner & Birley, 2002). Qualitative research contributes positively to the diversity of entrepreneurship issues and at the same time promotes rich and new ideas for the business phenomenon (Javadian et al, 2020). We used individual semi-structured interviews, as they are used more in qualitative entrepreneurship research as more effective (Blattner et al, 2020; Apostolopoulos et al, 2019; Steiner & Atterton, 2015). Semi-structured interviews are an appropriate choice for the collection of detailed information regarding the type and impact of business activities in non-urban areas (Steiner & Atterton, 2015). Sample definition and strategies

Sampling in qualitative research is based on the principle of appropriateness and adequacy (Morse & Field, 1996) with a small sample so as not to lose subjective and individual characteristics (Moser & Kostjens, 2018; Polit & Hungler, 1999). We followed this practice in our research. Taking into account the above, 15 private healthcare companies based in non-metropolitan areas of Greece were selected. According to Moser & Korstjens (2018), Convenience Sampling and Snow Ball (Chain Sampling) strategies are used as more adequate in qualitative research to identify the sample in primary care.

Table 1: The selected companies and their special characteristics

BUSINESS	YEAR OF ESTABLISHMENT	NUMBER OF EMPLOYEES	TYPE OF BUSINESS	Administrative regions of Greece TO WHICH THE ENTERPRISE BELONGS
R1	2008	200	Rehabilitation center	THESSALIA
R2	2010	5	Diagnostic Center	IPEIROS
R3	2004	21	Hemodialysis Center	WEST GREECE
R4	2011	8	Diagnostic Center	PELOPONNESE
R5	2013	76	Psychiatric clinic	EAST MACEDONIA & THRAKI
R6	2014	100	Rehabilitation center	PELOPONNESE
R7	1997	10	Diagnostic Center	ATTIKI
R8	2012	70	Mental Health Clinic	THESSALIA
R9	2017	24	Diagnostic Center	WEST GREECE
R10	2000	100	Psychiatric clinic	EAST MACEDONIA & THRAKI
R11	2005	12	Diagnostic Center	WEST MACEDONIA
R12	1991	3	Physiotherapy Center	STEREA GREECE
R13	2005	5	Diagnostic Center	THESSALIA
R14	2007	7	Medical & orthodontic care center	IPEIROS
R15	1990	3	Diagnostic Center	CENTRAL MACEDONIA

3.2 Research conduction elements

The research was conducted in August and September 2020. The semi-structured interviews were conducted with healthcare entrepreneurs in the Greek language. The interviews lasted 45 minutes and were conducted using Skype technology due to the COVID-19 pandemic, as this method provides as reliable data as the live interview (Mclntosh & Morse, 2015; Deakin & Wakefield, 2014). The semi-structured interviews were structured on three thematic sections. The reasons and incentives that led to investing in non-metropolitan areas. The concerns that were developed during the investment planning by investors. The existence or not of innovative ideas.

4. Data analysis

Based on the induction strategy, we examined the interviews separately proceeding to cross-checks in regard to the three thematic sections (Yin, 1994). Following the inductive approach relative to the research questions included in the three thematic units, the emerging issues were captured (Gioia et al, 2013). Table 2 lists the coding and creation of categories after an exhaustive and detailed process (Krippendorf, 2018) since the stage of data coding and their distribution into categories is a laborious process that requires special attention (Wong, 2008; Dey, 1993).

Table 2: Emerging issues

Reasons and incentives that led to the investment.	Investment opportunity due to the degraded provision of healthcare services by public healthcare structures Saturation of such services in metropolitan areas as opposed to non-metropolitan areas Emotional reasons due to locality
Concerns that arose during the planning of the investment.	Concerns about the consistency of payments by the state and insurance funds Concerns about the possibility of staffing with high standards of medical and nursing staff
The existence or non-existence of innovative ideas.	Innovative interventions in patient service and in the functional structures of the healthcare unit Obstacles and weaknesses in the development of innovative projects

5. Findings

The findings were structured on the emerging issues: Reasons and incentives that led to the investment in the field of healthcare in non-metropolitan areas, concerns developed by investors during the planning of the investment, and the existence or non-existence of innovative ideas in these investments

- Reasons and incentives that led to investing in healthcare in non-metropolitan areas

Healthcare entrepreneurs have invested in non-metropolitan areas because they saw the business opportunity presented in those areas. The existing public structures were unable to meet the healthcare needs of the residents and to provide them with high-quality healthcare services. They identified the weaknesses of hospitals, healthcare centers and rural clinics operating in non-metropolitan areas. These weaknesses forced the residents of these areas to move to large urban centers to receive high-quality healthcare services.

> *"We found a lack of organized structures in the area on behalf of both the public healthcare system and the private sector. Government public structures are unable to provide rehabilitation services to patients. The rehabilitation of patients has been given exclusively to the private sector".(R12)*

The large metropolitan areas had amassed a large number of public and private healthcare structures. A saturation of healthcare services was observed by healthcare entrepreneurs in metropolitan areas as opposed to non-metropolitan areas where there was fertile ground for healthcare investments.

> *"The motivation for starting the business was the fact that there was a lack of such healthcare services in the area. There was nothing else like it. On the contrary, the big urban centers have a plethora of such businesses." (R10)*

Investment incentives were also identified due to the location of businesses that felt safer to invest near their place of residence where their environment was familiar. They knew the needs of the inhabitants as well as the weaknesses of the public healthcare structures.

> *"It was a family decision because it is a family business and we were interested in the healthcare sector. There was no other corresponding private company in the area and the respective public services were degraded. We liked the idea of investing close to our place of residence ".(R6)*

- Concerns raised by investors when planning the investment

Healthcare entrepreneurs who wanted to invest in healthcare facilities in non-metropolitan areas were concerned about the consistency in terms of payments by the state and insurance funds in the contracts that they would sign with them. They stated that the Greek state and the insurance funds are often inconsistent in their obligations.

> *"There have been concerns about the difficulties in dealing with public insurance funds as the terms of their agreement are often not met." (R6)*

There were also concerns about the possibility of staffing with high standards of medical and nursing staff of the healthcare companies that they would establish since there is often a shortage of such staff in non-metropolitan areas.

> *"There is a problem with finding new scientific staff to work in the province, as a result of which I have a problem in the staffing of my services. This difficulty has existed since the beginning of our operation. The majority of the medical staff goes abroad and those that we find come for a short time. That does not help the business. "(R14)*

- Existence or not of innovative ideas and plans in healthcare investments in non-metropolitan areas

The process of finding out if entrepreneurs have innovated in the healthcare investments they made in non-metropolitan areas captured two elements. 60% of entrepreneurs implemented innovative plans to better serve their patients and the functionality of the healthcare structures they created. 40% hesitated to proceed with innovative designs and were satisfied with traditional forms of operation. No clinical innovations were detected.

Entrepreneurs who have embarked on innovative projects said that these will give them long-term profitability and will be competitive with the corresponding services of large urban centers.

> *"We have taken care to innovate in facilities, technology and public service. We are ahead in the execution of medical exams, in the delivery of the exams. All the services provided by us are innovative and pioneering and contribute to the upgrade and attractiveness of the area ".(R9)*

The detection also reflected the positive results of the healthcare companies that dared and innovated.

> *An innovative action, in the context of new innovative modes of operation, that I have done is the creation - manufacture and sale - of "invisible membranes" for orthodontic issues and their export abroad. That added a great momentum to our business. "(R14)*

Entrepreneurs who preferred traditional forms of operation and customer service did so for fear that the innovations would likely create higher operating costs.

> *"It takes a lot of attention to open up to new innovative things. At this stage we proceed traditionally and keep our operating costs low. We will probably look for such solutions later. "(R8)*

> *"The business environment for developing innovative ways to provide healthcare services is not very friendly today. That makes us careful. "(R6)*

6. Discussion

The detection of the incentives that led entrepreneurs to invest in the field of healthcare in non-metropolitan areas showed that they saw the investment opportunity created by the continuous degradation of public healthcare structures. They found the demand for healthcare services sought by the residents who, in order to cover these needs, were forced to move to large urban centers. The main motivation was the investment opportunity presented. This is also consistent with research showing that the public healthcare system in non-metropolitan areas is distorted and weak and lags behind when it comes to medical equipment and infrastructure.(Apostolopoulos et al, 2020; Tountas et al, 2005). Regional hospitals, healthcare centers and rural clinics are understaffed and in many cases are unable to meet the health and healthcare needs of residents (Mitropoulos et al, 2016; Economou, 2010). The locality element was also identified as an incentive for investment in healthcare in non-metropolitan areas. This element concealed two characteristics. The characteristic of local information and the security that it creates for the investor and the characteristic of the emotional attachment of investors to the place where they were born and raised, which is strong in Greece. Local information plays an important role in investment and creates an advantage for the local investor (Ling et al, 2021). The research of Ivković & Weisbenner, (2005) examining individual investors investing locally as to whether their preference is based on information or mere intimacy has shown strong indications that individual investors' local investments are superior to non-local investments. On the contrary, the emotional element in investing can lead to wrong and damaging investment decisions (Nofsinger, 2014; Pompian, 2012).

The concerns developed by entrepreneurs who wanted to invest in the healthcare sector in non-metropolitan areas were identified at the planning stage of their investment. These concerns were related to the unstable investment environment that exists in Greece and has to do with two dimensions.

With the relationship of the healthcare provider to the services needed by the insurance funds for their insured as well as to the services needed by the hospitals and healthcare centers. This relationship is reflected through a relevant contract signed by the providers with the insurance funds that in the past in Greece presented unreliability. The delays of payment of the providers for the healthcare services they offer to the insured have been reflected in research (Kentikelenis et al, 2019).

With the ability to staff the healthcare businesses of investors, especially with healthcare professionals of high standards, since that kind of staff is usually located in large urban centers. These concerns were based on research showing that in Greece there is a geographical inequality of medical staff at the expense of non-urban areas (Economou et al, 2017; Vardiampasis et al, 2014).

Finally, in regard to the existence or not of innovative products or/and services provided, all participants highlighted the need to innovate. Most of those who innovate, are focused on process innovation (in terms of better services provided), and one respondent in product innovation. What is very important, is that those firms responded that innovative activity helped them to manage successfully the competition with larger providers of health care services or increase the number of their clients. This is in accordance with the literature about the benefits of innovation in firm performance and growth (see indicatively, Koellinger 2008, Makris 2008 and Kafouros 2005). On the other hand, the firms that did not innovate, they pointed out as the main reason, the unfriendly to innovate governmental regulations and the high sunk cost of the overall process, with the former to be the main problem, as innovation policy can spur (or hinder) innovative process in firm-level (Hashi & Stojcicc, 2013). Encouraging firms to innovate is crucial for growth and development both in firm and country-level (Makris 2016).

7. Conclusions

The investments made in healthcare structures by the private sector in non-metropolitan areas are due to the investment opportunity created in these areas after the inability of public healthcare structures to provide upgraded healthcare services. Large urban centers had upgraded services in the public and private sectors, and residents of non-metropolitan areas were forced to move there to meet their needs. This meant cost, hassle and lost man-hours. This gap has been identified by the business world that has invested and continues to invest in the healthcare sector in non-metropolitan areas. Particularly, entrepreneurs from non-metropolitan areas, having both a personal opinion and information, were challenged by such an investment opportunity. Concerns have been raised about whether these companies could be staffed with high-level scientific staff that is hardly located far from major urban centers and whether the state and insurance funds were consistent in their obligations. The point where the business views were found to differ was on whether these investments should be innovative. Most entrepreneurs developed innovative plans and said they paid off. The innovative plans concerned patient service (process innovation) and the functionality of the healthcare structures they created. No innovations were detected in other areas and, in particular, no clinical innovations were detected.

This research comes to the aid of the business world that intends to develop investment plans in the field of healthcare in non-metropolitan areas and to reap the existing experience in such investments, concerns and obstacles. It is a useful tool for those who formulate a policy in the field of healthcare but also for regional and local government. Aspects of healthcare investment in non-metropolitan areas need further research.

References

Apostolopoulos, N., Newbery, R., and Gkartzios, M. (2019) "Social enterprise and community resilience: Examining a Greek response to turbulent times", *Journal of Rural studies*, Vol 70, pp. 215-224

Apostolopoulos, N., Ratten, V., Stavroyiannis, S., Makris, I., Apostolopoulos, S. and Liargovas, P. (2020) "Rural health enterprises in the EU context: a systematic literature review and research agenda", *Journal of Enterprising Communities: People and Places in the Global Economy*, Vol 14, No. 4, pp. 563-582.

Balas, E. A. and Chapman, W. W. (2018) "Road map for diffusion of innovation in health care",*Health Affairs*, Vol 37*,* No. 2, pp. 198-204.

Blattner, K., Stokes, T., Rogers-Koroheke, M., Nixon, G. and Dovey, S. M. (2020) "Good care close to home: local health professional perspectives on how a rural hospital can contribute to the healthcare of its community", *The New Zealand Medical Journal*, Vol 133, No*.* 1509, pp. 39-4.

Dafny, L. and Mohta, N. S. (2017) "New marketplace survey: the sources of health care innovation", *NEJM Catalyst*, Vol 3 *,* No*.* 1.

Deakin, H. and Wakefield, K. (2014) "Skype interviewing: Reflections of two PhD researchers. *Qualitative research"*, Vol 14, No.5,pp. 603-616.

Dey I. (1993) *Qualitative Data Analysis: A User-Friendly Guide for Social Scientists,* ,Routledge, London

Dixon, J. and Welch, N. (2000) "Researching the rural–metropolitan health differential using the 'social determinants of health", *Australian Journal of Rural Health*, Vol 8, No. 5, pp. 254-260.

Drakopoulou-Dodd, S., S. McDonald, G. McElwee and R. Smith. (2014) "A Bourdieuan Analysis of Qualitative Authorship in Entrepreneurship Scholarship", *Journal of Small Business Management* ,Vol. 52, No.4,pp. 633-654.

Economou C., Kaitelidou D., Karanikolos M. and Maresso A. *(*2017) "Greece: Health system review. *Health Systems in Transition"*, Vol 19, No. 5,pp. 1-192.

Economou, C. (2010) "Greece: Health System Review", *Health Systems in Transition,* Vol 12, No. 7,pp. 1-180.

Farmer, J., Munoz, SA. and Threlkeld G., (2012) "Theory in rural health. Aust J Rural Health", Vol 20, No. 4, pp. 185-189.

Gartner, W. and Birley, S. (2002) "Introduction to the Special Issue on Qualitative Methods in Entrepreneurship Research" ,*Journal of Business Venturing*, Vol 12, No. 5, pp. 387-396.

Gioia, D. A., Corley, K. G. and Hamilton, A. L. (2013) "Seeking qualitative rigor in inductive research: Notes on the Gioia methodology", *Organizational research methods*, Vol 16, No.1,pp. 15-31.

Hashi, I., and Stojcicc, N. (2013) "The impact of innovation activities on firm performance using a multi-stage model: Evidence from the Community, Innovation Survey 4," *Research Policy*, Vol 42, pp. 353– 366.

Ivković, Z. and Weisbenner, S. (2005) "Local does as local is: Information content of the geography of individual investors' common stock investments",*The Journal of Finance*, Vol 60 , No 1, pp. 267-306.

Javadian, G., Dobratz, C., Gupta, A., Gupta, V. K. and Martin, J. A. (2020) "Qualitative research in entrepreneurship studies: A state-of-science", *The Journal of Entrepreneurship*, Vol. 29 *,* No 2, pp. 223-258.

Kafouros, M. (2005) "R&D and productivity growth: evidence from the UK," *Economics of Innovation and New Technology*, Vol. 14, No. 6, pp.479-497.

Kentikelenis, A., Karanikolos, M., Reeves, A., McKee, M. and Stuckler, D. (2014) "Greece's health crisis: from austerity to denialism", *The Lancet*, Vol 383 *,* No. 9918, pp. 748-753.

Koellinger, P. (2008) "The relationship between technology, innovation, and firm performance—Empirical evidence from e-business in Europe", *Research Policy*, Vol 37, pp. 1317-1328.

Konde-Lule, J., Gitta, S. N., Lindfors, A., Okuonzi, S., Onama, V. O. and Forsberg, B. C. (2010) "Private and public health care in rural areas of Uganda", *BMC international health and human rights*, Vol 10 ,No. 1,pp 29.

Krippendorff, K. (2018) *Content analysis: An introduction to its methodology*, Sage publications

Lehoux, P., Pacifico Silva, H., Pozelli Sabio, R. and Roncarolo, F. (2018) "The unexplored contribution of responsible innovation in health to Sustainable Development Goals", *Sustainability*, Vol 10, No. 11, pp 4015.

Lehoux, P., Roncarolo, F., Silva, H. P., Boivin, A., Denis, J. L. and Hébert, R. (2019) "What health system challenges should responsible innovation in health address? Insights from an international scoping review", *International journal of health policy and management*, Vol 8 *,* No. 2, pp. 63.

Ling, D. C., Naranjo, A. and Scheick, B. (2021) "There is no place like home: Information asymmetries, local asset concentration, and portfolio returns", *Real Estate Economics*, Vol 49 *, No.* 1,pp. 36-74.

Makris, I. (2016) ''The effect of innovative activity in firm performance and development: Analysing data from eurozone'', *International Journal of Business and Economic Sciences Applied Research (IJBESAR)*, Vol 9, No. 2, pp. 87-92.

Makris, I. (2008) ''The factors affecting firms' growth: investment in tangible versus intangible assets in the Greek pharmaceutical industry'', *International Journal of Behavioural and Healthcare Research*, Vol 1, No. 1, pp. 91-104.

McIntosh, M. J. and Morse, J. M. (2015). "Situating and constructing diversity in semi-structured interviews", *Global qualitative nursing research*,Vol 2, 2333393615597674

Mitropoulos, P., Kounetas, K. and Mitropoulos, I. (2016) "Factors affecting primary health care centers' economic and production efficiency", *Annals of Operations Research*, Vol 247, No. 2,pp. 807-822.

Morse, MJ., & Field, AP. (1996) "Nursing research: The application of qualitative approach. London",*Chapman & Hall.*

Moser, A. and Korstjens, I. (2018) "Series: Practical guidance to qualitative research. Part 3: Sampling, data collection and analysis", *European Journal of General Practice*, Vol 24, No. 1, pp. 9-18.

Nofsinger, J.R. (2014) *The Psycology of Investing*, Pearson Series in Finance USA

Oikonomou, N., Tountas, Y., Mariolis, A., Souliotis, K., Athanasakis, K. and Kyriopoulos, J. (2016) "Measuring the efficiency of the Greek rural primary health care using a restricted DEA model; the case of southern and western Greece", *Health care management science*, Vol 19, No. 4, pp. 313-325.

Ozawa, S., and Walker, D. G. (2011) "Comparison of trust in public vs private health care providers in rural Cambodia", *Health policy and planning*, Vol 26 , No. 1 , pp. 20-29.

Pantelidis, P., Vozikis, A. and Meggouli, E. (2019) "Demand for primary healthcare services in Greece based on general practice prescribing model", MPRA Paper No. 92101.

Papatheodorou, Ch. and Mousidou, A. (2011*) "Healthcare and inequality in Greece: The distributive effect of the health system", Observatory of Economic and Social Developments*, GSEE Labor Institute, Athens (Greek).

Polit, FD. and Hungler, PB.(1999) *Nursing research: Principles and methods*, Philadelphia, Lippincott.

Pompian, M. M. (2012). *Behavioral finance and investor types: managing behavior to make better investment decisions*, John Wiley & Sons.

Przybilla, L., Klinker, K., Wiesche, M. and Krcmar, H. (2018*) "A Human-Centric Approach to Digital Innovation Projects in Health Care: Learnings from Applying Design Thinking"*, PACIS Proceedings, 226. https://aisel.aisnet.org/pacis2018/226

Redfern, J. (2017) "Smart health and innovation: facilitating health-related behaviour change" *Proceedings of the Nutrition Society*, Vol 76 No. 3,pp. 328-332.

Siskou, O., Kaitelidou D., Papakonstantinou, V. and Liaropoulos, L. (2008) "Private health expenditure in the Greek health care system: where truth ends and the myth begins*" Health Policy*, Vol 88 , No.2-3, pp. 282-93.

Souliotis, K., Tsimtsiou, Z., Golna, C., Nikolaidi, S., & Lionis, C. (2019) "Citizen Preferences for Primary Health Care reform in Greece", *Hippokratia*, Vol 23 , No. 3, 111.

Steiner, A. and Atterton, J. (2015) "Exploring the contribution of rural enterprises to local resilience" ,*Journal of Rural Studies,* Vol 40,pp. 30-45.

Tountas, Y., Karnaki, P., Pavi, E. and Souliotis, K. (2005) "The "unexpected" growth of the private health sector in Greece. *Health policy"*, Vol 74 *,* No 2,pp. 167-180.

Tountas, Y., Oikonomou, N., Pallikarona, G., Dimitrakaki, C., Tzavara, C., Souliotis, K., ... and Niakas, D. (2011) "Sociodemographic and socioeconomic determinants of health services utilization in Greece: the Hellas Health I study", *Health services management research*, Vol 24 No.1, pp. 8-18.

Tuan, T., Dung, V. T. M., Neu, I. and Dibley, M. J. (2005) "Comparative quality of private and public health services in rural Vietnam", *Health Policy and Planning*, Vol 20, No. 5, pp. 319-327.

Vardiampasis, V., Tsironi, M., Nikolentzo, A., Moisoglou, I., Galanis, P., Stavropoulou, H., ... and Prezerakos, P. (2014) "Health services staffing with physicians in the remote areas: Recruitment and retention incentives", *Archives of Hellenic Medicine/ArheiaEllenikesIatrikes*, Vol 31 *,* No 1.

Wong, L. P. (2008) "Data analysis in qualitative research: A brief guide to using NVivo. *Malaysian family physician: the official journal of the Academy of Family Physicians of Malaysia"*, Vol 3, No. 1 , pp, 14.

Yin, R. K. (1994) "Discovering the future of the case study. Method in evaluation research. *Evaluation practice"*, Vol 15, No. 3, pp. 283-290.

Influence of Mega Sporting Events on Entrepreneurial Ecosystems in Host Nations

Rauf Mammadov
IE Business School, Madrid, Spain
rauf.mammadov@student.ie.edu
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Abstract: Mega Sporting Events (MSEs) are often given credit for leveraging socio-economic benefits for the hosting nation through increased commerce and the promotion of entrepreneurial activities. These projected benefits have attracted nations to bid for the opportunity to host MSEs. But the extant literature offers limited evidence of the impact of MSEs on local entrepreneurial activities and outcomes. Furthermore, the literature addresses either how MSEs impact host countries prior to an event ("ex-ante") or the extent to which they stimulate effects following an event ('ex-post"). In either case, the holistic picture is missing, which makes it difficult to infer whether the anticipated outcomes are realized or not. In order to address this gap, the proposed study aims to evaluate the impact of MSEs on entrepreneurial ecosystems in nations that host them by employing a difference-in-difference (DID) analysis of a comprehensive dataset spanning from 2006-2019, with an emphasis on the 2018 Winter Olympics and the 2018 FIFA World Cup. The impact will be assessed by evaluating the change in host countries' Global Entrepreneurship Index (GEI), which is an annual index that uses 14 different pillars of the entrepreneurial ecosystem to determine the health of entrepreneurship in a country. This study is unique in form because the research design allows for the assessment of three different time periods (i.e., prior to and post award, and prior to the event), and incorporates the use of a baseline comparison prior to the award, so that the effects can be assessed pre-award, post-award and prior to the event. This study will aid in elucidating differences in these time periods, which will contribute to providing a better understanding of the effects of MSEs on entrepreneurial ecosystems on the ground.

Keywords: mega sporting events, entrepreneurial policies, entrepreneurial ecosystem, event leverage

1. Introduction

Mega Sporting Events (MSEs) can be defined as one-off or recurrent sporting events that are broadcast internationally, utilize multiple locations, and involve the world's most popular sports in terms of both participation and viewership (Pedersen and Thibault, 2018). MSEs are expensive to plan and stage, and have a huge impact on the built environment and communities in which they occur (Müller, 2015). They are often associated with socio-economic benefits for host nations, such as new entrepreneurial opportunities, international promotion, and increased commercial activities. These anticipated benefits encourage nations to bid for the right to host MSEs (Spilling, 1996; Hall, 2006; Sterken, 2006). However, despite these anticipated benefits, there is a lack of consistent empirical evidence regarding the impact of MSEs and associated policies on local entrepreneurial activities and outcomes in host nations. On the one hand, several studies demonstrate the positive impact of MSEs, such as improving the host's image, gaining the interest of international businesses, increasing commercial activity, and increasing tourism (Peric, 2018; Matheson, 2006; Chen, Qu and Spaans, 2013). On the other hand, several studies suggest that these benefits are outweighed by the costs of maintaining stadiums, infrastructure, and other facilities (Bjärsholm, 2017; Maharaj, 2015; Barclay, 2009). This ambiguity reflects the fact that studies focus on the impact of MSEs either ex-ante or ex-post and do not incorporate an examination of both (Sterken, 2006). As a result, a holistic picture is missing, making it difficult to assess whether MSEs bring significant benefits to entrepreneurial ecosystems in host nations (Vico, Uvinha and Gustavo, 2018; Maharaj, 2015; Briedenhann, 2011; Bjärsholm, 2017; Pappalepore and Duignan, 2016).

This study aims to fill this gap in the literature by evaluating the influence of MSEs on entrepreneurial ecosystems in host nations. It uses a difference-in-difference (DID) analysis of a comprehensive dataset spanning the period from 2006-2019, with a specific emphasis on the 2018 Winter Olympics and the 2018 FIFA World Cup. The impact of MSEs on entrepreneurial ecosystems in host nations will be measured using the Global Entrepreneurship Index (GEI). The GEI is an annual indicator based on 14 pillars of entrepreneurial ecosystems that are used to determine the health of entrepreneurship in a country (Ács, Szerb and Autio, 2017). The two MSEs were selected due to availability of GEI data for the host nations before and after the events were awarded and prior to the events taking place, and occurred in the same year, minimizing exogenous economic impacts from affecting the comparison. These two MSEs therefore serve as suitable datasets for analysis. In order to fulfil the objectives of this study, four hypotheses will be developed and tested.

The dependent variable in this study is the quality of entrepreneurial ecosystems in host and non-host countries. I plan to measure the quality of entrepreneurial ecosystems using the GEI. Unlike other indicators and indices of country-level entrepreneurial activity, such as social entrepreneurship environment, entrepreneurial propensity (Justo, De Castro and Maydeu-Olivares, 2008), and total entrepreneurship activity (Herman, 2018), GEI measures the quality, extent and depth of the entrepreneurial ecosystem that supports these activities (Herman, 2018). I plan to test the hypotheses using a DID model because it can capture qualitative differences between the entrepreneurial ecosystems in host and non-host nations. I propose to take the year in which the events were awarded as the point of reference. I will treat the GEI as the dependent variable and the 14 pillars of the GEI as independent variables, and propose to construct a regression equation. The regression equation will show the impact of various pillars on the GEI. The impact of each pillar can be compared before and after the award of the event.

In this paper, I put forward an argument for the need to study the quality of entrepreneurial ecosystems of host locations at three distinct stages: pre-award, post-award, and prior to the event. In addition, I propose to compare the quality of entrepreneurial ecosystems of host and non-host nations, accounting for the popularity of the MSE and the level of development across countries. The reason for this is to provide a deeper understanding of the impact of MSEs on the quality of entrepreneurial ecosystems and to generate important insights, which may be relevant to the policy decisions around bidding for MSEs. In proposing this methodology, I develop four hypotheses regarding the potential impacts of MSEs on entrepreneurial ecosystems of host nations.

In the next section, I discuss the extant literature and highlight the gap in research. From this literature review, it is apparent that a new way of measuring the impact of MSEs on host entrepreneurial activities will provide a more comprehensive insight into the relationship between MSEs and entrepreneurial ecosystems of host states. Following the literature review, this paper then outlines my four hypotheses of what the impact of MSEs are on entrepreneurial activities in a host country, including: 1) that hosting an MSE will have a positive impact on the GEI in the host nation; 2) that host nations will have greater incentives to develop their entrepreneurial ecosystems compared to non-host nations; 3) that the more popular the MSE hosted by the nation, the greater the positive impact on the entrepreneurial ecosystem; and 4) that the overall level of economic development of a host nation will moderate the relationship between hosting an MSE and the overall quality of entrepreneurial ecosystem, meaning developed countries will derive greater benefit from hosting MSEs than developing countries. Finally, after outlining the hypotheses, I turn to a comprehensive discussion of the methodology I develop to more accurately test these hypotheses and assess the effects of hosting an MSE. This paper concludes with a discussion of the expected outcomes of employing this methodology on the research data and the implications this has for studying entrepreneurial ecosystems in the future.

2. Literature review

2.1 Mega sporting events

According to Ratten (2010), as a global industry, sport motivates entrepreneurs to actively engage in sport-based entrepreneurial practices, which thus emerge as a distinct form of entrepreneurship. Ratten defines a 'sport-based entrepreneur' as 'someone who organizes, operates, and assumes risk for a sports-related business venture' and suggests 'that sport is essentially an entrepreneurial process due to the innovation, risk-taking, proactive activity, and value creation that takes place' (Ratten, 2010, p. 560).

Sports-based entrepreneurship lies at the intersection of entrepreneurship and sports management. Similar to traditional concepts of entrepreneurship, sports-based entrepreneurship is influenced by the social, technological, and international contexts in which the entrepreneurial activities take place (Ratten, 2010; Madalin, 2015). Like other forms of entrepreneurship, it is also regarded as a driver of economic growth and a source of job opportunities, and thus as directly benefiting local entrepreneurs.

Studies of this topic primarily seek to identify the factors that drive sports-based entrepreneurship and the factors that lead to its differential development in different countries (Madalin, 2015; Ratten, 2010). Only a few attempts were made to strengthen our understanding of entrepreneurship, opportunities, venture creation, and the scope for innovation in the context of sports (Ratten, 2011; Abratt, Clayton and Pitt, 1987).

Literature on sports-based entrepreneurship mainly assesses the creation of social and economic value within the context of sport. Accordingly, Bjärsholm (2017) defines sports-based entrepreneurship as a form of social entrepreneurship that utilizes sports to accomplish both social and financial goals. Hosting MSEs, such as the Olympic games, significantly impacts civil society and provides entrepreneurial opportunities across a range of industries, while the corporate sector boosts the economy and develops social capital (Glynn, 2008).

2.2 Entrepreneurial policies

However, further studies have shown that the entrepreneurial landscape in a host country is largely affected by the policies adopted by governments and policymakers at various levels.

The policies adopted during an MSE may be developed by the Local Organizing Committee (LOC), event organizers (e.g., FIFA or the IOC), or local or federal governments. These policies tend to be concerned with planning and promoting the event, the entertainment of spectators, improving the local trading environment, tourism, financial aid to local communities and entrepreneurs, providing tax exemptions, security, and the legacy of the event. The impact of event-related policies on local entrepreneurship is usually measured using self-reporting methods, including: semi-structured interviews (Chalip and Leyns, 2002; Vico, Uvinha and Gustavo, 2018), survey questionnaires (Vico, Uvinha and Gustavo, 2018; Lamla, Straub and Girsberger, 2014; Perić, 2018), and relevant self-reporting documentation (Chalip and Leyns, 2002; Maharaj, 2015; Paula, 2014).

As well, most articles focus on evaluating the impact of policies on the everyday activities of existing businesses, such as: price increases for products and services, increases in sales, and the scope for new entrepreneurial activities. For example, during the 2017 Southeast Asian Games in Malaysia, the federal government enacted several policies to aid local businesses, including: an extension of trading hours, tie-in advertisements and promotions, and the adoption of event-specific themes (Thuraiselvam, 2018). The policies, however, failed to generate substantial activity among local entrepreneurs. It was observed that 14 out of 15 businesses near the event venues did little or nothing to leverage the opportunity provided by the event (Thuraiselvam, 2018).

Similarly, during the 2010 FIFA World Cup, several pro-entrepreneurial policies were implemented by the South African government (Briedenhann, 2011). These policies aimed at strengthening public-private partnerships, creating job opportunities, and fostering awareness of upcoming business opportunities. Moreover, the South African government implemented policies to help local entrepreneurs build capacity in order to leverage these opportunities. In fact, a 'local benefit' policy was specifically adopted during the event to empower women in business, especially black women (Briedenhann, 2011). However, these pro-entrepreneurial policies failed to measurably boost local entrepreneurship (Briedenhann, 2011).

Along with a lack of interest in leveraging opportunities among local entrepreneurs, the implementation of inappropriate policies by the event organizers has been widely cited as a key reason for the underperformance of local entrepreneurs. For example, during the FIFA World Cups, sponsors, partners, and national supporters are given exclusive marketing and commercial rights. These policies legally prohibit the unauthorized use of official FIFA World Cup logos by enterprises other than those officially associated with the FIFA World Cup. Such policies are particularly detrimental to local businesses who cannot use the FIFA World Cup marks, such as the emblem, mascot, trophy and posters, which are considered of to have the largest commercial value (Koch, 2007).

Moreover, the absence of dedicated pro-entrepreneurial policies can severely affect local entrepreneurs. For example, the lack of efforts to increase awareness about upcoming business opportunities or to build capacity among local entrepreneurs has also been identified as reasons for local entrepreneurs' failure to capitalize on MSEs (Ibrahim and Ellis, 1987; Chalip and Leyns, 2002).

Thus, not only are the policies adopted by the host countries important for understanding the behaviour of entrepreneurs in the lead-up to and following an MSE, but these issues also point to the significance of the "entrepreneurship ecosystem" for fostering entrepreneurial activity.

2.3 Entrepreneurial ecosystem

Fostering entrepreneurship as an economic development strategy involves consideration of the "entrepreneurship ecosystem" (Isenberg, 2014). While there has being a growing amount of research exploring

the entrepreneurial ecosystem, the concept is still not well defined in the literature (Stam and van de Ven, 2021). Spigel (2015) argues that entrepreneurial ecosystems consist of 10 cultural, material and social attributes, and it is the relationship between these attributes that creates the ecosystem. Regional development strategies can aim to create an environment conducive to innovative start-ups. A process-based account of such an ecosystem provides a useful framework for understanding their role in creating business ventures (Spigel and Harrison, 2018).

Entrepreneurial ecosystems can be measured using social and cultural factors. Stangler and Bell-Masterson (2015) state that the success of an entrepreneurial ecosystem can be demonstrated by the number of new firms and employees operating in the environment. According to this model, the founding of many new firms and the creation of many jobs may indicate the success of an entrepreneurial ecosystem, while a lower density of new firms and fewer new jobs may indicate the failure of an ecosystem. A further relevant factor is the fluidity of firms, as measured by the movement or lack of movement of labor in an ecosystem. Increased movement of employees may be an indication of an unhealthy ecosystem. Lower employee turnover within an ecosystem suggests that it has the stability required to sustain businesses (Stangler and Bell-Masterson, 2015).

Stangler and Bell-Masterson (2015) further state that the health of entrepreneurial ecosystems can be measured by determining their level of internal connectivity. The participants in an ecosystem, such as investors and entrepreneurs, must interact for proper entrepreneurial functions to take place. Busenitz, Gomez, and Spencer (2000) indicate that the availability of connective infrastructure makes it possible for entrepreneurs to solve the problems they encounter. Favorable infrastructure can be supported by public policy, the knowledge and skills possessed by entrepreneurs, and admiration of citizens towards entrepreneurial activities (Busenitz, Gomez, and Spencer, 2000). An entrepreneurial ecosystem also needs to be diverse to counter any problems in a particular sector and to remain stable and sustainable (Stangler and Bell-Masterson, 2015).

2.4 Metrics of entrepreneurial activity

What these various studies highlight is the need to develop an effective measure of the health of an entrepreneurial ecosystem or environment conducive to entrepreneurial activity. An effective indicator is needed to comparatively evaluate entrepreneurial activities. Some of the proposed indicators include '*social entrepreneurial environment*' and '*entrepreneurial propensity*' (Justo, De Castro and Maydeu-Olivares, 2008, p. 604) and the Total Entrepreneurship Activity (TEA) indicator, which is based on percentage of individuals aged between 18 and 64 years who are either owners or managers of a startup or are otherwise nascent entrepreneurs. These metrics, however, are not able to measure or account for the success of various entrepreneurial activities, the level of these activities, nor the overall health of the ecosystem. The TEA focuses on the initiation of entrepreneurial activity as well as important aspects of economic growth, economic freedom, and global competitiveness (Ács, Szerb and Lloyd, 2018). But this quantitative approach fails to account for the quality of entrepreneurial activities, which is an important factor when measuring the effectiveness of an entrepreneurship ecosystem (Ács, Szerb and Lloyd, 2018, p. 17).

Because existing attempts to measure entrepreneurial activities have relied on problematic or incomplete indicators, in this paper I propose the use of GEI as a means to measure the quality and scale of an entrepreneurial ecosystem. Though Inácio Júnior, Dionisio and Fischer (2017) argue that the way GEI analyses input and output variables produces ambiguity, Ács, Szerb and Autio (2017) and Tasnim and Afzal (2018) claim that the GEI is the most comprehensive and effective index of the actual entrepreneurial outlook of a country because it can show the connection between progress in entrepreneurship as well as individual and organizational factors.

3. Hypotheses

My research seeks to answer the question: "Do MSEs influence the entrepreneurial ecosystem and policies of nations that host them, and, if so, is the influence positive or negative?" Broadly speaking, I focus on evaluating the influence of MSEs on entrepreneurial ecosystems and policies in host nations.

In order to answer this question, four hypotheses have been developed to be tested. The first hypothesis posits that hosting an MSE will have a positive impact on the GEI in the host nation because hosting an MSE induces changes in the economic and social environments that are likely to positively impact the entrepreneurial attitudes, abilities, and aspirations (Peric, 2018, Matheson, 2006, Chen, Qu and Spaans, 2013). The second

hypothesis posits that host nations will have greater incentives to develop their entrepreneurial ecosystems compared to non-host nations (Peric, 2018). The third hypothesis argues that the more popular the MSE hosted by the nation, the greater the positive impact on the entrepreneurial ecosystem (Sterken, 2006). Finally, the fourth hypothesis argues that the overall level of economic development of a host nation will moderate the relationship between hosting an MSE and the overall quality of entrepreneurial ecosystem, such that developed countries will derive greater benefits from hosting MSEs than developing countries (Hayduk, 2019).

4. Research methodology

4.1 Data analysis

In order to test these hypotheses, I plan to conduct data analysis to show whether there was a change in GEI for the host country as a result of hosting the MSE by comparing the score before and after the award of the MSE, and until its hosting. I will also construct models based on a regression equation with the GEI as the dependent variable and the 14 pillars of the GEI as independent variables. The regression equation will be able to explain the impact of each of the 14 pillars on the overall GEI score. As the data is in time series, it enables comparison of various time periods with a particular year as point of reference.

The fit of the model will be tested based on the value of R-squared. The significance of each independent variable in the model will be decided based on their P value at 95 percent significance level.

The data analysis will be split into two parts: descriptive analysis and hypotheses testing. In the descriptive part, summary statistics as well as visual representations will be prepared to present the results. The hypotheses testing of the data analysis will be done using Difference-in-Difference analysis.

Several provisions will be made for dummy variables, including whether a country is an MSE host or non-host and whether a country is developed or developing according to their classification by the International Monetary Fund. Furthermore, for further refinement of the analysis, which will focus on the influence of MSEs on the GEI of Russia and South Korea, I also propose to make a provision for a dummy variable of "1" for the FIFA World Cup and "0" for the Winter Olympics.

I propose to consider the year of interest as the year of award of the MSE and, based on that particular year, to carry out Difference-in-Difference analysis in order to detect the difference in statistical results for the pre-award period compared with a post-award time period and until the MSE is held. This will be done based on panel data analysis.

I expect to see a difference in the GEI before and after the award, and until the event is held. The influence of the indicators should also change. The formation of the control and treatment groups is likely to indicate the impact of the event. The time series data will facilitate comparison between various time periods. The regression equation should also be able to function as a forecasting model for future events.

4.2 Difference-in-Difference analysis

Difference-in-difference (DID) is used to determine changes that take place after some actions have been taken. The definition and use of the approach vary depending on the nature of a study. Ashenfelter and Card (2010) define it as involving “simple panel-data methods applied to sets of group means in cases when certain groups are exposed to the causing variable of interest and others are not.”

Goodman-Bacon (2018) explains that the DID model has two major facets: ‘pre’ and ‘post’, indicating the periods before and after the intervention (in this case, the MSE award). The major difference between the two periods is that there is a change in outcome after the intervention. Fredriksson and de Oliveira (2019) indicate that the most common approach is to have two datasets from two different times, with the later one reflecting observations taken after the intervention. The common assumption is that the treatment group would have followed the same trend if there had been no intervention.

The other advantage of the DID method is that it assesses groups that do not undergo the intervention. Egami and Yamauchi (2019) indicate that it is possible to improve the effectiveness of the DID method by assessing parallel trends, improving estimation, and allowing more parallel trend assumptions. Filipović and Miljković

(2014) conducted an analysis of entrepreneurial ecosystems using the DID approach after the 2008 recession and found that countries that applied aggressive transition policies in 2008 were less affected by the Global Financial Crisis overall, as underscored by GDP changes.

The DID method can be used to determine changes in an entrepreneurial ecosystem with the formation of a treatment group and a control group based on the hosting of MSEs. Conley and Taber (2005) argue that it is possible to determine the impact of small policy changes over time by using a DID methodology.

5. Conclusion

My study aims to bridge the gap in research on the impact of MSEs on entrepreneurial ecosystems in host nations. MSEs may be able to influence the socio-economic structure of a country by changing its entrepreneurial ecosystem. In this paper, I have argued for the utility of a new methodology for measuring the entrepreneurial ecosystems affected by the MSEs. The use of the GEI is unique in this area of research and will be among the key contributions of this study. The GEI dataset enables us to carry out the statistical tests applicable to panel data. The use of a regression equation and DID analysis is likely to prove a robust methodology for better understanding the impacts of events like MSEs on entrepreneurial ecosystems.

A country's entrepreneurial ecosystem depends on various macroeconomic parameters, such as the economic structure, the relative sizes and roles of the country's public and private sectors, and the composition of GDP in terms of primary, secondary and tertiary sectors. This study focuses on the impact of MSEs and as such has implications for policymaking in the areas of entrepreneurship and MSEs. Distinguishing the impact of each of the 14 pillars of the GEI on the final GEI score will enable policymakers to better decide how best to strengthen their entrepreneurial ecosystems. Furthermore, the anticipated findings of this study may provide a rationale for certain policy changes, which may be considered by the nations bidding to host the MSEs, in order to positively influence the national and local entrepreneurial ecosystems. This study may also show the possible impact of MSEs on entrepreneurial ecosystem at different levels, as well as clarify whether different type of MSEs have distinguishing impact on entrepreneurial ecosystems of host nations.

References

Abratt, R., Clayton, B. C. and Pitt, L. F. (1987). Corporate Objectives in Sports Sponsorship. *International Journal of Advertising*. 6(4): 299-312.

Ács, Z., Szerb, L., and Autio, E. (2017). Introduction to the Global Entrepreneurship Index. *Global Entrepreneurship and Development Index* 2016 (pp. 1-2). Springer, Cham.

Ács, Z. J., Szerb, L. and Lloyd, A. (2018). The Global Entrepreneurship Index 2018. Washington, D.C. Retrieved from: https://thegedi.org/wp-content/uploads/dlm_uploads/2017/11/GEI-2018-1.pdf

Ashenfelter, O., and Card, D. (Eds.). (2010). Handbook of Labor Economics, Elsevier.

Bjärsholm, D. (2017). Sport and Social Entrepreneurship: A Review of a Concept in Progress. *Journal of Sport Management.* 31: 191-206.

Briedenhann, J. (2011). Economic and Tourism Expectations of the 2010 FIFA World Cup – A Resident Perspective. *Journal of Sport and Tourism*. 16(1): 5-32.

Busenitz, L. W., Gomez, C., and Spencer, J. W. (2000). Country institutional profiles: Unlocking entrepreneurial phenomena. *Academy of Management Journal*, 43(5), pp. 994-1003.

Chalip, L., and Leyns, A. (2002). Local business leveraging of a sport event: Managing an event for economic benefit. *Journal of Sport Management*. 16(2): 132-158.

Chen, Y., Qu, L. and Spaans, M. (2013). Framing the Long-Term Impact of Mega-Event Strategies on the Development of Olympic Host Cities. *Planning, Practice and Research*. 28(3): 340–359.

Conley, T. G. and Taber, C. R. (2011). Inference with "difference in differences" with a small number of policy changes. *The Review of Economics and Statistics*, 93(1), pp. 113-125.

Egami, N. and Yamauchi, S. (2019). Using Multiple Pre-treatment Periods to Improve Difference-in-Differences and Staggered Adoption Designs. Retrieved from: https://soichiroy.github.io/files/papers/double_did.pdf

Filipović, S., and Miljković, M. (2014). Transition economies during global economic crisis: A difference in differences approach. *Industrija*, 42(3), pp. 23-39.

Fredriksson, A. and de Oliveira, G. M. (2019). Impact evaluation using Difference-in-Differences. *RAUSP Management Journal*, 54(4), pp. 519-532.

Glynn, M. A. (2008). Configuring the Field of Play: How Hosting the Olympic Games Impacts Civic Community. *Journal of Management Studies*, 45(6), 1117–1146. doi:10.1111/j.1467-6486.2008.00785.x.

Goodman-Bacon, A. (2018). Difference-in-differences with variation in treatment timing, (No. w25018). *National Bureau of Economic Research*.

Hall, C. M. (2006). Urban Entrepreneurship, Corporate Interests and Sports Mega-Events: The Thin Policies of Competitiveness within the Hard Outcomes of Neoliberalism. *The Sociological Review*. 54(2): 59-70.

Hayduk, T. (2019). Leveraging sport mega events for international entrepreneurship*. International Entrepreneurship and Management Journal*, 15, 1-25.

Herman, E. (2018). Innovation and entrepreneurship for competitiveness in the EU: an empirical analysis. *Proceedings of the International Conference on Business Excellence*, 12, 425-435.

Ibrahim, A. B. and Ellis, W. (1987). An empirical investigation of causes of failure in small business and strategies to reduce it. *Journal of Small Business and Entrepreneurship*, 4(4): 18-24.

Inácio Júnior, E. I., Dionisio, E. A., and Fischer, B. (2017). Assessing Efficiency in National Systems of Entrepreneurship: Is the United States A Good Benchmark? *EnANPAD 2017.*

Isenberg, D. (2014). What an entrepreneurship ecosystem actually is. *Harvard Business Review*, 5(1), 7.

Justo, R., De Castro, J. O. and Maydeu-Olivares, A. (2008). Indicators of entrepreneurship activity: some methodological contributions. *International Journal of Entrepreneurship and Small Business*, 6, 604-621.

Koch, A. (2007). Business Opportunities around the FIFA World Cup (PDF presentation slides).

Lamla, M. J., Straub, M. and Girsberger, E. M. (2014). On the economic impact of international sport events: microevidence from survey data at the EURO 2008. *Applied Economics*. 46(15): 1693–1703.

Madalin, M. S. (2015). The Economic and Social Coordinates of Developing A Sport Entrepreneurship Index–Current Challenges and Prerequisites. *Annals-Economy Series*, 3: 224–229.

Maharaj, B. (2015). The turn of the south? Social and economic impacts of mega-events in India, Brazil and South Africa. *Local Economy: The Journal of the Local Economy Policy Unit,* 30.

Matheson, V. A. (2006). Mega-Events: The effect of the world's biggest sporting events on local, regional, and national economies. *Economics Department Working Papers*.

Müller, M. (2015). What makes an event a mega-event? Definitions and size*. Leisure Studies*. 34(6): 627-642.

Pappalepore, I. and Duignan, M. B. (2016). The London 2012 cultural programme: A consideration of Olympic impacts and legacies for small creative organisations in east London*. Tourism Management*, 54, 344-355.

Paula, M. D. (2014). The 2014 World Cup in Brazil: Its Legacy and Challenges. 1-21. Retrieved from: https://www.solidar.ch/sites/default/files/solidar_suisse_study_world_cup_brazil_14.pdf

Peric, M. (2018). Estimating the Perceived Socio-Economic Impacts of Hosting Large-Scale Sport Tourism Events. *Social Sciences*, 7, 176.

Pedersen, P. M. and Thibault, L. (2018). Contemporary Sport Management 6th Edition. 544.

Ratten, V. (2010). Developing a theory of sport-based entrepreneurship. *Journal of Management and Organization*. 16: 557–565.

Ratten, V. (2011). Social entrepreneurship and innovation in sports*. Int. J. Social Entrepreneurship and Innovation*. 1(1): 42-54.

Spigel, B. (2015). The Relational Organization of Entrepreneurial Ecosystems. *Entrepreneurship Theory and Practice*, 41(1), 49–72. https://doi.org/10.1111/etap.12167

Spigel, B. and Harrison, R. (2018). Toward a process theory of entrepreneurial ecosystems. *Strategic Entrepreneurship Journal*, 12(1), 151-168.

Spilling, O. R. (1996). Mega event as strategy for regional development The case of the 1994 Lillehammer Winter Olympics. *Entrepreneurship and Regional Development*, 8:4, 321-344.

Stam, E., van de Ven, A. Entrepreneurial ecosystem elements. *Small Business Economics*, 56, 809–832 (2021). https://doi.org/10.1007/s11187-019-00270-6

Sterken, E. (2006). Growth Impact of Major Sporting Events*. European Sport Management Quarterly*. 6(4): 375-389.

Stangler, D. and Bell-Masterson, J. (2015). Measuring an entrepreneurial ecosystem. *Kauffman foundation research series on city, metro, and regional entrepreneurship*, 16.

Thuraiselvam, S. (2018). Local Businesses Leveraging on the 29th SEA Games Winter Sports. *APJIHT*. 7: 35-43.

Tasnim, N. and Afzal, M. N. I. (2018). An empirical investigation of country level efficiency and national systems of entrepreneurship using Data Envelopment Analysis (DEA) and the TOBIT model. *Journal of Global Entrepreneurship Research*, 8(1), p. 37.

Vico, R. P., Uvinha, R. R. and Gustavo, N. (2018). Sports mega-events in the perception of the local community: the case of Itaquera region in São Paulo at the 2014 FIFA World Cup Brazil. *Soccer and Society*. 20(6): 1-14.

Wolfe, M. T., and Shepherd, D. A. (2013). "Bouncing Back" From a Loss: Entrepreneurial Orientation, Emotions, and Failure Narratives. *Entrepreneurship Theory and Practice*, 39(3), 675–700. doi:10.1111/etap.12057

Supporting Innovation and Growth of Microenterprises in Peripheral Region

Anneli Manninen
Estonian Business School, Tallin, Estonia
anneli.manninen@ebs.ee
DOI: 10.34190/EIE.21.062

Abstract: This study shares experiences of growth-oriented microenterprises and regional actors during a business development programme of peripheral region in Finland. University of Applied Sciences (UAS) and three Development Companies (DC) joined forces to build and test measures together with the entrepreneurs. DCs supported business planning and identified bottlenecks and potential development projects. UAS organized training camps in fundamental business skills and integrated students into development projects. The qualitative study aimed to better understand needs of microentrepreneurs and measures useful for them. As age and field of participating enterprises varied it was also used to identify differences between them. Theme interviews helped to discover perceived benefits and learning experience of microentrepreneurs and respective company developers. Altogether 24 micro- and small enterprises were followed throughout the two-year programme, which resulted in six product or service innovations and significant growth in seven enterprises. Entrepreneurs were also better equipped to face the challenging economic times. Policymakers and regional actors could use the findings when preparing their plans and actions on regional development. It was evident that intense cooperation between the actors increased the perceived and actual benefits for all parties. The study also revealed that jointly orchestrated measures clearly supported the development of most microenterprises by learning, cooperation, and anticipation. The same is even more true if the actors share the same field of interests. Circular economy was common field for some enterprises. This created potential for future cooperation and joint business development. Combination of different measures was assessed very useful. Though, start-up and young enterprises could utilize learning possibilities better than the incumbent entrepreneurs, who would prefer more tailored approach. Most useful fields of learning were future orientation and marketing. Microentrepreneurs anticipate future learning needs as well to be in digital marketing and sales. Development projects by students enhanced business development and even lead to innovations by some enterprises. In addition, students we found to gain wide entrepreneurial learning possibilities when cooperating with microentrepreneurs.

Keywords: business development, growth-orientation, innovation, microentrepreneurship, peripheral region

1. Introduction

In spite of the fact that microenterprises and small and medium-sized enterprises (SMEs) are recognized to be significant contributors to economic growth in all countries little attention has been given to their enchantment (Isoherranen & Ratnayake, 2018). Study by Deller (2010) suggests that microenterprises play an important but complex role in economic growth. Microenterprises which have less than ten employees represent 93 percentage of enterprises in Finland (OSF, 2021). Their growth is essential for the future economic success and employment of regions. Thus, supporting microenterprises looking for growth is important. Growth-orientation is a multidimensional concept. According to Ylitalo (2010) growth is top priority for growth-oriented entrepreneurs. They also accept risk and environmental factors as important elements for enterprise development. Growth-orientation was a prerequisite for participating in the two-year development program of this study. Criteria and growth targets were set by regional DCs, non-profit companies owned by municipalities and purposed to increase growth and competitiveness of the region's businesses (Räisänen & Tuovinen, 2020).

Small enterprises are distinctly different from bigger ones in qualitative and quantitative terms (Wyer, Mason & Theodoropoulos, 2000). Their development has own constrains as owner-manager and size make them a unique problem type. Growth challenges of microenterprises (Gherhes et al., 2016) are also different. As owner-manager centric they might lack necessary business and management capabilities and business support functions. However, evidence related to microenterprises is limited. Influence of experience on growth, the importance of manager's human capital and expertise on managing growth should be according to Gherhes et al. (2016) further studied with particular emphasis on managerial and business skills. Lack of fit between available training and development programmes and the needs of microenterprises was identified as well. According to Viljamaa (2011) ability to access external expertise is crucial for small enterprises. Thus, public advisory services are important for them. There is also a need to pay attention to the microenterprises' context-specific requirements and individual needs of innovative microenterprises while developing their services (Jokela, Niinikoski & Muhos, 2015). However, we still know too little about innovation in microenterprises or how to support owners in their development.

The importance of finding effective and suitable ways to support innovation and growth of microenterprises was recognized by three DCs and a UAS. They combined their know-how to build a development programme which included training on fundamental business skills, sparring by company developers of DCs as well as development projects by students. The follow-up study aimed at building understanding of the different support efforts and their impact experienced by the 24 entrepreneurs and respective company developers. Multi-case approach was used to clarify, how they perceive their needs and different support actions together with learning experience and benefits for business development.

This study was conducted in a specific peripheral region in Southern Finland. Peripheral region is here simply defined being outside the capital or other major cities (Habersetzer, 2016). Peripheral region can also be characterized as downward transitional region with declining resource-base, industrial structure and loss of population and capital (van Aswegen & Retief, 2020). Majority of microenterprises are located in such regions. The study is structured as follows. After introducing the purpose of the study, the paper presents some innovation and growth literature with focus on microenterprises. Then methodology is described, followed by findings. Finally, discussion and conclusions part includes implications, and suggestions for future research.

2. Theoretical background

2.1 Growth and development of microenterprises

Martín-García and Morán Santor (2019) reviewed relation between company size and performance and found no overall pattern to connect the two variables. Performance can according to them be measured by growth, variation in size, productivity, or cost-efficiency, but it is also widely accepted that it depends highly on local factors. The development of microenterprises can according to Alom et al. (2016) be evaluated by growth in employment, revenue, or profit or by assessing overall improvement. According to Koryak et al. (2015) evidence suggests that performing key processes successfully supports firm's growth. These processes include continuous improvement, market orientation, internationalisation, market development as well as general functional and strategic management. Innovations and growth with limited resources requires microenterprises to operationalize strategies effectively and increase their opportunities for knowledge sharing by networking (Taneja, Pryor & Hayek, 2016). Thus, combining resources and capabilities efficiently drives organizational performance.

Three categories, namely firm owner's attributes, business characteristics and business environmental factors, are critical to business success (Alom et al., 2016). However, studies of these aspects and microenterprises are quite rare as they are often embedded in SMEs. Gherhes et al. (2016) identified necessary entrepreneur's characteristics for the growth of small businesses. It is essential to be able to learn from experience, and important managerial skills are capability to manage growth, marketing, financial capabilities, and proactiveness. Thapa (2015) found no significant association between age, educational attainment nor previous experience of microentrepreneurs and enterprise performance, but managerial skills, managerial foresight, and creative tendency had significant positive and social networks positive effects on the performance. Growth of microenterprises is also found positively related to three aspects of entrepreneurial orientation proactiveness, innovation and risk taking (Asad et al., 2018).

According to Mahmutaj and Krasniqi (2020) educational background and entrepreneurial experience are both positively correlated to growth of SMEs while firm's age showed slight negative correlation. Alom et al. (2016) also found the age of microenterprise negatively related to its performance. However, Thapa(2015) found performance of older and smaller microenterprises higher than that of the younger or bigger ones.

Gherhes et al. (2016) argue that microenterprises differ from larger businesses in the areas of business capabilities and practices, manager's characteristics, growth ambition as well as their business environment. Business and institutional environment can according to them be either supportive or a constrain to growth-oriented microenterprises. They found most important aspect to be access to resources and business support as well as adequacy of available finance options. Thus, business development can be expected to be enhanced by supporting the development of key capabilities and business practises. Lajqi and Krasniqi (2017) found that only entrepreneur's training has statistically significant positive effect on growth aspirations. O'Dwyer and Eamon (2000) argue that challenges and obstacles for growth of microenterprises are significantly different from those of larger organizations. As they aimed to establish training and development interventions required by

the microentrepreneurs, they found that workshop content should include marketing, sales, management, finance, business strategy and planning, information technology and administration.

2.2 Innovation and microenterprises

Microentrepreneurs perceive innovation as one of the main contributors for the company's business success (Štavlić, Funarić &Galić, 2020). However, studies linking innovation and firm size are contradictory. Many earlier studies have according to Marom, Lussier, and Sonfield (2019) found a negative relationship between firm size and innovation, but they found that larger firms pursue a strategy that tends to be higher in innovation and lower in risk, while smaller firms prefer a strategy higher in risk but lower in innovation.

Four elements that are essential for innovation are strategy, effective implementation mechanisms and external relationships as well as supportive organizational context (Tidd, Bessant & Pavitt, 2008). In microenterprises strategy is mainly set by the entrepreneur. As entrepreneurial leadership has a mediating role in innovation of microenterprises (Dabić et al., 2021), entrepreneur's orientation and openness to engage with innovation together with capacity to understand and implement innovation are essential (Kelliher, Mellett & Harrington, 2020). Thus, their capabilities are considered most critical for innovation and business success as well (Lin et al., 2020).

Effective implementation of innovation requires capabilities from both the manager and employees. Successfully innovative SMEs (Taipale-Erävala, Henttonen & Lampela, 2017) have an open-minded ability and a mental attitude enabling them to develop entirely new trends and thoughts enhanced by development friendly mindset and an attitude to cooperate beneficially with all partners. Roper and Hewitt-Dundas (2017) also find managerial attitudes, resource coordination, appropriability strategies and partnering skills equally important as technological competencies. In addition to well-established dimensions of entrepreneurial orientation Dimitratos, Liouka and Young (2014) identified learning as a key competence at subsidiary level. It is linked to entrepreneurial initiative and ability to exploit locally generated knowledge. The role of intellectual agility of employees is emphasized in micro and small businesses' innovativeness (Dabić et al., 2021) making development of capabilities important not only for the manager but the whole personnel.

However, microentrepreneurs face challenges in managing innovation and do not engage in innovation networks, because available networks are perceived unsuitable (Faherty and Stephens, 2016). Henley and Song (2020) found a causal chain linking the acquisition and formalisation of information to the production of innovation and through it to microbusiness performance. According to them support for microenterprises needs careful targeting and balancing focused on innovation as a route to business growth. Existing development programme approaches, and timings are not appropriate either. Thus, support structures and networks should be tailored to meet the actual needs of microenterprises in their specific regions.

3. Methodology

This paper presents a multi-case study discussing if or how regional support organizations can help to foster innovation and growth of microenterprises. Therefore, it aims to explore the following questions:

- 1. How microentrepreneurs perceive their own needs and support actions targeted to them?
- 2. How microentrepreneurs describe their learning experience and benefits for business development?
- 3. How the success of microenterprises in innovation and growth could be explained?

This study used inductive research design and case study methodology to explore experience during a development program. The research process is shown in figure 1.

Case-study research aims at building theory by combining existing theoretical knowledge with new empirical and practical insights (Eisenhardt, 1989; Yin, 2009).The aim is in-depth description, analysis and understanding of the issue. Multiple case study often builds around one issue and data analysis consists of description of the cases, themes, cross-case themes found and the analysis itself (Creswell, 2007, 78–79).

Data was gathered through thematic interviews and project documentation was used as well. Themes aim cover those questions that are wished to cast light on (Patton 2002, 343). The themes included experienced learning, perceived gains for business by different actions and combination of them as well as future needs and

expectations. When using case study methodology, it is important to gain the confidence of the participants (Creswell, 2007, 120). Thus, the researcher had multiple contacts with the interviews during the development programme in order to build trust. Three company developers and 24 entrepreneur were interviewed. Creswell (2007, 126) recommends 20-30 cases for grounded theory, Guest, Bunce, and Johnson (2006) between 6 and 12. As nine enterprises experienced growth, innovation, or both, it was adequate for comparison. Content analysis was used to divide the themes and content is into categories using inductive reasoning (Patton 2002, 453).

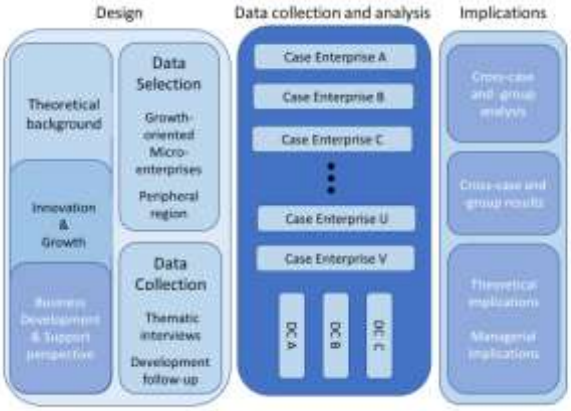

Figure 1: Research process

4. Findings

The findings are represented separately for each research questions.

4.1 How microentrepreneurs perceive their own needs and support actions targeted to them?

Almost all enterprises described digitalization, marketing, and sales improvement important for them and necessary also in the future. Development of automation and robotics concerned most as well. When looking forward internationalization, growth-related measures and widening own competence base are anticipated. Supportive measures are still needed.

Different actions and their effect on business or learning were described more diverse. All the companies perceived the sparring by DC very useful. One DC took extra effort in combining different actions together. This resulted in positive assessment of the whole. Another DC had circular economy as unifying objective, which enabled enterprises to find partners for business development. However, it was clearly depending on the needs and situation of the enterprise, which measures they found useful. In overall, enterprises with shorter entrepreneurial experience found training more useful for both their business and competence development. They also perceived to have adopted new knowledge and developed innovation from students' ideas. More experienced entrepreneurs found nothing or less new in training but still described future and customer orientation beneficial for development. Projects by students produced some new ideas or solutions. Development program also helped to better analyse the current business position.

The experiences were further analysed and listed under three means of development: learning, cooperation, and anticipation. Data analysis is shown in Table 1. Learning was influenced by the categories of willingness to learn, learning approach and openness to alternative views. Cooperation was in this case divided in accepting support from the DC, peer support, co-creation with students and trust. Anticipation had two categories of identifying future trends and topics as well as recognizing future needs.

4.2 How microentrepreneurs describe their learning experience and benefits for business development?

There were as many descriptions as there are enterprises. Cooperation with students was found useful and beneficial for business development

> *J:" I had a chance to learn new things from six young experts…our enterprise gave responsible and concrete business-related tasks for the students. Every meeting did produce something concrete to*

support our business and everything they did also gave me a lot of thoughts how to further utilize these things in my own enterprise."

S: "I did gain a wider picture of my field."

O: "Not really any new learning as I have a long entrepreneurial experience."

U: "We gained much practical benefit and just from such perspectives, which we would not otherwise have thought about. In that sense, it opened our thinking. And we got quite excellent ideas, what we could do and how to develop our functions. But above all we gained a new business field for our enterprise."

Possibilities for networking and meeting other entrepreneurs were valued by all.

L: "Tips how develop my own competence and some networking, which is actually quite important."

I: "To analyse where we are, a realistic analyse, it would serve us well. That you can improve your competence is one significant thing, but it also increases your energy level as an entrepreneur. Contacts with others do help."

D: "I think it brings you back to the ground, that your own company is not the centre of the world and the problems are universal. All do not have all the same problems, but all have similar problems. And it widens your own views and helps to open the knots you have inside your head, which prevent you from doing rational decisions."

Cooperation is also believed to be the means for development in the future. However, universities willingness to help is questioned.

DC C: "I think the cooperation was for all part good and we found that it confined our views about enterprises wanting to cooperate and innovate together."

Q: "And there might rise some new thoughts, that I have this know-how which might bring you value added."

E: "Education will help by bringing the theory part and in that way create understanding…and sort of by sharing the latest knowledge help us to develop in that sense."

B: "If you listen to the universities you will certainly not hear them talk about entrepreneurs."

4.3 How the success of microenterprises in innovation and growth could be explained?

To answer the question the data was further divided in two groups according to the results. In the end of the development programme altogether nine enterprises of the 24 had experienced innovation and/or growth. Growth was validated through increase in employment and innovation as product or service innovation. The two group, the ones with growth and/or innovation and the ones without can be found in Table 1 together with their examples and quotations in different categories.

Table 1: Data analysis

Means of Development Category	*Enterprises with Innovation and Growth*	*Enterprises with no Innovation and Growth*
	Learning	
Willingness to learn	Learning from others, tips for learning, new learning.	Nothing new or knew already but had forgotten, single bits.
Learning approach	Opens up thinking, mentally strengthening, gaining wider picture.	Use of given tools.
Openness to alternative views	New, different, or outside views, critical assessment, new solutions.	Examples, ideas, tools, support for own thinking.
	Cooperation	
Accepting support by Development Company	Mental support, reinforcement, target setting, and follow-up.	Problem identification and development needs, noticing to be stuck.
Peer Support	Unformal meetings and conversations, opinions, and experience of other entrepreneurs.	Seeing that problems are universal, meeting people, dialogue, and networking.

Means of Development Category	*Enterprises with Innovation and Growth*	*Enterprises with no Innovation and Growth*
Co-creation with Students	Support for business, new product, and business model development.	Not quite in target, went to minus side, useful, concrete step forward, courage to start a new thing.
Trust	Designating responsible tasks for the students, trusting business-related tasks.	Skills shortage, deficiencies in competence, different way of thinking.
Anticipation		
Identifying future trends and topics	Individualism, circular economy, sustainable development, automation, marketing, sales.	Project management, stress management, automation, robotics, digitalization, and marketing.
Recognizing future needs	Growth-related problem solving, support and wider competence for growth.	Internationalization, relevant support units.

Enterprises with innovation and growth were equally from manufacturing and service fields. In terms of size all the enterprises except one were very small with less than five employees. Growth happened more often when the entrepreneur had long entrepreneurial experience. However, innovation took place by entrepreneurs with less than five years of experience.

It seems that innovation and growth is enhanced by the entrepreneurs willingness to learn as well as openness to alternative views. These enterprises also produced a broader picture and wider views, while others were more interested in specific contents. All perceived support by DC and networking with other entrepreneurs very useful. However, there seems to be differences in respect to the usefulness of training and student integration. Enterprises with innovation and growth were more receptive to both. They also had more holistic learning approach. The group with no innovation and growth benefitted by realizing they might do things differently.

> *M: "What I learned is that if you keep sitting with the same people and just keep thinking about serious daily business, no development will take place."*

5. Discussion and conclusions

Business development is enhanced by supporting the development of key capabilities and business practises (Gherhes et al., 2016). According to literature capabilities needed for innovation and growth are proactiveness, risk-taking, networking and learning together with open-minded mental attitude and development friendly, co-operative mindset (Dimitratos, Liouka and Young, 2014; Roper & Hewitt-Dundas, 2017; Taipale-Erävala, Henttonen & Lampela, 2017).

There is evidence that multi-actor development programme adapted to the needs of microenterprises is beneficial for their business development. Sparring by the DC and possibilities for networking and peer support were found useful as they helped to develop business practises. Networking is important for innovation and growth as well (Thapa, 2015; Jamak, Ghazali & Sharif 2017; Roper & Hewitt-Dundas, 2017). However, microenterprises who produced growth and innovation were also able to cooperate beneficially with all parties (Taipale-Erävala, Henttonen & Lampela, 2017). In addition, they were willing to learn and had open-minded, holistic learning attitude. Learning is crucial for innovation (Dimitratos, Liouka & Young, 2014; Gherhes et al., 2016).

Training and sparring enhanced future perspective and provided a supportive environment (Gherhes et al., 2016) important for microenterprises. This gave entrepreneurs tools for proactiveness and risk-taking needed for business development and growth. Student integration seems to be an unutilized source for business development as they clearly produced ideas for innovation. The students gain wider learning possibilities for entrepreneurial competence as well (Tyni, 2020). Almost all enterprises described digitalization, marketing, and sales important also in the future (O'Dwyer & Eamon, 2000). They are also vital for growth (Koryak et al., 2015). Enterprises with shorter entrepreneurial experience found to training useful for business and competence development. More experienced entrepreneurs found little new and were less open for learning or new ideas. However, growth was more probably by them as Mahmutaj and Krasniqi (2020) also discovered.

To conclude it is important to remind that all microenterprises are different. Therefore, support actions should be individualized. However, it is also justified to claim that the more entrepreneurial experience has been attained the less willing microentrepreneur seems to be to accept outside views or to change. This might hinder

recognition of opportunities as well as possibilities for innovation. On the other hand, experience enhances possibilities for growth. These observations have both managerial and practical implications.

One fit for all is not an effective way to enhance innovation and growth of microenterprises. This is worth taking into account when drafting regional policy agendas, allocating resources, or planning actions. Some support measures such as networking and sharing experience with other entrepreneurs are valued by all. As networking and partnering skills are increasingly important, DCs and UASs should adopt enhancing them as their regular tasks. Jointly orchestrated combination of measures by regional actors was regarded highly recommendable by most microenterprises and should be supported. Regional development theme also increased probability for finding business partners with joint objectives.

Less experienced entrepreneurs value developing their business skills and support for growth. They are also more open to beneficial cooperation with all parties. This also seems to advance wider learning and enhance innovation. More experienced entrepreneurs wish to have a change to dig deeper in certain business areas. However, some of them also recognized need for change and things that hinder them from developing. Training should take into account the different needs of microenterprises for business development. Differentiating support actions according to the experience could thus be appropriate and more effective.

The future research could explore why experience seems to inhibit learning and find new ways to enhance it. All entrepreneurs value futures thinking and wish to increase their digital marketing and sales skills. This could be a fruitful research field in microenterprise context as well. It was found beneficial for UAS to integrate students in development projects of microenterprises to gain deeper understanding of entrepreneurship. How entrepreneurs learn in this cooperation and gain new innovations could also be worth studying.

Microentrepreneurs participating in this study came from varied enterprises and had different entrepreneurial experience and educational background giving the multi-case approach room for versatile findings. Still, it has several limitations. The number of participating enterprises and their specific regional context lessens the generality of the results. The educational level of the microentrepreneurs was quite high possibly causing more positive learning experience. Cultural difference between countries and regions might also limit their usability.

References

Alom, F., Abdullah, M., Moten, A. and Azam, S. (2016) "Success factors of overall improvement of microenterprises in Malaysia: An empirical study", Journal of Global Entrepreneurship Research, Vol. 6, No. 1, pp 1–13. https://doi.org/10.1186/s40497-016-0050-2.

Asad, M. Shabbir, M. S., Salman, R., Haider, S. H., and Ahmad, I. (2018) "Do entrepreneurial orientation and size of enterprise influence the performance of micro and small enterprises? A study on mediating role of innovation", *Management Science Letters*, Vol. 8, No. 10, pp 1015–1026.

Cresswell, J.W. (2007) *Qualitative Inquiry & Research Design*. *Choosing Among Five Approaches*, Sage, Thousand Oaks.

Dabić, M., Stojčić, N., Simić, M., Potocan, V., Slavković, M., and Nedelko, Z. (2021) "Intellectual agility and innovation in micro and small businesses: The mediating role of entrepreneurial leadership", Journal of business research, Vol. 123, pp 683–695. https://doi.org/10.1016/j.jbusres.2020.10.013.

Deller, S.C. (2010) "Spatial Variations in the Role of Microenterprises in Economic Growth", *The Review of Regional Studies*, Vol. 40, No. 1, pp 71–97.

Dimitratos, P., Liouka, I. and Young, S. (2014) "A missing operationalization: Entrepreneurial competencies in multinational enterprise subsidiaries", *Long Range Planning*, Vol. 47 No. 1–2, pp. 64–75.

Eisenhardt, K.M. (1989) " Building theories from case study research", *Academy of management review*, Vol. 14, No. 4, pp 532–550.

Faherty, U. and Stephens, S. (2016) "Innovation in micro enterprises: reality or fiction?", *Journal of Small Business and Enterprise Development*, Vol. 23, No. 2, pp 349–362.

Gherhes, C., Williams, N., Vorley, T. and Vasconcelos, A.C. (2016) "Distinguishing microbusinesses from SMEs: a systematic review of growth constraints*", Journal of Small Business and Enterprise Development*, Vol. 23, No. 4, pp 939–963.

Guest, G., Bunce, A., and Johnson, L. (2006) "How many interviews are enough?", *Field Methods*, Vol. 18, pp 59–82.

Habersetzer, A. (2016) "Spinoff dynamics beyond clusters: pre-entry experience and firm survival in peripheral regions", *Entrepreneurship & Regional Development*, Vol. 28, No. 9-10, pp 791–812.

Henley, A. & Song, M. (2020). Innovation, internationalisation and the performance of microbusinesses. International small business journal, 38(4), 337-364. https://doi.org/10.1177/0266242619893938.

Isoherranen, V. and Ratnayake, R.M.C. (2018) "Performance assessment of microenterprises operating in the Nordic Arctic region", *Journal of Small Business & Entrepreneurship*, Vol. 30, No. 5, pp 431–449.

Jokela, H., Niinikoski, E.R. and Muhos, M. (2015) "Knowledge dynamics and innovation: case studies in a sparsely populated area", *International Journal of Innovation and Learning*, Vol. 17, No. 2, pp 234–253.

Kelliher, F., Mellett, S., and Harrington, D. (2020) "Enablers of green innovation in the micro-firm—perspectives from Ireland and Canada", Journal of Small Business & Entrepreneurship, Vol. 33, No. 3, pp 1–20. DOI.10.1080/08276331.2020.1789826

Koryak, O., Mole, K.F., Lockett, A., Hayton, J.C., Ucbasaran., and Hodgkinson, G.P. (2015) "Entrepreneurial leadership, capabilities, and firm growth", *International Small Business Journal,* Vol. 33, No. 1, pp 89–105.

Lajqi, S., and Krasniqi, B. A. (2017) "Entrepreneurial growth aspirations in challenging environment: The role of institutional quality, human and social capital", Strategic Change, Vol. 26, No. 4, pp 385–401. doi:10.1002/jsc.2139.

Lin, Y., Chen, C., Chao, C., Chen, W., and Pandia, H. (2020) "The Study of Evaluation Index of Growth Evaluation of Science and Technological Innovation Micro-Enterprises", Sustainability, Vol. 12, No. 15, pp 1–25. https://doi.org/10.3390/su12156233.

Mahmutaj, L.R. and Krasniqi, B. (2020) "Innovation types and sales growth in small firms: evidence from Kosovo", *South East European Journal of Economics and Business*, Vol. 15, No. 1, pp 27–43.

Marom, S., Lussier, R., and Sonfield, M. (2019) "Entrepreneurial strategy: The relationship between firm size and levels of innovation and risk in small businesses", Journal of Small Business Strategy, Vol. 29, No. 3, pp 33–45.

O'Dwyer, M. and Eamon, R. (2000) "Management development issues for owners/managers of micro-enterprises." *Journal of European Industrial Training*, Vol. 24, No. 6, pp 345–353.

Martín-García, R. and Morán Santor, J. (2019) "Public guarantees: A countercyclical instrument for SME growth. Evidence from the Spanish Region of Madrid", Small Business Economics, Vol. 56, No. 1, pp 1–23. https://doi.org/10.1007/s11187-019-00214-0.

OSF - Official Statistics of Finland (2021) *"Regional statistics on entrepreneurial activity"*, Statistics Finland, Helsinki.

Patton, M.Q. (2002) *Qualitative Research & Evaluation Methods*, Sage Publications Inc., Thousand Oaks.

Roper, S. and Hewitt-Dundas, N. (2017) "Investigating a neglected part of Schumpeter's creative army: what drives new-to-the-market innovation in micro-enterprises?", *Small Business Economics*, Vol. 49, pp 559–577.

Räisänen, J. and Tuovinen, T. (2020) "Digital innovations in rural micro-enterprises", *Journal of Rural Studies*, Vol. 73, pp 56–67.

Štavlić, K., Funarić, M., and Galić, K. (2020) "Microentrepreneurs´ Innovation", *Proceedings of FEB Zagreb International Odyssey Conference on Economics and Business*, Vol. 2, No. 1, pp 696–705.

Taipale-Erävala, K., Henttonen, K., and Lampela, H. (2017), "Entrepreneurial competencies in successful innovative SMEs", *International Journal of Entrepreneurship and Small Business*, Vol. 38, No. 3, pp 251–276.

Taneja, S., Pryor, M.G., and Hayek, M. (2016) "Leaping Innovation Barriers to Small Business Longevity", Journal of Business Strategy, Vol. 37, No. 3, pp 44–51.

Thapa, A. (2015) "Determinants of microenterprise performance in Nepal", *Small Business Economics*, Vol. 45, No. 3, pp 581–594.

Tidd, J., Bessant, J., and Pavitt, K. (2001) *Managing Innovation*, John Wiley & Sons, New York.

van Aswegen, M., and Retief, F. P. (2020) "The role of innovation and knowledge networks as a policy mechanism towards more resilient peripheral regions", *Land use policy*, Vol. 90, No. 11, pp 1–12.

Tyni, E. (2020) *Student Experiences of Development Work with Microenterprises*, Bachelor's thesis of Laurea UAS, Espoo.

Viljamaa, A. (2011) "Exploring small manufacturing firms' process of accessing external expertise", *International small business journal*, Vol. 29, No. 5, pp 472–488.

Wyer, P., Mason, J., and Theodorakopoulos, N. (2000) "Small business development and the "learning organization"", *International Journal of Entrepreneurial Behaviour and Research*, Vol. 6, No. 4, pp 239–259.

Yin, R.K. (2009) *Case Study Research: Design and Methods*. 4th ed., Sage, Thousand Oaks.

Ylitalo, J. (2010) *Resources and growth orientation as predictors of firm growth,* Master's thesis of Aalto University, Helsinki.

Learning in a Real-World Context and Exploring Innovative Digital Learning Environments

Lea Oksanen
LUT, University Finland
lea.oksanen@lut.fi
DOI: 10.34190/EIE.21.190

Abstract: The objective of this paper is to address the role a social agency may have in supporting teachers beyond school borders in their quest for real-world working life connections for learners. According to OECD research, entrepreneurship education (EE) activates learners with the competences and equips them with the necessary skills and knowledge for their future working life in the changing world. It supports the learners' agency and ability to act upon opportunities and ideas and converts them into value for others. Recent studies show that facing the challenge of a rapidly changing environment, teachers' capacity to carry out entrepreneurship education in a real-world context is decisive for learners. This case study presents how a competent external entity plays a social agency role by offering virtual company visits, and thus supporting teachers beyond school borders in their quest for real-world working life connections for learners. The role of social agency assisting teachers in their digital EE practices warrants for further studies.

Keywords: entrepreneurship education, digital learning, working life orientation, real-world learning context experiences

1. Introduction

Entrepreneurship education (EE) flourishes in the real-world context. EE introduces students to working life knowledge and increases their competence (Bacigalupo et al, 2015) at responding to the real-life challenges outside school. It opens the students' eyes to the skills, mindsets and knowledge required in their future jobs. It encourages schools to co-operate with the surrounding community, organisations and even digitally.

When the learning takes place outside the school context or is based on external coursework or assignments, it is EE in the real-world context. A huge shift towards digital learning is challenging as it transforms the learning environment. Similarly, a huge shift in teachers' role – shifting from the traditional lecturers to enablers and facilitators – takes place in applying EE practices, especially in a digital environment. The digitalisation of EE can be seen as an obscurity to get through or an occasion with ample opportunities to leap forward (Ratten and Jones, 2020) as in the case of engaging an outside entity, a national NGO acting as a social agent in arranging virtual company-visits for learners nationwide.

2. Literature review

To respond to the policy initiatives, this case study presents how the social agency of an outside entity may support teachers and schools with the digital teaching of EE (Ratten and Jones, 2020). It recognises the importance of social agency (Shapiro, 2005) and its support role in facilitating crossing work and school boundaries (Collinson et al, 2009) via arranging virtual workplace visits for learner to attend digitally. Referring to the essence of social agency as it stands according to White (1985), this case presents the idea that an outside entity from beyond school borders may act as an agent in an agency relationship and may act on behalf of another (Shapiro, 2005) in a supporting role to assist organisations and their members in their actions or activities. According to Shapiro (2005), in this context, schools represent organisations with teachers and principals representing their members, whereas the agency assists collaboration beyond the school borders and offers low threshold, free of charge digital-learning opportunities accessible nationwide.

Agency, as Mitnick argued (1998, p. 12), is simply 'a general social theory of relationships of "acting for" or control in complex systems'. Of course, this statement differs from the original economic theory of agency as it does not include the direct fiduciary element. The original economic agency theory entails costs, incentives, and economic fiduciaries; however, in this article, social agency refers to the work of Mitnick (1998, p. 12; 1992, p. 76), showing the links between agency in a social context and enhancing the EE in a real-life context.

Agency relationships are divided in two by Mitnick's (1998) observations: 'the activities and problems of identifying and providing services of "acting for" (the agent side), and the activities and problems of guiding and correcting agent actions (the principal side)'. The role of social agency in this case goes to a Finnish national NGO supporting teachers in their quest to pursue the curricula guidelines of work-based learning during the Covid-19

restrictions. The NGO identifies the problem of how to arrange work-oriented practical training or an on-site visit (which are required by the national curriculum) in the prevailing Covid-19 situation.

To respond to the needs of teachers a virtual distance-learning workplace visit was created. The case study presents how the social agent – in this case, the NGO – recognised the need for action. It acted for the teachers by supporting them to fulfil the curricula requirements regarding working life orientation. The study highlights how crossing work and school boundaries (Tynjälä, 2008) can be supported digitally by social agency (White, 1985; Mitnick, 1998; Shapiro, 2005). Furthermore, it shows how digital EE learning environments can be enhanced (Ratten and Jones, 2020) by social agency in real-world situations where lockdowns prevented any physical crossing of school and work boundaries (Collinson et al, 2009) and made the virtual option at hand the only possibility. Most countries in the European Union have launched national strategies for EE in general schooling (Pepper, 2011; Lackéus, 2013).

A sudden change in learning conditions and the prevailing Covid-19 conditions EE can be seen as an opportunity to seek new opportunities which others may not yet have recognised (Shane and Venkataraman, 2000) in a learning environment. In the case study an outside-of-school entity served its social agency purpose of supporting teachers and responding to the need to organise virtual visits in Finland. Shapiro (2005) referred to this kind of entity as a social agent; here, the entity saw a unique opportunity for creating online virtual company visits that were open to all, nationwide. This approach highlights two impressive factors related to discovering entrepreneurship: recognising it and acting upon it (Shane and Venkataraman, 2000).

3. Context

The world witnessed profound changes in communication technology during the last half of the twenty-first century (Collinson et al, 2009). The current prevailing conditions of Covid-19, on top of the massive ongoing revolution of communications technology, lead to rethinking how people learn and how 'knowledge society' needs 'knowledge workers' and 'citizens of the world' (Drucker 1959, 1993; see also Collison et al, 2009).

In 2020, all organisations (including schools) were forced to adapt fast to unforeseen circumstances. The OECD (2020) calls for the accessibility of international collaboration to share open, online educational resources and digital learning platforms and to encourage technology companies to join this effort. Yet, at the same time, the process of global collaboration that aims to foster educational innovation is still in its infancy. The OECD report (2020) ensured that it is possible to enhance digital learning opportunities for teachers and encourage teacher collaboration beyond school borders.

It is worthy to mention that the prevailing condition of curricula in Finland roots EE in all education levels, from basic education to tertiary education (Oph, 2018). The cross-curricular theme of EE promotes teaching practices across any given subject lines. In addition, it highlights the importance of work-oriented learning. It also points out that the teachers' professionalisation, in terms of their autonomy in the classroom in Finland, stands out. The teacher is independent and free to make choices about how to teach within his or her classroom if the way he or she teaches fulfils the curricula framework demands in any given situation.

EE in a real-world context crosses work and school boundaries (Tynjälä, 2008) with the aim to familiarise the school with the real world outside. Prior to the pandemic crisis, debate on the importance of EE practices in schools across all education levels was increasing in Europe and worldwide (OECD, 2015; 2018). Aligned with both the specific objectives of the European Union working programme that focuses on the future of work in the European Union (EU Council Recommendation, 2018) and the changing needs of the future workforce, competent EE plays a significant role in learning.

4. Real-world work orientation

This case study describes how teachers may benefit from fast-acting social agency in a real-world context regarding crossing work and school boundaries (Tynjälä, 2008). The social agency supports teachers in the work orientation of students, supporting them to become familiar with authentic real working life within the surrounding society. At the same time, the social agency networks support the requirement of the Finnish national curricula that calls for work orientation regardless of the learners' age levels.

In addition, the aim of EE is to encourage schools to co-operate with the surrounding community, companies, institutions, and organisations, and to bring the opportunities to the classroom or home school digitally. Learning happens outside the school context or is based on external coursework or assignments (Tynjälä, 2008).

The previous EE research emphasises the importance of a student as an agent of his or her own learning (Garnett, 2012). EE places learners as agents of their own learning processes by being active in the process (Ruskovaara, 2014; Garnett, 2013; Birdthistle et al, 2007). This expands a teacher's role from his or her specialisation to being a facilitator (Foliard et al, 2018) of real-world contacts and interactions. Furthermore, the teacher serves as an enabler of active learning; learning by doing involves actions, especially when students are solving authentic, real-world problems.

The teacher's role in EE is that of an enabler and facilitator instead of that of a centre-stage lecturer. The digital era may widen the schools operating culture from only participating in its surrounding area to even participating worldwide. EE stresses the awareness and knowledge of the present working life demands. EE encourages the teacher to actively follow and respond to the current work force demand or wider societal challenges. A digital leap can even take learning to an international arena.

5. Entrepreneurship education in the real-world context

EE encourages teachers to work with real-world contacts. The real-world stories and narratives allow students an opportunity to reflect and identify the successes, innovations, values created and, at the same time, the challenges that real-world entrepreneurs encounter in their work. Entrepreneurship stories from real-world cases lead the learner to analytical and creative thinking (Ruskovaara, 2014; Gartner, 2007; Fletcher, 2007; Shepherd, 2004). Today's digital technologies enable hearing the entrepreneurship stories in a real-time sequence.

The real-world project work assignments enable learners to carry out activities themselves (Ruskovaara and Pihkala, 2013), placing teachers in the background as facilitators or coaches. Project work assignments from real enterprises have resulted in positive outcomes (Cooper et al, 2004; Pittaway and Cope, 2007; Solomon, 2007; Richardson and Hynes, 2008; Ruskovaara and Pihkala, 2014). The authentic company assignments also enable learners to develop their communication skills and nurture the preparedness that is necessary for collaboration (Garnett et al, 2016). Furthermore, authentic experience develops the resilience to cope with uncertainty, and strengthens problem-solving skills and understanding of controlled risks (Ruskovaara and Pihkala, 2014). With the present advanced technology, these skills also need to be practiced digitally.

Authentic business idea assignments deepen the action, communication, and networking skills of the learner. Business idea assignments in a real-world context are widely used in EE (Gibb, 2002; Neck and Greene, 2011). The usefulness of authentic learning settings has been highlighted by researchers (Powell, 2013; Neck and Greene, 2011) as they often involve an experimental learning approach (Kolb, 1984). All the authentic project works with a real-world context allow students to actively engage in design, implementation, and collaboration, as well as engage in networking and communication in teams. Yet again, this is possible with advanced digital learning environments.

The real-world context and work assignments in learning allow students to experience uncertainty and ambiguity, as well as to take and measure risks (Powell, 2013) to reach their objectives individually or collectively as a group. Upon completion of project work of any sort, the most important aspect is the learners' reflection on their successes and failures as a learning lesson.

Current research verifies that companies are authentic learning environments in which to enhance learning (Cope and Watts, 2000; Cope, 2005; Matlay and Carey, 2007; Draycott and Rae, 2011; Powell, 2013; Ruskovaara et al, 2017), and at the same time, they can enhance students' understanding and reflection of the society they live in. With lockdowns, digital visits to companies can give a close simulation of reality.

6. Method

Qualitative research in a case study format was selected by the researcher to resemble real-life situations during the prevailing pandemic situation and its multiple wealth of details in two respects (Flyvbjerg, 2006, p. 223): the prevailing curricula and the social agency of an outside entity to support teachers during the pandemic. First, it

is important for the development of a nuanced view of the reality that human behaviour cannot meaningfully be simply understood as rule-governed acts (Flyvbjerg, 2006). Second, the concrete proximity to the studied reality and observation of the action under study (Flyvbjerg, 2006) can contribute to holistic learning about the unabridged phenomenon.

The case study method was chosen by the researcher to depict how social agency works for teachers in need of support (White, 1985; Mitnick, 1992; 1998; Shapiro, 2005) in applying a real-life working orientation to learners. It observes virtual work visits as an innovative social agency that supports teachers. Further, the project coordinator of Tralla.fi was interviewed.

7. Findings

This case study concentrates on an NGO called Economy and Youth (hereafter, TAT). It is a national influencer in Finland that helps young people develop their skills in economy as well as working life and get excited about entrepreneurship.

TAT's mission is to provide a bridge to the future. The working life and economy skills of young people are at the heart of TAT's operations. TAT's values are effectiveness, being inspiring, being pioneering and being responsible. TAT's operations are financed, for example, by the Confederation of Finnish Industries (EK), the Ministry of Education and Culture, municipalities, companies, and other foundations. Tralla.fi is one of TAT's many services.

Tralla.fi carried out four virtual visits targeted to learners of primary school, upper secondary school, and a secondary school. The webinars were conducted on the selected platform, operated by Stremia company. The platform was chosen because it offers easy access to teachers and students – they can join a company visit by simply clicking one link on the Tralla.fi website. Participation did not require pre-registration or membership.

The emergency state caused by Covid-19 led to the need for digitally organised real-world visits. The Tralla.fi service started receiving concerns from teachers and schools that company visits and practical training internships were impossible to arrange due to lockdowns. Teachers expressed their concern about what to do and how to organise practical trainee positions for learners. In addition, teachers and schools were suddenly in a situation where teaching the pupils and students had to be carried out remotely and digitally.

The prevailing circumstances during the lockdowns sparked the innovative action of the outside entity. Tralla.fi launched a new innovative strategy that responded to the demand and need of schools and teachers to implement business cooperation during the pandemic. The innovative idea of virtual real-world company visits was originated. TAT, with its Tralla.fi service, acted fast regarding the opportunity and was responsible for the design, implementation, and dissemination of virtual visits together with its partners and networks.

The digital implementation made it possible for all learners to extensively attend the virtual visits from different cities and municipalities all over Finland. Recordings of the visits were also made available, for the use of schools afterwards.

Four different virtual real-life company visits, in authentic learning settings (Powell, 2013; Neck and Greene, 2011), were organised, executed, and moderated by Tralla.fi.

The first visit was carried out together with a collection agency, Perintäritari Oy (perintaritari.fi). The theme was focused on learners from primary school and up. It concentrated on managing one's finances and on the responsibility, economy and decision-making involved in money spending. Practicing from early on will develop the learner's mindset towards finding new opportunities in a context and, furthermore, develop it towards the idea of new value creation (Blenker, 2011).

The second visit was aimed at the upper secondary school age learners. Kesko is a good-sized grocery and consumer goods market chain with 1800 markets in eight countries, headquartered in Finland. The theme of the visit was sustainable development with the Kesko ongoing campaign of actions against climate change. It addressed how Kesko deals with environmental concerns by producing and using solar energy in its premises. It raised awareness how entrepreneurial, active and customer value-creating working-life skills are valued in the

company (Kuratko, 2005; Lackeus, 2013; EC Education and Training, 2018; Seikkula-Leino et al, 2010; Fiet, 2007a: Löbler, 2006; Jones, 2010; Garnett, 2012).

The third visit was carried out in collaboration with Fennia Mutual Insurance Company (Fennia.fi, hereafter, Fennia). Fennia is a sizable insurance provider in Finland. The visit was directed to upper secondary school learners. The topic concentrated on future trends in working life and entrepreneurship, as well as on diversity and the ability to seize entrepreneurial opportunities.

The fourth virtual visit introduced a serial entrepreneur, start-up representative Johannes Laine (Johanneslaine.fi). The entrepreneur was invited to take part in a discussion in person (Pittaway and Hannon, 2008; Shepherd, 2004; Solomon, 2007), in a studio. He presented his entrepreneur story (Ruskovaara, 2014; Gartner, 2007; Fletcher, 2007; Shepherd, 2004) in the pandemic era with business ups and downs, his story ranging from starting with an ice-cream stand and ending up with 12 companies and four bankruptcies. All the students were encouraged to discuss and think about their life principles to see if becoming an entrepreneur could be an option for them in the future. The real-life example was aimed to augment the student's ability to handle the diversity and complexity of common issues in an entrepreneur's life (Blenker, 2011), for example, teamwork, time management and profitability.

All four virtual work visits took place in the school year 2020–2021. Their content was aligned with the EE research literature. The length of all virtual visit was one hour. The tuition included a company representative's presentation, learner-centred and activating tasks, and panel discussions on the theme. Learners were able to engage themselves by asking questions or giving comments via real-time chat channels to reflect their experiences simultaneously.

The delivery method of the virtual visit was open access by informed decision. The aim was to set up a transparent virtual company visit that is open to any teacher or learner anywhere in Finland despite their geographical location. Providing an open access format and an open internet link emphasized the principles of equality, inclusivity, and accessibility. Not requiring pre-registration but simply allowing access via a single internet link automatically enhanced the transparency and lowered the threshold of teachers' attendance with their learners in the classroom or in-home classes.

Links to virtual visits were opened 270 to 549 times in the four one-hour visits all over Finland, proving the success of the initiative. The process ensured that all the visitors had equal access from their computer screens, regardless of their location. Learners and teachers participated in the virtual visits via an easy link, either via the teacher's computer or via a home computer. Further assignments after a visit are available to enhance more positive outcomes (Cooper et al, 2004; Pittaway and Cope, 2007; Solomon, 2007; Richardson and Hynes, 2008; Ruskovaara and Pihkala, 2014).

8. Discussion

An outside entity that is inclined to support EE may serve as an effective social agency and provide resources for teachers in their application of entrepreneurship education. The outside entity here, a national NGO called TAT and its Tralla.fi service in Finland, first recognised an opportunity to create virtual work visits for learners. It acted fast upon the idea (Shane and Venkataraman, 2000) by applying an experimental learning approach (Kolb, 1984) and organising four different open, virtual company visits for learners. In this article, TAT is referred to as a social agency that supports EE learning without any reimbursement elements. Useful, authentic learning settings (Powell, 2013; Neck and Greene, 2011) were created innovatively, by organising digital working visits. The learning took place in a digital distance learning format.

This case study demonstrates that a competent entity from beyond school borders may act as an effective social agency. In the same way, as White (1985, p. 188) refers to social agency as 'a neat kind of social plumbing' that can solve the dilemma, the action taken by the NGO solves teachers' dilemma of organizing real-life work visits in digital environment when classrooms are closed. Further the action of an NGO as social agent solves teachers' problem how to fulfil the curricula requirements of the authentic working life orientation, when learning only takes place in a distance mode. Here, as explained earlier, the social agency diverges from the original agency theories that have fiduciary relationships. In this study social agency only refers to collaboration.

It was not possible to collect systematic, direct feedback from the participants in the virtual visits due to having chosen an open access format without registration. However, some feedback received by email reflect the outcome positive and rewarding:

- I was involved in the monetary-themed excursion, and it was a great event!
- The idea [of a virtual business visit] is nice; with a slightly more pedagogical approach, this would be great!
- Please arrange more virtual visits.

9. Conclusion

This study proves that a competent outside entity to act as a social agency in the niche of supporting teachers in their EE activities. The study highlights that a social agency must be competent and elastic enough to support teachers with innovative action and to collaborate nationally with the operators, the teachers. This case presents how an outside entity was able to act fast in a highly demanding Covid-19 situation. It sought a suitable strategy and digital solution to the provision of virtual work visits for all learners equally, inclusively, and accessibly. The case study demonstrates how a simple process of collaboration between an agency and operators at a right moment fosters educational innovation. It indicates that a social agency may have an important role in delivering entrepreneurial learning in a digital environment to serve the needs of twenty-first century teachers (OECD, 2020).

10. Limitations

As the virtual visits are new phenomena in real work learning and number of events are limited, similarly as the digital methodology of their arrangement, thus further research is recommended. Alike as social agency aspect in assisting teachers digitally in their EE warrants further research.

References

Bacigalupo, M., Kampylis P., Punie Y. and Van den Brande, G. (2006) EntreComp: The Entrepreneurship Competence Framework, Luxembourg: Publication Office of the European Union; EUR 27939 EN; DOI:10.2791/593884

Birdthistle N., Hynes B. and Fleming P. (2007) "Enterprise education programmes in secondary schools in Ireland: A multi-stakeholder perspective", Education + Training, Vol. 49, No. 4, pp 265–276. http://dx.doi.org/10.1108/00400910710754426

Blenker, P., Korsgaard, S., Neergaard, H. and Thrane, C. (2011) "The questions we care about: Paradigms and progress in entrepreneurship education", Industry & Higher Education, Vol. 25, pp 417–427.

Collinson, V., Kozina, E., Lin. Y-H K., Ling, L., Matheson, I., Newcombe, L. and Zogla, I., (2009) "Professional development for teachers: a world of change", European Journal of Teacher Education, Vol. 32, No. 1, pp 3–19, DOI: 10.1080/02619760802553022

Cooper, S., Bottomley, C. and Gordon, J. (2004) "Stepping out of the classroom and up the ladder of learning. An experiential learning approach to entrepreneurship education", Industry & Higher Education, Vol. 18, No. 1, pp 11–22.

Cope, J. (2005) "Toward a dynamic learning perspective of entrepreneurship", Entrepreneurship Theory and Practice, Vol. 29, No. 4, pp 373–397.

Cope J. and Watts, G. (2000) "Learning by doing – an exploration of experience, critical incidents and reflection in entrepreneurial learning", International Journal of Entrepreneurial Behaviour and Research, Vol. 6, No. 3, pp 104–124.

Draycott M. and Rae, D. (2011) "Enterprise education in schools and the role of competency frameworks", International Journal of Entrepreneurial Behavior & Research, Vol. 17, No. 2, pp 127–145.

Drucker, P. F. (1959) Landmarks of tomorrow, New York: Harper. [Google Scholar]
Drucker, P. F. (1993) Post-capitalist society, New York: HarperCollins. [Google Scholar]

EC Education and Training (2018). Council Recommendation of 22 May 2018 on key competences for lifelong learning (Text with EEA relevance.) ST/9009/2018/INIT OJ C 189, 4.6.2018, p. 1–13. Retrieved on 23.05.2021

Fiet, J.O. (2001a) The theoretical side of teaching entrepreneurship. Journal of Business Venturing, Vol. 16, No. 1, pp 1–24.

Fletcher, D. (2007) "Toy Story": The narrative world of entrepreneurship and the creation of interpretive communities. Journal of Business Venturing, Vol. 22, pp 649–672.

Flyvbjerg B., (2006) Five Misunderstandings about Case-Study Research, Qualitative Inquiry, Vol. 12, No. 2, pp 219–245.

Foliard, S., Pontois, S., Fayolle, A. and Diermann, I. (2018) The Legitimacy of Teachers in Entrepreneurship Education: What We can Learn from a Literature Review, in Higgins, D., Jones, P. and McGowan, P. (Eds.) Creating Entrepreneurial Space: Talking Through Multi-Voices, Reflections on Emerging Debates (pp 7–23). (Contemporary Issues in Entrepreneurship Research, Vol. 9A), Emerald Publishing Limited.

Garnett, J., Abraham, S. and Abraham P. (2016) "Using work-based and work-applied learning to enhance the intellectual capital of organization", Journal of Work-Applied Management, Vol. 8, No. 1, pp 56–64.

Garnett J. (2013) “Enterprise pedagogy in music: an exploration of multiple pedagogies”, Music Education Research, Vol. 15, No. 1, pp 1–18. https://doi.org/10.1080/14613808.2012.703175

Gartner, W.B (2007) “Entrepreneurial narrative and a science of the imagination”, Journal of Business Venture, Vol. 22, pp 613–627.

Gibb, A. (2002) “In pursuit of a new ‘enterprise’ and ‘entrepreneurship’ paradigm for learning: creative destruction, new values, new ways of doing things and new combinations of knowledge”, International Journal of Management Reviews, Vol. 4, No. 3, pp 233–269.

Ruskovaara, E. (2014) Entrepreneurship Education in Basic and Upper Secondary Education – Measurement and Empirical Evidence Ph.D. thesis, Lappeenranta University of Technology, Finland

Kolb, D.A. (1984) Experiential learning: experience as the source of learning and development. Englewood Cliffs, NJ: Prentice Hall.

Kuratko, D.F. (2005) “The Emergency of Entrepreneurship Education: Development, Trends, and Challenges”, Entrepreneurship Theory and Practice, Vol. 29, No. 5, pp 577–597.

Lackeus, M., (2013) Developing Entrepreneurial Competencies: An Action-Based Approach and Classification in Education, Division of Management of Organizational Renewal and Entrepreneurship, Department of Technology Management and Economics, Chalmers University of Technology, Gothenburg, Sweden

Löbler, H. (2006) “Learning entrepreneurship from constructive perspective”, Technology Analysis Strategic Management, Vol. 18, pp 19–38.

Matlay H. and Carey, C., (2007) “Entrepreneurship education in UK: a longitudinal perspective”, Journal of Small Business Enterprise and Development, Vol. 14, No. 2, pp 252–263.

Mitnick B.M. (2015) Agency Theory, Business Ethics, Vol. 2. https://doi.org/10.1002/9781118785317.weom020097

Mitnick B.M. (1984) Agency problems and political institutions. Presented at Annu. Meet.Am. Polit. Sci. Assoc., 80th, Chicago.

Mitnick B.M. (1992) The theory of agency and organizational analysis. In Ethics and Agency Theory, ed. Bowie NE and Freeman RE, pp 75–96. New York: Oxford Univ. Press

Mitnick BM. 1998. Agency theory. In The Blackwell Encyclopedic Dictionary of Business Ethics, ed. Freeman, RE and Werhane, PH, pp 12–15. Malden, MA: Blackwell.

Jones, C. (2010). “Entrepreneurship Education: Revisiting our role and purpose”, Journal of Small Business and Enterprise Development, Vol. 17, pp 500–513

Neck, H.M. & Greene P.G. (2011) “Entrepreneurship education: Known worlds and New Frontiers”, Journal of Small Business Management, Vol. 49, No. 1, pp 55–70.

OECD. (2018). The future of education and skills education 2030: The future we want, Resource document. Organisation for Economic Cooperation and Development. Retrieved July 10, 2020, from https://www.oecd.org/education/2030/E2030%2520Position%2520Paper%2520(05.04.2018).pdf. Retrieved 23.5.2021

OPH/Opetus-ja kulttuuriministeriö 2018. Koulutuksen yrittäjyyslinjaukset. Retrieved on http://minedu.fi/yrittajyyslinjaukset on 23.5.2021

OECD. (2015). From creativity to initiative, building entrepreneurial competencies in schools, Entrepreneurship360 guidance note for: Policy makers. Resource document. Retrieved July 2, 2020, from https://www.oecd.org/employment/leed/E360-guidance-note-policy-makers.pdf. Retrieved March 21, 2021.

OECD. (2018). The future of education and skills education 2030: The future we want, Resource document. Organisation for Economic Cooperation and Development. from https://www.oecd.org/education/2030/E2030%2520Position%2520Paper%2520(05.04.2018).pdf. Retrieved March 21, 2021

OECD (2021), "Barriers to professional development for early childhood education and care centre leaders: Percentage of ECEC centre leaders who reported that they “agree” or “strongly agree” with the following barriers to professional development", in Building a High-Quality Early Childhood Education and Care Workforce: Further Results from the Starting Strong Survey 2018, TALIS, OECD Publishing, Paris, https://doi.org/10.1787/6db638d9-en. Retrieved March 21, 2021.

Pepper, D. (2011) “Assessing Key Competences across the Curriculum — and Europe”, European Journal of Education, Special Issue: Key Competences in Europe, Vol. 46, No. 3, pp 285–432. Special Issue: Key Competences in Europe https://doi.org/10.1111/j.1465-3435.2011.01484.x Retrieved March 21, 2021.

Pittaway, L. and Hannon, P. (2008) “Institutional strategies for developing enterprise education. A review of some concepts and models”, Journal of Small Business and Enterprise Development, Vol. 15, pp 202–226.

Pittaway, L. and Cope, J. (2007) Simulating entrepreneurial learning: Integrating experiential and collaborative approaches to learning. Management and learning, Vol. 38, pp 211–233.

Powell B.C. (2013) “Dilemmas in Entrepreneurship pedagogy”, Journal of Entrepreneurship Education, Vol. 16, pp 99–112.

Ratten V. and Jones P. (2020) “Covid-19 and entrepreneurship education: Implications for advancing research and practice”, International Journal of Management Education, Vol. 21, No. 1: 100432, doi: 10.1016/j.ijme.2020.100432.

Richardson, I.and Hynes, B. (2008) “Entrepreneurship education: Towards an industry sector approach”, Education C Training, Vol. 50, pp 188–198.

Ruskovaara, E.and Pihkala, T. (2013) “Teachers implementing entrepreneurship education: classroom practices”, Education+ training, Vol. 55, No. 2, pp 204–216.

Ruskovaara E. and Pihkala T. (2014) “Education in Schools: Empirical Evidence on the Teacher's Role”, The Journal of Educational Research, Vol. 108, No. 3, pp 236–249.

Shane, S. and Venkataraman, S., (2000) “The promise of entrepreneurship as a field of research”, Academy of management review, Vol. 25, No. 1, pp 217–226.

Shapiro S. P. (2005) “Agency Theory”, Annual Review of Sociology, Vol. 31, No. 1, pp 263–284 annualreviews.org/doi/abs/10.1146/annurev.soc.31.041304.122159.

Shepherd, D. A. (2004). “Educating entrepreneurship students about emotion and learning from failure”, Academy of Management Learning and Education, Vol. 3, pp 274–287.

Seikkula-Leino, J., Ruskovaara, E., Ikävalko, M., Mattila J., and Rytkölä, T. (2010). ”Promoting entrepreneurship education: the role of the teacher”, Education and Training, Vol. 52, No. 2, pp 117-127.

Solomon, G. (2007) “An examination of entrepreneurship education in the United States”, Journal of Small Business and Enterprise Development, Vol. 14, pp 168–182.

Sommarström, K, Ruskovaara E., & Pihkala, T. (2017). ”Company visits as an opportunity for entrepreneurial learning”, Journal for International Business and Entrepreneurship, Vol. 10, No. 3, pp 298–315 DOI: 10.1504/JIBED.2017.085505.

Stremia Oy, https://stremia.fi/ Retrieved on 6.2.2021

Tralla.fi virtuaalinen yritysvierailu Perintäritari Oy: https://tralla.fi/tuotekortit/virtuaalinen-yritysvierailu-perintaritari-oylle/ Retrieved on 23.05.2021.

Tralla.fi virtuaalinen yritysvierailu Fenniaan: https://tralla.fi/tuotekortit/virtuaalinen-yritysvierailu-fenniaan/ Retrieved on 23.05.2021.

Tralla.fi Virtuaalinen yritysvierailu Keskolle: https://tralla.fi/tuotekortit/virtuaalinen-yritysvierailu-keskolle/ Retrieved on 23.05.2021.

Tralla.fi Yrittäjävierailu Johannes Lainen: https://www.mediaserver.fi/live/trallayrittajavierailu/ Retrieved on 23.05.2021

Tynjälä, p. (2008). “Perspectives into learning at the workplace”, Educational Research Review, Vol. 3, No. 2, pp 130–154 https://doi.org/10.1016/j.edurev.2007.12.001

White HC. 1985. Agency as control. See Pratt & Zeckhauser 1985, pp 187–212.

Online Consumer Behaviour: Opportunities and Challenges for the Elderly

Michael Olumekor and Sergey Polbitsyn
Ural Federal University, Ekaterinburg, Russia
Molumekor@urfu.ru
s.n.polbitsyn@urfu.ru
DOI: 10.34190/EIE.21.027

Abstract: Humans are living longer than ever before, and people above 65 are the fastest growing age group in the world. However, while technological progress, the proliferation of the internet and business innovation – among other factors – have inspired other age groups to increasingly adopt e-commerce, this has not been the case for elderly people, particularly those in Russia. This paper is a literature review examining the existing literature on the challenges elderly people face in buying and selling goods and services online. It connects existing data on the consumption patterns in Russia with the leading theories on consumer behaviour, and narrows it down to contemporary research on the elderly. Among other factors, this paper found that Russian elderly consumers and small entrepreneurs continue to prefer brick-and-mortar companies to e-commerce. Difficulty with verifying a product's quality, problems with navigating complex websites, a fear of making financial transactions online, and a fear of receiving counterfeit products are some of the main factors contributing to this. Furthermore, this paper also found that companies currently fail to target elderly customers compared to other market segments, thereby failing to make their online platforms responsive to the specific needs of the elderly. However, there remains a significant gap in existing literature on the consumer behaviour of elderly people in e-commerce. And research specific to Russian elderly entrepreneurs remains limited. Moreover, leading theories on consumer behaviour are also less relevant to elderly consumers in a digital age. This presents additional opportunities for further research. The current COVID-19 pandemic which has disproportionately affected older people has placed a greater urgency on this research. Therefore, the outcome will be relevant to policy makers and political leaders worried about reducing the fatality rate of the pandemic while boosting economic growth, and for businesses trying to innovate web-platforms to increase turnover. It will also be a crucial contribution to the existing literature on elderly consumer and entrepreneurial behaviour.

Keywords: e-commerce, consumer behaviour, elderly research, Russian economy, entrepreneurship

1. Introduction

Cheaper internet, affordable smart phones and popular internet services have increasingly meant we are now spending more time online than ever before. Data from Hootsuite and We Are Social (2019) shows people around the world spend an average of 6 hours and 42 minutes online every day. For Russia it is 6 hours and 29 minutes. This number is expected to have significantly increased during the Covid-19 lockdowns as more people turned to social media to find meaning (New York Times, 2020). This huge growth in internet adoption has enhanced e-commerce, and presents an unprecedented opportunity for businesses, policy makers and customers.

However, while e-commerce has brought about a different level of shopping experience for people of all ages, younger adults have dominated other age groups. They participate more in internet shopping, and companies have always targeted them as primary potential customers (Bucko et al, 2018; Pandey & Parmar, 2019; Rahman et al., 2018). This fact has meant older adults – people above age 65 – have in many cases been treated as afterthoughts in the design, creation and marketing of most online shopping platforms. Besides, elderly small business owners are also less likely to sell products online.

While it might seem pragmatic for companies to concentrate resources on younger adults, a closer look shows that companies are missing out on a very big business opportunity with the elderly. People above 65 are the fastest growing demographic in the world and they comprise a large portion of the population of many countries. For instance, in 2019 about 703 million people were aged 65 and older in the world, and in Russia it was 21.7 million (World Bank, 2019). By 2050 the number of people above 65 is projected to almost double in size, reaching 1.5 billion globally (United Nations, 2019). Furthermore, in many countries people above 65 are among the most financially stable and they are also more likely to own properties. As many developed societies move closer to ageing populations, it will become more difficult for online businesses to continue excluding this group from their target plans.

1.1 E-commerce and the elderly

About 25% of the global population engage in some form of internet shopping. This figure is growing exponentially and is projected to exceed 2.14 billion people in 2021 (Law, 2019). People across all age groups are increasingly buying things online for a number of reasons, including convenience and a faster shopping experience, among others (Pandey & Parmar, 2019; Vasic et al., 2019). The increasing popularity of e-commerce coupled with the Covid-19 pandemic has placed a greater urgency on business to provide better online shopping experiences for people of all age groups, including the elderly. This represents a significant shift from several years ago when older adults were often regarded as a tech-phobic group e-commerce retailers could not penetrate (Lian & Yen, 2014). Companies often ignored advertising to the elderly and were convinced social networking websites, smartphone advertisement, and e-commerce were out of their reach (Smith, 2019).

For the Russian elderly, there are clear differences in their shopping habits compared to younger adults. Recent data from Deloitte (2019) shows that while 61% of people between the ages of 26-35 buy things online at least once a month, only 41% of people above 55 do so. And the number dwindles as people get older. This is also true for education levels, as "respondents with higher education degrees tend to make online purchases more often than respondents with secondary education" (Deloitte, 2019). Moreover, e-commerce in Russia has experienced a significant boom in recent years, with 87% of Russians reporting making an online purchase. However, for frequent online shopping, the number reduces to only 51% (Deloitte, 2019). And across all product categories, older Russians buy things online less frequently than younger adults.

2. Consumer behaviour theories

These leading theories can explain how to motivate elderly customers and entrepreneurs to buy/sell more things online.

2.1 The Motivation-Need theory

In 1943, Abraham Maslow proposed his hierarchy of needs. According to Maslow, human behaviour can be grouped into a five-point priority framework which people go through to meet their needs (Andersen, 2018). In order of priority, the needs include physiological needs, safety, belongingness and love, esteem, and self-actualisation. This theory places human needs at the centre of understanding human behaviour. It demonstrates rewards in every hierarchy and explains how we attempt to fulfil our needs (Zalenski & Raspa, 2006). To put it simply, people essentially buy products that satisfy their needs. While businesses can target consumers in any level of hierarchy, consumers will most certainly select products that bring the biggest utility to them. However, several subsequent scholarships have argued that some of the 'needs' Maslow defined are not actual needs of human beings. Further criticisms have been levied against Maslow's system of placing human needs in a fixed hierarchy. Scholars like Barling (1977), Compton (2018), Desmet & Fokkinga (2020), Neubauer & Martskvishvili (2018), and Tezcan Uysal & Genç (2017) have argued against the idea of humans having a preconceived idea of needs. They argued human needs are often psychological and necessity based, and hierarchies could differ from individual to individual. For example, a person might strip themselves of a lower-stage need if they aspire for self-actualisation (Desmet & Fokkinga, 2020). And the cause and effect correlation between need and actions cannot always be directly related (Compton, 2018; Neubauer & Martskvishvili, 2018; Tezcan Uysal & Genç, 2017). Furthermore, another limitation of this theory is that it did not address the nature of human beings who can sometimes not be aware of their needs (Desmet & Fokkinga, 2020). For elderly consumers, some of these criticisms are crucial. As people who were not born with digital technologies, many elderly consumers might be unaware of any preconceived need to buy or sell things online. Therefore, policy makers and business leaders must intensify the messaging on the benefits of e-commerce to this group, while creating a digital environment that fosters Maslow's hierarchy.

2.2 The theory of reasoned action

Martin Fishbein and Icek Ajzen developed the 'Theory of Reasoned Action' in 1967 (Coleman et al., 2011; Ellis & Helaire, 2020), based on behavioural studies using the Expectancy Value Models. The study aimed to examine the discrepancy between consumer behaviour and attitude (Peña-García et al., 2020). The theory's central argument postulates that the behaviour of a consumer is dependent on their intention to produce or acquire a particular outcome. Specificity is critical in the process of decision-making (Aktaş & Şimşek, 2020) and a consumer only performs a specific action if a similarly precise outcome is predicted. Therefore, elderly entrepreneurs and businesses seeking to acquire more elderly customers should equate every online purchase

with a favourable outcome specific to the elderly demographic. Furthermore, the theory of reasoned action stresses the value of motivating customers to develop stronger intentions to buy things (Arevalo & Brown, 2019; Sun, 2020). Making websites and apps simpler to navigate could potentially boost their intentions.

However, subsequent research criticised this theory, with some arguing that the behavioural pattern of consumers are not entirely voluntary and cannot always be controlled or anticipated (Darley et al., 2010). Some of these criticisms led the author – Icek Ajzen – to incorporate perceived behavioural control to the original theory of reasoned action. The updated version of the theory became known as the theory of planned behaviour (Kan et al., 2020). However, 'intention' is also regarded as the primary and significant determinant of actual purchasing behaviour in the theory of planned behaviour. While some researchers have found that the intention to purchase does not necessarily translate into actual purchasing (Indiani & Fahik, 2020), others have concluded that purchase intention can influence and motivate real-time online purchasing (Peña-García et al., 2020).

2.3 Engel, Kollet, Blackwell (EKB) theory

The EKB Model is another core theory of consumer behaviour. This theory claims that consumers go through a five-step phase before making a purchase (Aktaş & Şimşek, 2020). The first step is the input phase. This is the stage in which consumers absorb information, typically from the advertising or product/service description available on newspapers, television, or the product. For example, Russian consumers – including the elderly – usually get product recommendations/information from friends and relatives, from online reviews and from traditional media (Deloitte, 2019). After gathering this knowledge, consumers process the information by comparing it to previous expectations and experiences, before making a decision. Consumers are also influenced by methods/alternatives, variables and external influences (Osei & Abenyin, 2016). To increase elderly online shopping, businesses and policy makers must target them at the input/information gathering stage.

2.4 Hawkins Stern impulse buying

In contrast to some of the aforementioned theories, the Hawkins Stern theory firmly stresses the concept of impulse behaviour. In addition to rational spending behaviour, the author – Hawkins Stern – claimed that unexpected purchasing instincts fit to create a complete image of the typical customer (Aktaş & Şimşek, 2020). Impulse purchases are primarily influenced by external factors and have no correlation to conventional decision-making. Stern established four types of impulse buying. The first is Pure impulse purchase. This can be explained by individuals who buy a food item they like, even though they did not plan to buy it. The second group includes reminded impulse purchase. These are the groups of people who decide on buying something after they see it. The third category involves suggested impulse purchases. This can occur in a situation where a company offers additional warranties on products to encourage this kind of buying. The final category is the planned impulse decision of consumers. In this category, consumers want to buy a product but are hesitant about the particulars.

The Hawkins Stern theory can provide a great opportunity for online businesses trying to acquire more elderly customers. Every aspect of a product including packaging, features, product display, and ease of shopping – among others – can potentially have an influence on the impulse of consumers (Agarwal & Priya, 2019). This is also true for the design and construction of online shopping websites and apps. For example, businesses can place products that are popular with elderly customers within easy proximity to motivate them to buy online. Stern emphasised the availability of products induces the probability of impulsive purchasing decisions.

3. Gaps, current research and opportunities on elderly consumer behaviour in e-commerce

While all the aforementioned theories of consumer behaviour continue to provide relevant insight into the habits of elderly customers, they were all mostly introduced at a time when online shopping was either nonexistent or extremely minimal. Online shopping behaviour can be sometimes very different from those of physical stores (Cox et al., 2020; Loxton et al., 2020; Rahman et al., 2018; Tomić et al., 2019). Moreover, because humans constantly change, consumer behaviour and preferences also keep changing with time (Cox et al., 2020; Morrow-Howell et al., 2020; Najdený et al., 2019; Peña-García et al., 2020; Tomić et al., 2019).

Bucko et al. (2018) argued that the major concern of consumers – both elderly and younger adults – while buying products online are product quality, loyalty, product return issues, and the distribution of inaccurate products. Another group of researchers found that clear product definition, product features, available information,

payment options, and after-sale responses are among the variables that primarily influence the satisfaction of customers from online shopping (Jibril et al., 2020; Loxton et al., 2020; Ofori & Appiah-Nimo, 2019). Furthermore, Sonwaney & Chincholkar (2019) presented a range of variables that affect consumer behaviour. These factors include demographic factors, psychological factors, information, personality traits, trust, convenience, social factors, privacy factors, and security, among others. Recent researches indicate that online consumer purchasing behaviour is influenced by some additional factors, including marketing stimuli, online promotion, customer service, product quality and consistency, price and offers, social factors, information availability, online reviews and social media presence. Additionally, technical factors like website/app standard and quality, response and speed also influence consumers (Cox et al., 2020; Jibril et al., 2020; Loxton et al., 2020; Najdený et al., 2019; Pandey & Parmar, 2019; Rahman et al., 2018; Reddipalli, 2020; Suman et al., 2019; Sweney, 2019; Tomić et al., 2019).

For Russian elderly consumers and entrepreneurs, several factors can influence them to adopt e-commerce. Research from Deloitte (2018) shows that for sales of fashion goods, about 68% of Russians "have difficulty checking a product's quality and do not have the same pleasant sensations when shopping online". Issues like this can significantly turn off elderly consumers. Businesses can potentially address this by offering elderly Russians the ability to pay after receipt, or the opportunity to deliver several multiple options similar to their original interest. Furthermore, product quality is a big influencer of consumer behaviour all over Russia. A 2019 survey of Russians found that 50% of Russians reported receiving low quality, defective or spoiled goods, while 40% reported buying counterfeit goods (Deloitte, 2019).

The impact of COVID-19 on retail and consumer behaviour will likely have a lasting impact (Accenture, 2020; Loxton et al., 2020; Nyrop et al., 2020). While many consumers minimised expenses during the heights of the pandemic, entrepreneurs and consumers across all generations were more inclined to buy and sell things online than ever before (Borsellino et al., 2020; Butu et al., 2020; Coker, 2020; Gao et al., 2020; Nyrop et al., 2020). Elderly consumers particularly engaged more in e-commerce due to the pandemic (Morrow-Howell et al., 2020). Furthermore, following a survey involving 2000 respondents, Mintel (2020) reported a significant increase in e-commerce usage among people 65 and older. They reported a 43% increase among the elderly, compared to 42% among the rest of the population. COVID-19 has likely compelled older adults to be more accustomed to e-commerce. All of these show that amidst the devastating impact of the pandemic, elderly people acquired a new familiarity with e-commerce. Additionally, there was a concerted effort by businesses and political leaders to encourage more online shopping. As the aforementioned theories of consumer behaviour prove, commerce blossoms when a pressing need is coupled with available information. This bodes well for the future of e-commerce and the elderly.

4. Limitation

This is a literature review of an ongoing PhD research. Therefore, all analysis, results and recommendations are not conclusive.

References

Accenture. (2020). How COVID-19 will permanently change consumer behavior. *Accenture, April*, 1–9. https://www.accenture.com/us-en/insights/retail/coronavirus-consumer-behavior- research

Agarwal, A., & Priya, C. (2019). *Use of Hawkins Stern's impulse buying theory (1962) in online shopping.* Project Guru. https://www.projectguru.in/hawkins-sterns-impulse-buying-theory- online-shopping/

Aktaş, H., & Şimşek, G. (Eds.). (2020). *Consumer Behavior Models.* Peter Lang D. https://doi.org/10.3726/b16567

Andersen, J. A. (2018). Managers' Motivation Profiles: Measurement and Application. *SAGE Open,* 8(2), 215824401877173. https://doi.org/10.1177/2158244018771732

Arevalo, M., & Brown, L. D. (2019). Using a reasoned action approach to identify determinants of organized exercise among Hispanics: A mixed-methods study. *BMC Public Health*, 19(1), 1–10. https://doi.org/10.1186/s12889-019-7527-1

Barling, J. (1977). A critical review of the application of Maslow's motivation theory in industry. *SA Journal of Industrial Psychology*. https://doi.org/10.4102/sajip.v0i0.282

Borsellino, V., Kaliji, S. A., & Schimmenti, E. (2020). COVID-19 drives consumer behaviour and agro-food markets towards healthier and more sustainable patterns. *Sustainability (Switzerland)*, 12(20), 1–26. https://doi.org/10.3390/su12208366

Bucko, J., Kakalejčík, L., Ferencová, M., & Wright, L. T. (2018). Online shopping: Factors that affect consumer purchasing behaviour. *Cogent Business & Management,* 5(1), 1535751. https://doi.org/10.1080/23311975.2018.1535751

Butu, A., Brumă, I. S., Tanasă, L., Rodino, S., Vasiliu, C. D., Doboș, S., & Butu, M. (2020). The impact of COVID-19 crisis upon the consumer buying behavior of fresh vegetables directly from local producers. Case study: The quarantined area of

Suceava County, Romania. *International Journal of Environmental Research and Public Health,* 17(15), 1–25. https://doi.org/10.3390/ijerph17155485

Coker, J. (2020). Covid-19: *Elderly consumers set to drive eCommerce market post-crisis*. Essential Retail. https://www.essentialretail.com/news/elderly-consumers-drive-ecommerce/

Coleman, L. J., Bahnan, N., Kelkar, M., & Curry, N. (2011). Walking The Walk: How The Theory Of Reasoned Action Explains Adult And Student Intentions To Go Green. *Journal of Applied Business Research* (JABR), 27(3), 107. https://doi.org/10.19030/jabr.v27i3.4217

Compton, W. C. (2018). Self-Actualization Myths: What Did Maslow Really Say? *Journal of Humanistic Psychology,* 002216781876192. https://doi.org/10.1177/0022167818761929

Cox, N., Ganong, P., Noel, P., Vavra, J., Wong, A., Farrell, D., & Greig, F. (2020). Initial Impacts of the Pandemic on Consumer Behavior: Evidence from Linked Income, Spending, and Savings Data. SSRN Electronic Journal. https://doi.org/10.2139/ssrn.3633008

Darley, W. K., Blankson, C., & Luethge, D. J. (2010). Toward an integrated framework for online consumer behavior and decision making process: A review. *Psychology and Marketing*, 27(2), 94–116. https://doi.org/10.1002/mar.20322

Deloitte. (2018). *New Year & Christmas 2019 Spending Survey.* Deloitte. https://www2.deloitte.com/content/dam/Deloitte/ru/Documents/consumer-business/new- year-2019-spending-survey-eng.pdf

Deloitte. (2019). *Consumption in Russia* − 2019. Deloitte Russia. https://www2.deloitte.com/ru/en/pages/consumer-business/articles/2019/consumption-in- russia.html

Desmet, P., & Fokkinga, S. (2020). Beyond maslow's pyramid: Introducing a typology of thirteen fundamental needs for human-centered design. *Multimodal Technologies and Interaction*, 4(3), 1–22. https://doi.org/10.3390/mti4030038

Ellis, J. M., & Helaire, L. J. (2020). A Theory of Reasoned Action Approach to Examining Academic Help-Seeking Behaviors Among Adolescents in a College Readiness Program. *Urban Review*, 0123456789. https://doi.org/10.1007/s11256-020-00549-z

Gao, X., Shi, X., Guo, H., & Liu, Y. (2020). To buy or not buy food online: The impact of the COVID-19 epidemic on the adoption of e-commerce in China. *PLoS ONE,* 15(8 August), 1–14. https://doi.org/10.1371/journal.pone.0237900

Hootsuite & We Are Social. (2019, January 30). Digital 2019: *Global Internet Use Accelerates - We Are Social*. We Are Social. https://wearesocial.com/blog/2019/01/digital-2019- global-internet-use-accelerates

Indiani, N. L. P., & Fahik, G. A. (2020). Conversion of online purchase intention into actual purchase: The moderating role of transaction security and convenience. *Business: Theory and Practice*, 21(1), 18–29. https://doi.org/10.3846/btp.2020.11346

Jibril, A. B., Kwarteng, M. A., Pilik, M., Botha, E., & Osakwe, C. N. (2020). Towards understanding the initial adoption of online retail stores in a low internet penetration context: An exploratory work in Ghana. *Sustainability (Switzerland),* 12(3). https://doi.org/10.3390/su12030854

Kan, M. P. H., Fabrigar, L. R., & Fishbein, M. (2020). *Encyclopedia of Personality and Individual Differences. Encyclopedia of Personality and Individual Differences*, 1–8. https://doi.org/10.1007/978-3-319-28099-8

Law, T. J. (2019). *19 Powerful Ecommerce Statistics That Will Guide Your Strategy In 2020.* Oberlo. https://www.oberlo.com/blog/ecommerce-statistics

Lian, J.-W., & Yen, D. C. (2014). Online shopping drivers and barriers for older adults: Age and gender differences. *Computers in Human Behavior*, 37, 133–143. https://doi.org/10.1016/j.chb.2014.04.028

Loxton, M., Truskett, R., Scarf, B., Sindone, L., Baldry, G., & Zhao, Y. (2020). Consumer Behaviour during Crises: Preliminary Research on How Coronavirus Has Manifested Consumer Panic Buying, Herd Mentality, Changing Discretionary Spending and the Role of the Media in Influencing Behaviour. *Journal of Risk and Financial Management,* 13(8), 166. https://doi.org/10.3390/jrfm13080166

Mintel. (2020). *Senior consumers: marketers' "lost generation."* Mintel. https://www.mintel.com/marketing-to-older-generations

Morrow-Howell, N., Galucia, N., & Swinford, E. (2020). Recovering from the COVID-19 Pandemic: A Focus on Older Adults. *Journal of Aging & Social Policy,* 32(4–5), 526–535. https://doi.org/10.1080/08959420.2020.1759758

Najdený, R., Križan, F., Bilková, K., Sládeková Madajová, M., & Gurňák, D. (2019). Consumer behaviour of seniors visiting shopping malls: Case study from Bratislava. *Folia Geographica,* 61(2), 126–143.

Neubauer, A. C., & Martskvishvili, K. (2018). Creativity and intelligence: A link to different levels of human needs hierarchy?*Heliyon*, 4(5), e00623. https://doi.org/10.1016/j.heliyon.2018.e00623

Nyrop, M., Alexander, N., Lindquist, M. B., & Karlsen, J. T. (2020). COVID-19 will permanently change e-commerce in Denmark. *Deloitte*, March, 2–4.

Ofori, D., & Appiah-Nimo, C. (2019). Determinants of online shopping among tertiary students in Ghana: An extended technology acceptance model. *Cogent Business & Management,* 6(1), 1644715. https://doi.org/10.1080/23311975.2019.1644715

Osei, B. A., & Abenyin, A. N. (2016). Applying the Engell–Kollat–Blackwell model in understanding international tourists' use of social media for travel decision to Ghana. *Information Technology & Tourism*, 16(3), 265–284. https://doi.org/10.1007/s40558-016- 0055-2

Pandey, A., & Parmar, J. (2019). Factors Affecting Consumer's Online Shopping Buying Behavior. *SSRN Electronic Journal*, 541–548. https://doi.org/10.2139/ssrn.3308689

Peña-García, N., Gil-Saura, I., Rodríguez-Orejuela, A., & Siqueira-Junior, J. R. (2020). Purchase intention and purchase behavior online: A cross-cultural approach. *Heliyon*, 6(6). https://doi.org/10.1016/j.heliyon.2020.e04284

Rahman, M. A., Islam, M. A., Esha, B. H., Sultana, N., & Chakravorty, S. (2018). Consumer buying behavior towards online shopping: An empirical study on Dhaka city, Bangladesh. *Cogent Business and Management,* 5(1), 1–22. https://doi.org/10.1080/23311975.2018.1514940

Reddipalli, R. (2020). Howard Sheth Model of Consumer Behaviour on Buying a Smartphone. *SSRN Electronic Journal*. https://doi.org/10.2139/ssrn.3658496

Smith, C. (2019). Senior Citizen Ecommerce Habits in 2018. *DIGITAL MARKETING*. https://doi.org/https://trinity.one/insights/digital-marketing/senior-citizen-ecommerce- habits-2018/

Sonwaney, V., & Chincholkar, S. (2019). Identifying the factors impacting online consumer buying behaviour. *International Journal of Scientific and Technology Research*, 8(8), 445– 456.

Suman, S. K., Srivastava, P., & Vadera, S. (2019). Age and gender influences on consumer behavior towards online discounts. *International Journal of Recent Technology and Engineering*, 8(2), 5202–5211. https://doi.org/10.35940/ijrte.B1046.078219

Sun, W. (2020). Toward a theory of ethical consumer intention formation: re-extending the theory of planned behavior. *AMS Review,* 10(3–4), 260–278. https://doi.org/10.1007/s13162-019- 00156-6

Sweney, M. (2019). *More than half of people aged 65 and over now shop online – ONS.* The Guardian. https://www.theguardian.com/money/2019/aug/12/more-than-half-of-people-aged- 65-and-over-now-shop-online-ons

Tezcan Uysal, H., & Genç, E. (2017). Maslow's Hierarchy of Needs in 21St Century: the Examination of. *Researches on Science and Art in 21st Century Turkey,* April 2018, 211–227.

The New York Times. (2020, April 7). *The Virus Changed the Way We Internet.* The New York Times. https://www.nytimes.com/interactive/2020/04/07/technology/coronavirus-internet- use.html

Tomić, S., Leković, K., & Tadić, J. (2019). Consumer behaviour: the influence of age and family structure on the choice of activities in a tourist destination. *Economic Research-Ekonomska Istrazivanja*, 32(1), 755–771. https://doi.org/10.1080/1331677X.2019.1579663

United Nations. (2019). *World Population Ageing 2019*. United Nations. https://www.un.org/en/development/desa/population/publications/pdf/ageing/WorldPopul ationAgeing2019-Highlights.pdf

Vasic, N., Kilibarda, M., & Kaurin, T. (2019). The Influence of Online Shopping Determinants on Customer Satisfaction in the Serbian Market. *Journal of Theoretical and Applied Electronic Commerce Research*, 14(2), 0–0. https://doi.org/10.4067/S0718-18762019000200107

World Bank. (2019). *Population ages 65 and above, total - Russian Federation* | Data. Data.Worldbank.org. https://data.worldbank.org/indicator/SP.POP.65UP.TO?locations=RU

Zalenski, R. J., & Raspa, R. (2006). Maslow's Hierarchy of Needs: A Framework for Achieving Human Potential in Hospice. *Journal of Palliative Medicine,* 9(5), 1120–1127. https://doi.org/10.1089/jpm.2006.9.1120

Enhancing Social Impacts of Third Sector Organizations Amid the Covid-19 Pandemic

Maria Madalena Raptopoulos and Ana Simaens
Iscte - University Institute of Lisbon, Business Research Unit (BRU), Lisbon, Portugal
Maria_Madalena_Raptopoulos@iscte-iul.pt
ana.simaens@iscte-iul.pt
DOI: 10.34190/EIE.21.183

Abstract: The effectiveness achieved by Third Sector Organizations (TSOs) is directly linked to goals based on their missions and results generated by their actions, which can positively or negatively impact their beneficiaries. Even in normal situations, there is already a difficulty in gathering resources to maintain their operations. The advent of the Covid-19 pandemic tends to worsen this situation depending on their social innovation and resilience capacities. From such an issue, the present study identifies strategies and lessons learned by Portuguese and Brazilian TSOs that were affected by the Covid-19 pandemic. Moreover, an assessment is made on what they did to maximize the positive social impacts and minimize the negative ones, considering the crisis management theory. Then, a qualitative phenomenological-type exploratory research was conducted, whose data was collected primarily from in-depth interviews and secondarily from documents published in the TSOs' websites. The data collected from thirty-two Portuguese and Brazilian TSOs were assessed by means of content analysis, based on existing theory and on new subjects arisen from the reported experiences. The results have shown that, regardless the institutional model, most of them were not prepared to deal with that crisis. Besides, they had been reacting as the effects were underway, seeking to maximize the positive social impacts and to minimize the negative ones. Additionally, it is highlighted the importance of a flexible management to adapting to a new challenge in order to achieve different priority goals and to meet the main beneficiaries' needs during the pandemic. Although in an early-stage research, interesting results have already been found, which can lead to contributions to management, governance, leadership, strategy, social innovation, sustainability and, ultimately, to the design of a crisis management model for TSOs. This research also calls for complementary future works.

Keywords: third sector, social impact, social innovation, crisis management, Covid-19, governance

1. Introduction

According to Fernandes (1994), the Third Sector refers to a set of organizations and private initiatives that aim at the production of goods and services of public interest. Following this roadmap, the effectiveness achieved by TSOs is directly linked to their institutional missions and the social impacts caused by them in the environment which they operate in, as per Ebrahim and Rangan (2010). Enjolras (2015) states that these impacts can generate positive or negative transformations in the behaviours and attitudes of people, communities, beneficiary institutions or even main related parties.

Lecy, Schmitz and Swedlund (2012) claim that even in normal situations the TSOs' goals are rarely simple and consistent. Cacheda (2018) complements that the organizations also compete for the same resources or financing in times of economic recession, and, as exemplifies Osborne (2012), their sustainability is weakened. On the other hand, certain institutions may have their operating spaces leveraged, depending on their capacities for social innovation and resilience, as per Shier and Handy (2016).

A survey conducted by NOVA SBE (2020) showed that Portuguese TSOs experienced a drop in revenue and volunteering, and also closed some activity to the public, impacting directly the beneficiaries of their actions. Due to social confinement, Brazilian TSOs also interrupted ongoing projects and partnerships, according to Melo (2020) and had their activities interrupted or suspended, as per Mobiliza (2020).

Previous researches also demonstrated that, despite the impacts caused by Covid-19, there are social assistance activities that can be offered to the population, according to Cardona and Campos-Vidal (2019), when they act by crisis management forefront, in the view of Boyd and Martin (2020).

Therefore, considering the crisis management theory, the goal of this study is to bring up what Portuguese and Brazilian TSOs with good governance did to enhance the social impacts generated to their beneficiaries, starting from the acquaintance of the positive social impacts that can be generated or maximized, and the negative social impacts that can be minimized, due to the effects caused by the pandemic.

2. Theoretical framework

2.1 The Third Sector

The entities that comprise the Third Sector may vary by country or region, according to Salamon and Sokolowski (2014). Thus, any research work that aims to study this sector must consider the diversity and particularities of its composition.

The Brazilian Third Sector is composed of civil associations in general, cooperatives, foundations, non-governmental organizations, civil society organizations of public interest, social enterprises and social organizations, according to Fux, Modesto and Martins (2017).

The Portuguese Third Sector complements this composition with Holy Houses of Mercy, local development organizations, museums, mutualist associations, social solidarity private institutions (called 'IPSSs'), as per Franco (2005), and still People's Houses, according to the Portuguese Ministry of Labor and Solidarity (1998). The institutionalization of this sector in Portugal was recently reviewed in the Social Economy Basic Law by Assembleia da República (2013).

Moreno-Albarracín et al (2020) point out that one of the most complex challenges currently faced by TSOs is to demonstrate that they manage resources with efficiency and excellence, and do not deviate from their mission accomplishments. Therefore, transparency, accountability and governance are precious values for their survival, given that they generate credibility, legitimacy, and trust, which are necessary to project a positive image to society and to improve their reputations, according to Civitillo, Ricci and Simonetti (2019), Gandía (2011) and Peng, Kim and Deat (2019). These good practices also increase their chances to get future contributions from donors, as per Harris and Neely (2021).

On the other hand, there is not a regulation that obliges the TSOs to publish their financial and non-financial information, according to Ortega-Rodríguez, Licerán-Gutiérrez and Moreno-Albarracín (2020), with some exceptions, like the IPSSs in Portugal and social organizations in Brazil, because they receive governmental resources and need to be accountable regarding their applications, as per Santos, Laureano and Machado (2014) and Fux, Modesto and Martins (2017).

TSOs occupy a strategic position acting for health services provision, as exemplified by Zabdyr-Jamróz (2017), in the social assistance, as highlighted by Feiock and Andrew (2006), among other social goods in general, as per Ortega-Rodríguez, Licerán-Gutiérrez and Moreno-Albarracín (2020). Thus, they have an important relation to contribute to the reach the Sustainable Development Goals (SDGs) of the United Nations (UN) 2030 Agenda, according to Enjolras et al (2018) and United Nations (2018).

2.2 Third Sector crisis management

Bedenik (2020) defines crisis management as an activity aimed at managing a dangerous situation, and Jaques (2007) claims that this process involves four stages: prevention, preparation, response and revision, whose phases give a guidance as to the infrastructure and resources needed, risk management and training for emergency response and actions for crisis incident and post-crisis management.

In a crisis situation, the TSOs sustainability is a little more threatened, but, depending on their capacities for social innovation and resilience, as proposed by Shier and Handy (2016), and the application of appropriate crisis management, as suggested by Boyd and Martin (2020), it is possible to maintain their reputations, according to De Blasio and Veale (2009), and to develop useful and sustainable operations for the community where they act in, as per Lyth et al (2017).

Therefore, in a crisis scenario, Gilstrap et al (2016) and Never (2011) claim that the challenges of TSOs' leaders become more focused at teamwork, transparency to stakeholders, agility in responses, strategic performance, emotional balance and good knowledge of the operating segment, in order to develop a proactive approach to target the best opportunities and to mobilize the best resources in order to achieve the greatest social impacts, according to Austin, Stevenson and Wei-Skillern (2006).

2.3 Covid-19 pandemic through the lens of crisis management

The effects of this global health crisis are being considered bigger than the 2008 financial crisis, as per OECD (2020), and have generated, on all sectors of civil society, social and economic effects and impacts such as: reducing people interaction due to social distancing; organizations reducing or shutting down their production, or trying to find alternative ways to provide their services; workers looking for other forms of collaboration from home; and unemployment, according to Rigotti, De Cuyper and Sekiguchi (2020) and Sorribes, Celma and Martínez-Garcia (2021).

The impact of the illness is also unequal, with far greater socio-economic and health consequences for poor and marginalized communities, as per Clulow, Dimitrouka and Zapata (2020) and Kang et al (2020), and the lockdown also had a negative effect on mental and physical health, social life, finances, education and food security on children with disabilities and their families, according to Mbazzi et al (2021).

The studies conducted by NOVA SBE (2020) and Bragança et al (2021) showed that the Portuguese TSOs had to: implement a contingency plan for Covid-19 suspected and confirmed cases, as well as hygiene protection measures; cancel face-to-face meetings and adopt tele-working; reduce or suspend services and/or social responses, and still adapt some of them to remote operation; create new services and social responses to the pandemic; lay-off workers and promote the psychological well-being of employees.

The NOVA SBE's survey also demonstrated a perceived decrease in TSOs' revenues and volunteering; cost increase, mostly due to protection, disinfection and safety equipment, but also by increasing expenses associated with food. However, none of these previous studies were based on theoretical framework to understanding the effects and impacts perceived by participants, rather directly on their experiences.

3. Methodology

This study approaches a qualitative exploratory research of the phenomenological type, according to Creswell (2010) and Marshall and Rossman (2016), which aims at exploring and understanding the meaning of the effects caused by the Covid-19 to Portuguese and Brazilian TSOs in order to maintain themselves providing positive social impacts to their beneficiaries. Then, in-depth semi-structured interviews were carried on, whose protocol was developed based on literature review, as per Brinkmann and Kvale (2015).

The semi-structured interview protocol was composed of blocks with questions regarding the interviewee identification with the organization, the activities and goals achieved by the TSOs and their main funding sources, as well as their current beneficiaries. These questions were made in order to classify the organizations in relation to these characteristics. The second block was built with questions related to the effects caused by pandemic as perceived by the interviewees, and how they felt about it.

The third block contained questions on the existing processes regarding those four stages of the crisis management model proposed by Jaques (2007), but specifically what the TSOs did during the crisis and post-crisis phases to maximize the social impacts and minimize the negative ones, the main adopted changes or those that had to be created or abandoned. The focus was on crisis and post-crisis stages in order to observe if any difference was perceived according to the variation in the infection waves and their effects within both countries. Lastly, what learned lessons the interviewees would like to share with other leaders about their experiences on the phenomena.

As there is not a single and complete available list of TSOs in each country (Brazil and Portugal), but a few ones by categories, diversified and incomplete, it was necessary to define a criterion to collecting and selecting the organizations to be invited, as follows:

- Existence of a complete public official record at a governmental base, as guided by Appe (2015), namely the Social Development Ministry, for Brazilian TSOs, and the Social Security, for the Portuguese TSOs;
- Choice of a category to standardize sampling across countries, excluding cooperatives and People's Houses from the Portuguese list, since the Brazilian list does not include them;
- Good practices of governance, accountability and transparency, as guided by Civitillo, Ricci and Simonetti (2019) and França et al (2015), in addition to national or regional coverage; and

- Minimum sample size of 15 TSOs to be interviewed from each country, considering the range of 15 ± 10 proposed by Brinkmann and Kvale (2015).

The selection based on the 'good governance, accountability and transparency practices' criterion was to check the existence in the TSOs' websites of, at least, the publication of the updated statutes and financial and accounting statements, work plans, activity or management reports, estimated budgeting reports and auditing reports, for the last three years. The outcome was a list of 82 Portuguese and 85 Brazilian TSOs selected to be contacted. The invitations were then sent and 32 organisations (16 of each country) accepted to be interviewed.

The interviews were performed online from December, 2020 to March, 2021 by *Zoom*© tool, in Portuguese language, with audio and video recorded, and lasted from 25 minutes to 3 hours and a half, approximately. In order to hold their confidentiality, the TSOs were identified as "B" (stands for Brazilian) or "P" (stands for Portuguese) followed by a number 01 to 16.

All the recorded audios had their speeches manually and verbatim transcribed, based on the ethics, as guided by Brinkmann and Kvale (2015), as well as on the validity and reliability aspects in qualitative research, according to Creswell (2010) and Marshall and Rossman (2016). From the transcripts, a detailed abductive content analysis was performed, as per Gioia, Corley and Hamilton (2013).

The content analysis comprised the following steps: 1) Organization of the data by country; 2) Reading of all data collected from literature review combined with the interviews in order to get a general perception of the collected information related to the research topic; 3) Building the primary data coding in categories, themes and subthemes, based on the literature review; 4) Coding of the interviews and addition of categories, themes and subthemes emerging from them; 5) Detailed description of the data and proposition of subjects consolidated according to the relationships among them; 6) Proposal of a narrative between the findings according to this early-stage research scope.

Although the research might initially seem to have a sample source limitation, since the primary data was collected from the available government list with a limit in the number of organizations, the experiences reported by the interviewed TSOs' presented saturation in the analysed time period. That indicates that the sampling does not need to be augmented.

4. Results and discussion

The first finding of this early-stage research has been the lack of complete official registrations of the TSOs. Considering about 782 thousand Brazilian TSOs, as per IPEA (2021), and 55 thousand Portuguese TSOs, according to Suspiro (2016), the only available lists represent 2,6% and 10% of the total TSOs from each country, respectively.

Out of the interviewed TSOs universe, only three were prepared to deal with crisis emergencies because they had already dealt somehow with hunger, poverty and health impacts similar to those caused by the Covid-19 pandemic. Additionally, only one of them had a crisis management process in place, and a few had contingency plans, even though all of them had to be revised in order to address the effects and impacts caused by pandemic.

In addition, even the TSOs that claimed to be prepared to handle the crisis had an increased demand and a decreased volunteering, so that they had to look for further resources, as stated by Shier and Handy (2016). They had to be more innovative as to giving responses to beneficiaries, according to Austin, Stevenson and Wei-Skillern (2006). As it can be seen from an extract of the P01's interview, the activities developed by that TSO did not stop:

> *"…we had more requests, many more requests, people asking for support […] On the other hand, we had fewer volunteers, because the older ones stayed at home to protect themselves. Then, we had to look for more volunteers. There were no economic consequences in terms of activity because we did not close. On the contrary, as we had more requests, we had to look for more donors and to be more innovative on inputting resources, revenues and donations." (P01)*

Also, most of the interviewed TSOs had their social responses limited or closed during the restricted measures of social distancing, as shown below from the statement excerpt of the P03's interview:

> *"…the parent groups really stopped, mainly because, in the territories where the activities are carried out, the spread of the virus was felt the most. In the social districts of Lisbon there was an immense spread, there were many schools that closed, and they keep on closing." (P03)*

In addition to the containment measures such as the closure of social responses, the statement above also confirms that the more vulnerable regions, and consequently people, were those more affected by the spread of the virus, as stated by Clulow, Dimitrouka and Zapata (2020) and Kang et al (2020).

In spite of the negative impact of interrupting the face-to-face activities in the lockdown, the adjustment to the digital world gave the TSOs the opportunity to create positive impacts in terms of fundraising and to capturing new users:

> *"The institution gained tremendous visibility during confinement. All the activities that we promote for families and technicians online have gained tremendous visibility. We were not expecting anything; however, we easily exceeded twelve thousand followers […], almost doubling in just two months. And we have contact with institutions that we did not have before. It was really good." (P03)*

Furthermore, a TSO overcame the previous need to perform every task face-to-face:

> *"We clearly had to adapt, […], especially to those already ongoing services, passed to online format. I think this has increased our expertise in the use of these tools, […] and, in some contexts, has allowed us to deconstruct the notion that everything has to be done in person. It does not." (P06)*

From the expansion to digital world and innovation, the TSOs were able to provide equipment to users that allowed them to minimize the impact of interrupting the face-to-face activities, as well as to keep the responses, working and still organizing and expanding the participation in events that previously were physically attended, as it can be seen from the quotes of the P05, P06, P07 and B09 interviews:

> *"…we had already invested in tablets and technologies to allow families to keep in close contact. It is one thing for us to say it is okay, and it is another thing for them to see and talk to their children, to their parents, yes, it has another impact." (P05)*

> *"So, the communication channels were, above all, important. The campaigns were launched on Facebook, on social networks and on our website, […] and we never closed the online and telephone channels at any time […] All telephones at the offices were routed to the manager and employees […], this integration is what allows people, whatever the communication channel, to enter and ask for help or to report a situation, which is addressed and which a response is given to." (P06)*

> *"Our conference was physical; it was always physical. With the Covid issue, our main leaders immediately thought outside the box. So, they prepared within, I think, one month, something that no institution has done recently, and I do not know if any would, broadly in the Zoom application, very beautiful with rooms and auditorium […] We had more themes and more visitors than if done in Lisbon [...] and everything was made in-house by our volunteers..." (P07)*

> *"We used a combination of platforms because they had different schedules. We had a conversation group on Facebook for people in social vulnerability […] and we activated several programs on YouTube [...], so we managed to bring science content, well-being content, […] general interest content. Then we managed to mix music with interviews, with the curator's speech, […], we did a merge, nothing different from what was already happening within four walls. We used Zoom to do webinars and courses. And that increased our impact." (B09)*

Some TSOs (e.g., B01) took advantage of corporate social responsibility, working with companies to obtain donations of equipment and mobile phone chips that enabled users to remote learning:

> *"[…] we are already negotiating with a telephone company to donate 15 thousand chips, for free, for 16 months [...] and we have also managed to make a deal with a large construction company here in Sao Paulo […], and we gained tablets with chips and 4G, and we sent them to the young people's homes to be able to attend synchronous classes." (B01)*

However, there are social responses which depend on the trust environment created between the TSO and their users. So, the assistance has to be carried on with more attention on details and from the development of new skills by workers and volunteers:

> *"But over the phone, we had to start paying attention to the silences, the tones of voices, the crying, the sigh. From the tone of voice, you can tell if the person is anxious, sad, crying or had been crying. With volunteers we do the same and guide the same, because volunteers are our eyes. In person it was easier, because they observed things, for example, if the medication tray was untidy, if the person was not well..." (P08)*

In order to mitigate the economic negative effects, the TSOs also act together with their boards to lower the financial co-participation from those users that had their incomes partially or totally impacted by unemployment:

> *"The day care centres, for example… As soon as we closed, it was decided by the Board of Directors to reduce the monthly fee to these social responses that ended. However, there were other parents who also asked us to reduce tuition because they were unemployed or were in a more precarious situation, and we acceded to all the requests they made to us." (P05)*

Although several primary social responses were not the provision of food and financial aid, several TSOs reported that they had to adjust their budgets to providing resources and food to beneficiaries, to their families, to people who take care of them and to anyone else who looked for the TSO:

> *"…there are also families that need to supply the most basic need: to feed. But we quickly realized that the needs went beyond that. We started to have people who came to us for help in paying rent, electricity, water and gas." (P15)*

Other TSOs took advantage of the need to providing food and hygiene and cleaning products to their beneficiaries, whose demand touched companies to establish new partnerships:

> *"The [B03] is not an organization created with the intention of being assistentialist, but at the time of the pandemic, this campaign we created has a completely assistentialist character, which is to bring basic baskets and hygiene kits for families. We saw it as a moment really necessary; on the other hand, it may even be an opportunity to bring partner companies that, at first, will make donations to this campaign and, in the future, we can have them commit to other projects that are not so assistentialist." (B03)*

Considering the universe of interviewed TSOs, only three Portuguese organizations had as a goal to reach the first and/or second United Nations' SDGs, related to fight against poverty and hungry directly. But after the Covid-19 pandemic, all of them, in both countries, had to develop actions to help their beneficiaries with their basic needs.

Additionally, those TSOs that work with prevention of violence or child abuse, where social distancing kept them from following events more closely, took advantage of the demand for food supplies in order to visit families and identify potential risk situations:

> *"…we developed a response plan which was the supply of basic food baskets, bringing food to families, but together with the issue of child protection and sexual abuse, because these children have been at home for almost a year with their families and we do not know what is going on with them, so by visiting the children, visiting the houses, one is able to identify the abuses…" (B10)*

No interviewed organization had to shut down employees due to the decrease in revenues, but some put their workers in lay-off regime or shifted their teams to the responses that continued to work, where face-to-face service centres had to be closed:

> *"…we can also see that people adapt easily to areas that are very different, because it is not the same thing to treat a child and to treat an adult […] but people have somewhat easily adapted themselves." (P05)*

In order to minimize the emotional effects caused by pandemic, all the Brazilian TSOs and 14 Portuguese TSOs reinforced the social and psychological support to its employees, as well as to their beneficiaries. Additionally, in all the interviewed organizations, the leadership adapted their work modalities to keep closer to their teams, through more constant meetings and the use of social interaction applications.

Most Brazilian TSOs claimed to be hard to establish a dialogue with the government to assist in the development of social impact actions that could help mitigate the effects caused by the pandemic.

Finally, all interviewed organisations mentioned that they would have a more complete picture of the social and economic effects caused by the Covid-19 pandemic in the medium and long term.

5. In conclusions

Despite the crisis scenario and the fact that organizations are neither prepared to deal with crises nor have crisis management processes, the sampled organizations did not have a reduction in their resources that have drastically impacted their operations, in contrast to what previous studies stated.

The responses that had to be interrupted were impacted due to mobility restrictions and social distancing. However, with creativity, social innovation and the use of information and communication technologies, the TSOs managed to carry on most of their social responses remotely, in reduced groups or by meeting new emergency demands not foreseen in their statutes, such as the supply of food, hygiene and cleaning materials, and the payment of household expenses, expanding the contribution to other United Nations' SDGs previously not contemplated in their original lines of action and helping the government in that social mission.

Besides that, by negotiation capability, they were able to develop partnership strategies to manage the current needs and to gather future partners to new projects or demands.

The TSO leadership was also important to control the adversity with resiliency in order to keep a healthy environment, to motivate workers and to mobilize volunteers who could continue on the field, as well as to touch social bodies for quick decision-making regarding some increases in spending or reallocation of resources.

The criterion for selecting TSOs with good governance practices is proven to be a relevant factor to this research because well managed organizations were capable of leading actions, projects and budgets with the necessary effectiveness to meet their beneficiaries' demands and to act in a coordinated manner with their stakeholders.

The ongoing analysis of the outcomes of this work is not only leading to the knowledge of the main effects and impacts caused by the pandemic, but also to the possibility of proposing a crisis management model that contemplates the processes arising from the resilience strategies and attitudes adopted by the interviewed TSOs.

The main research limitations are related to: the limited number of TSOs in the available TSO lists of official public government records in the countries surveyed; the TSOs' scope of actions restricted to national or, at least, regional coverage; and the effects and impacts caused by Covid-19 pandemic not fully perceived and collected during the time period of the interviews because the pandemic was still underway in both countries. Consequently, other processes implemented or lessons learned might have been not completely captured then.

As a suggestion for future works, a new round of interviews could be held with the same interviewed TSOs in order to bring up some new findings regarding the topic, considering the different aspects of the infection waves. In addition, due to method limitation, further research may be performed from a larger sample of interviews, and a complementary survey research can be assessed, either with the same geographical scope or encompassing other European countries' TSOs for comparison.

References

Appe, S. (2015) 'Government Mapping of the Third Sector: A Government Innovation for Regulation and Coordination? Perspectives From the Third Sector', *International Journal of Public Administration*, 38(10), pp. 724–733. doi: 10.1080/01900692.2014.956896.

Assembleia da República (2013) *Lei de Bases da Economia Social*, *Diário da República*. Lisbon: Diário da República n.º 88/2013, Série I-A de 2013-05-08. Available at: https://dre.pt/application/conteudo/260892.

Austin, J. E., Stevenson, H. and Wei-Skillern, J. (2006) 'Social and Commercial Entrepreneurship: Same, Different, or Both?', *Entrepreneurship theory and practice*, 30(1), pp. 1–22. Available at: https://www.clearlyso.com/wp-content/uploads/2015/02/Social-and-Commercial-Entrepreneurship-Same-Different-or-Both.pdf.

Bedenik, N. O. (2020) 'Pandemic crisis management', *The holistic approach to environment*, 10(4), pp. 109–123. doi: 10.33765/thate.10.4.3.

De Blasio, A. and Veale, R. (2009) 'Why say sorry? Influencing consumer perceptions post organizational crises', *Australasian Marketing Journal*, 17(2), pp. 75–83. doi: 10.1016/j.ausmj.2009.05.007.

Boyd, N. M. and Martin, E. C. (2020) 'Sense of community responsibility at the forefront of crisis management', *Administrative Theory and Praxis*, pp. 1–13. doi: 10.1080/10841806.2020.1765288.

Bragança, A. *et al.* (2021) *O Impacto da Pandemia de COVID-19 nas IPSS e seus Utentes em Portugal*. Porto. Available at: http://rotass.cnis.pt/wp-content/uploads/2021/03/Relatório-COVID-19-nas-IPSS.pdf.

Brinkmann, S. and Kvale, S. (2015) *InterViews: Learning the Craft of Qualitative Research Interviewing*. 3rd. Ed. California: SAGE Publications Inc.

Cacheda, B. G. (2018) 'Social Innovation and Crisis in the Third Sector in Spain. Results, Challenges and Limitations of "Civic Crowdfunding"', *Journal of Civil Society*, 14(4), pp. 275–291. doi: 10.1080/17448689.2018.1459239.

Cardona, J. and Campos-Vidal, J. F. (2019) 'The impact of the economic crisis on the practice of social casework', *European Journal of Social Work*, 22(6), pp. 874–886. doi: 10.1080/13691457.2018.1461065.

Civitillo, R., Ricci, P. and Simonetti, B. (2019) 'Management and performance of Non-Profit Institutions: finding new development trajectories—evidence from Italy', *Quality and Quantity*, 53(5), pp. 2275–2290. doi: 10.1007/s11135-018-0719-4.

Clulow, S., Dimitrouka, N. and Zapata, I. Z. (2020) 'COVID on three continents: how local children's organisations in Africa, Europe and South America are adapting to the coronavirus challenge', *Journal of Children's Services*, 15(4), pp. 295–303. doi: 10.1108/JCS-07-2020-0046.

Creswell, J. W. (2010) *Projeto de Pesquisa: Métodos Qualitativo, Quantitativo e Misto*. 3.ed. Edited by Artmed. Porto Alegre: SAGE Publications Inc.

Ebrahim, A. and Rangan, V. K. (2010) *The Limits of Nonprofit Impact: A Contingency Framework for Measuring Social Performance*, *Harvard Business School*. 10–099. Available at: https://www.hbs.edu/ris/Publication Files/10-099_0b80d379-8e88-4992-9e8f-4b79596b1ff9.pdf.

Enjolras, B. (2015) *Measuring the Impact of the Third Sector: From Concepts to Metrics*, *TSI Working Paper Nº5*. 05. Brussels. Available at: http://thirdsectorimpact.eu/site/assets/uploads/documentations/tsi-working-paper-no-5-measuring-the-impact-of-the-third-sector-from-concept-to-metrics/TSI_WP5_Measuring-TSI_Concept_to_Metrics1.pdf.

Enjolras, B. *et al.* (2018) *The Third Sector as a Renewable Resource for Europe: Concepts, Impacts, Challenges and Opportunities*, *The Third Sector as a Renewable Resource for Europe: Concepts, Impacts, Challenges and Opportunities*. Edited by Palgrave Macmillan. Cham: Springer International Publishing. doi: 10.1007/978-3-319-71473-8.

Feiock, R. C. and Andrew, S. A. (2006) 'Introduction: Understanding the relationships between nonprofit organizations and local governments', *International Journal of Public Administration*, 29(10–11), pp. 759–767. doi: 10.1080/01900690600769530.

Fernandes, R. C. (1994) *Privado porém público: o Terceiro Setor na América Latina*. 2 edição, *Privado porém público: o Terceiro Setor na América Latina*. 2 edição. Edited by Relume-Dumará. Rio de Janeiro: Relume-Dumará.

França, J. A. *et al.* (2015) 'Manual de Procedimentos para o Terceiro Setor'. Brasília, p. 228. Available at: http://www.plataformamaisbrasil.gov.br/images/manuais/Manual_de_Procedimentos_para_o_Terceiro_Setor.pdf.

Franco, R. C. (2005) *Defining the Nonprofit Sector: Portugal*. No.43. Baltimore.

Fux, L. ., Modesto, P. and Martins, H. F. (2017) *Organizações Sociais após a Decisão do STF na ADI n 1923/2015*. First. Edited by Fórum Conhecimento Jurídico. Belo Horizonte: Fórum Conhecimento Jurídico.

Gandía, J. L. (2011) 'Internet disclosure by nonprofit organizations: Empirical evidence of nongovernmental organizations for development in Spain', *Nonprofit and Voluntary Sector Quarterly*, 40(1), pp. 57–78. doi: 10.1177/0899764009343782.

Gilstrap, C. A. *et al.* (2016) 'Sensegiving, Leadership, and Nonprofit Crises: How Nonprofit Leaders Make and Give Sense to Organizational Crisis', *Voluntas*, 27(6), pp. 2787–2806. doi: 10.1007/s11266-015-9648-1.

Gioia, D. A., Corley, K. G. and Hamilton, A. L. (2013) 'Seeking Qualitative Rigor in Inductive Research: Notes on the Gioia Methodology', *Organizational Research Methods*, 16(1), pp. 15–31. doi: 10.1177/1094428112452151.

Harris, E. E. and Neely, D. (2021) 'Determinants and Consequences of Nonprofit Transparency', *Journal of Accounting, Auditing and Finance*, 36(1), pp. 195–220. doi: 10.1177/0148558X18814134.

Instituto de Pesquisa Econômica Aplicada [IPEA] (2021) *No Title*, *Mapa das Organizações da Sociedade Civil*. Available at: https://mapaosc.ipea.gov.br/resultado-consulta.html (Accessed: 27 March 2021).

Jaques, T. (2007) 'Issue management and crisis management: An integrated, non-linear, relational construct', *Public Relations Review*, 33(2), pp. 147–157. doi: 10.1016/j.pubrev.2007.02.001.

Kang, M. *et al.* (2020) 'COVID-19 impact on city and region: what's next after lockdown?', *International Journal of Urban Sciences*, 24(3), pp. 297–315. doi: 10.1080/12265934.2020.1803107.

Lecy, J. D., Schmitz, H. P. and Swedlund, H. (2012) 'Non-Governmental and Not-for-Profit Organizational Effectiveness: A Modern Synthesis', *Voluntas*, 23(2), pp. 434–457. doi: 10.1007/s11266-011-9204-6.

Lyth, A. *et al.* (2017) 'Valuing third sector sustainability organisations–qualitative contributions to systemic social transformation', *Local Environment*, 22(1), pp. 1–21. doi: 10.1080/13549839.2016.1149457.

Marshall, C. and Rossman, G. B. (2016) *Designing Qualitative Research*. 6th Ed. SAGE Publications Inc.

Mbazzi, F. B. *et al.* (2021) 'The impact of COVID-19 measures on children with disabilities and their families in Uganda', *Disability & Society*, 0(0), pp. 1–24. doi: 10.1080/09687599.2020.1867075.

Melo, R. D. (2020) *Coronavírus e o terceiro setor: necessidade de manutenção das parcerias e projetos*, *Migalhas de Peso*. Available at: https://www.migalhas.com.br/depeso/322440/coronavirus-e-o-terceiro-setor--necessidade-de-manutencao-das-parcerias-e-projetos (Accessed: 3 April 2021).

Ministério do Trabalho e da Solidariedade (1998) *Decreto-Lei No. 171 de 25 de Junho de 1998*. Portugal: Diário da República n.º 144/1998, Série I-A de 1998-06-25. Available at: https://dre.pt/application/file/478288.

Mobiliza (2020) 'Estudo Impacto da COVID-19 nas OSCs Brasileiras: da resposta imediata à resiliência'. Sao Paulo: Mobiliza, p. 8. Available at: https://voluntariadoempresarial.org.br/wp-content/uploads/2020/06/sumario_estudo_ocs_3-mOBILIZA.pdf.

Moreno-Albarracín, A. L. *et al.* (2020) 'Measuring what is not seen—transparency and good governance nonprofit indicators to overcome the limitations of accounting models', *Sustainability (Switzerland)*, 12(18), pp. 1–20. doi: 10.3390/su12187275.

Never, B. (2011) 'Understanding constraints on nonprofit leadership tactics in times of recession', *Nonprofit and Voluntary Sector Quarterly*, 40(6), pp. 990–1004. doi: 10.1177/0899764010378357.

NOVA School of Business & Economics [NOVA SBE] (2020) 'Questionário "Impacto do COVID-19 e do Estado de Emergência nas Organizações Sociais de Portugal"'. Lisbon: NOVA School of Business & Economics, p. 8. Available at: https://www2.novasbe.unl.pt/Portals/0/Files/DSKC_SIOsImpactCovid19_Results.pdf?ver=2020-05-04-173552-063.

OECD (2020) *OECD Employment Outlook 2020: Worker Security and the COVID-19 Crisis*. Edited by OECD. Paris: OECD (OECD Employment Outlook). doi: 10.1787/1686c758-en.

Ortega-Rodríguez, C., Licerán-Gutiérrez, A. and Moreno-Albarracín, A. L. (2020) 'Transparency as a key element in accountability in non-profit organizations: A systematic literature review', *Sustainability (Switzerland)*, 12, pp. 1–21. doi: 10.3390/su12145834.

Osborne, S. P. (2012) 'Debate: Can the third sector survive the recession? Evidence from Scotland', *Public Money and Management*, 32(4), pp. 245–247. doi: 10.1080/09540962.2012.691296.

Peng, S., Kim, M. and Deat, F. (2019) 'The Effects of Nonprofit Reputation on Charitable Giving: A Survey Experiment', *Voluntas*, 30(4), pp. 811–827. doi: 10.1007/s11266-019-00130-7.

Rigotti, T., De Cuyper, N. and Sekiguchi, T. (2020) 'The Corona Crisis: What Can We Learn from Earlier Studies in Applied Psychology?', *Applied Psychology*, 69(3), pp. 1–6. doi: 10.1111/apps.12265.

Salamon, L. M. and Sokolowski, S. W. (2014) *The third sector in Europe: Towards a consensus conceptualization*, *TSI Working Paper Series No. 2.* Seventh Framework Programme (grant agreement 613034). Brussels. Available at: http://thirdsectorimpact.eu/documentation/tsi-working-paper-no-2-third-sector-europe-towards-consensus-conceptualization/.

Santos, M. R. C., Laureano, R. M. S. and Machado, M. J. (2014) 'Contabilidade de gestão no terceiro setor: estudo empírico em instituições particulares de solidariedade social', *Tourism & Management Studies*, 10(Special Issues), pp. 79–87.

Shier, M. L. and Handy, F. (2016) 'Cross-Sector Partnerships: Factors Supporting Social Innovation by Nonprofits', *Human Service Organizations Management, Leadership and Governance*, 40(3), pp. 253–266. doi: 10.1080/23303131.2015.1117556.

Sorribes, J., Celma, D. and Martínez-Garcia, E. (2021) 'Sustainable human resources management in crisis contexts: Interaction of socially responsible labour practices for the wellbeing of employees', *Corporate Social Responsibility and Environmental Management*, 28(2), pp. 936–952. doi: 10.1002/csr.2111.

Suspiro, A. (2016) *O que é e o que vale a economia social*, *Observador*. Available at: https://observador.pt/2016/05/19/o-que-e-e-o-que-vale-a-economia-social/ (Accessed: 22 March 2021).

United Nations [UN] (2018) *Transforming Our World: The 2030 Agenda for Sustainable Development*, *United Nations*. United Nations. Available at: https://sustainabledevelopment.un.org/content/documents/21252030 Agenda for Sustainable Development web.pdf.

Zabdyr-Jamróz, M. (2017) 'Voluntary (NGO) sector involvement in health promotion for older population in Europe', *Epidemiology Biostatistics and Public Health*, 14(2), pp. 1–12. doi: 10.2427/12420.

Management Issues in the Family-Owned Businesses From Romanian Publishing Industry During Succession Process

Cezar Scarlat and Gabriela Doina Stănciulescu[1]
Doctoral School of Entrepreneurship, Business Engineering and Management, University "Politehnica" of Bucharest, Romania
cezarscarlat@yahoo.com
stanciulescu.gabriela2na@yahoo.com
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Abstract: This paper proposes a discussion on the management practices and management conflicts identified in family-owned businesses, active in the Romanian book publishing industry for about two decades – in order to be old enough to reach their lifecycle's growth or maturity stage (hence the management practices to be identified). As the selected companies are of similar age and size, facing the situation of transferring the company management to their successors, the authors' focus is, specifically, on the management conflicts that have emerged during this succession process (hence the management conflicts which possibly emerge during this process). The research methodology includes both secondary research (literature survey) and primary research (interviews with executives of the selected companies). A set of 17 companies from the target group answered and accepted to be interviewed. The merit of this study is the specific investigation of a set of companies of similar age and size, active in a single industry from Romania, facing similar issue of succession – revealing their management practices as well as possible correlation between management level and intensity of management conflict. The implications are of interest for theorists – as academics and researchers – as well as for practitioners – as founding entrepreneurs facing current or potential situation of transferring the management of the business to their heirs. The lessons learnt from the cases analysed are actually useful for all managerial levels, and applicable not only in the book publishing industry.

Keywords: family-owned businesses, organization lifecycle, management practices, succession process, management conflicts, Romanian book publishing industry

1. Introduction

After two generations of communism and centrally planned economy – that have interrupted an unprecedented flourishing inter-war economic development – the Romanian economy re-started in 1990. One of the sectors that have taken off was the *publishing industry*, in its two branches: firstly, the newspapers publishing (in a kind of "rush" to privatize, literally by any means, the former state-owned printing companies) and the book publishing, mainly by private entrepreneurial initiatives. The latter features relatively higher educated entrepreneurs with technology background (some of them linked to printing industry), lower investments, and favourable market environment – from that perspective of relatively educated, book-loving population. Many of the new small publishing houses started up as *family businesses.* After two-to-three decades of organic development as family-owned businesses, many of them have reached the maturity stage of their lifecycle (on the one hand) and, on the other, the founding entrepreneurs are gradually retire and their heirs are taking over – in a process known as *succession*, either management succession only or complete (ownership and management) succession process.

As family business is not a prominent area of study in Romania, the authors initiated a research project, its scope of work being family-owned, small or medium-sized enterprises active in the Romanian book publishing industry.

Thus, this paper presents some of the results of this research project in progress, and its focus is on two types of *management issues* (*i.e. management practices* and *management conflicts*) among members of this class of companies, actually old enough to be reaching the maturity stage of their *organizational lifecycle* or very closed to it, in different phases and types of growth.

While the management practices are linked to the organizational lifecycle (Scarlat and Şişu, 2019; 2021; Şişu and Scarlat, 2019a; 2019b) and growth phase (Greiner, 1972, 1998), the management conflicts are likely to be associated with the succession process in the family-owned businesses (Niculescu, Stănciulescu and Niculescu, 2020). Therefore, the investigation area is limited to the family-owned, more than two decades old businesses, facing the succession process, active in the Romanian book printing industry.

[1] Corresponding author

The remaining of the paper is structured as follows: literature survey on the organization lifecycle in general and growth stage in particular; research methodology; results and discussion; conclusions and managerial implications as well as limitations and further research paths to be explored.

2. Management practices during the phases of growth along organizational lifecycle

It is expected that SMEs (small and medium-sized businesses), which are young firms too, to be more adaptable and flexible in chasing the opportunities identified by the entrepreneur, two-fold: because the founding entrepreneur is leading the company directly and, because of the size, they are managed easier. In their dynamics, more entrepreneurial and more successful a small business is, larger in size it grows; and, as Stevenson and Jarillo-Mossi (1986) observed, while growing, the "seeds of destruction are sown" and the "transition from an entrepreneurial growth firm to a 'well-managed' business is often accompanied by a decreasing ability to identify and pursue opportunities" – in other words, to be less entrepreneurial. Exactly for this very reason, it is important to have a closer look with the researcher's eyes and tools to examine the *management practices of small companies along early stages of the its organization lifecycle*.

The concept of lifecycle was adopted by management authors in time, by analogy to the biological lifecycle ("from cradle to grave"), and adapted to several suitable cases as product lifecycle, project lifecycle, technology lifecycle, but also *industry lifecycle, business lifecycle and organization lifecycle*. According to most authors – from Churchill and Lewis (1983) to Lester, Parnell and Carraher (2003) and Lester and Parnell (2008) – the organization lifecycle counts four or five stages bearing more-or-less similar names.

The topic has proved to be so attractive that occasionally several scholars conducted studies on the existing lifecycle models – as Hanks (1990) has completed. The most common five-stage lifecycle includes: *Entrepreneurial* stage, *Start-up* or just Existence stage (it starts right after the organization's birth – organization's creation); *Survival* (sometimes associated with significant growth); *Maturity* or Success; *Renewal* (then associated with innovation, creativity and decentralized management); *Decline* (which, eventually, ends at organization's death – termination). Regardless the number of the stages, the general pattern of the organization evolution is the same, passing through periods of expansion – as shown by Mintzberg (1984) and, at a point in time, termination – by Kimberly and Miles (1980). Zone (2013) investigated the organization lifecycle in qualitative terms, considering three management dimensions (ethics, mode of functioning, procedures and regulations), while Greiner (1972, 1998) focused on the growth aspects of the organization lifecycle, considering five management practices (management focus, organizational structure, style of the top management – one of which is entrepreneurial, control system, management reward system).

Table 1 depicts the five phases of growth, each of them defined by evolution and revolution periods (generated by different types of crises): growth by creativity (limited and followed by a leadership crisis); growth by direction (followed by an autonomy crisis); growth by delegating (limited by control crisis); growth by coordination (limited by so-called 'red tape' bureaucratic crisis); growth and expansion by collaboration – which is using more flexible management structures.

Table 1: The chart of organization's management practices, by phases of growth – after Greiner (1998)

Management practices	The five phases of growth (and the respective types of growth)				
	Phase 1	*Phase 2*	*Phase 3*	*Phase 4*	*Phase 5*
	Growth by creativity	Growth by direction	Growth by delegating	Growth by coordination	Growth & expansion by collaboration
Management focus	'Make & sell'	Operations efficiency	Market expansion	Organization consolidation	Problem solving & innovation
Organizational structure	Informal	Centralized & functional	Decentralized & geographical	Line staff & product groups	Matrix of teams
Style of the top management	Individualistic & entrepreneurial	Directive	Delegation	'Watchdog'	Participative
Control system	Market results	Standards & cost centres	Reports & profit centres	Investment centres & plans	Mutual goal setting
Management reward system	Ownership	Salary & merit increases	Individual bonus	Profit sharing & stock options	Team bonus

The 5-phase Greiner model is convenient from management standpoint, in case of growing companies – which is the most interesting instance to study (as all other companies are falling). Therefore, the focus of the present study is to identify the management practices of the selected companies, and their phase of growth (sense Greiner).

In practice companies belonging to the same group follow the same strategic line – the group strategy (Scarlat and Şişu, 2019; Şişu and Scarlat, 2019a; 2020) – and it is likely to display similar management practices, even they are not in the same stage of the organizational lifecycle (Şişu and Scarlat, 2019b; Scarlat and Şişu, 2021). The question is: *How identical from managerial standpoint (as management practices) are the companies from the same national industry, of similar age and size, sharing such peculiarity as being family-owned?*

And, in addition: *How much are inclined to management conflicts the family-owned companies from the same national industry, of similar age and size, while facing the succession process?*

3. Research methodology

This exploratory, qualitative study progressed along the year of 2020, and covered companies, of similar age and size, active in the Romanian book publishing industry, sharing the same peculiarity (family-owned business). The selection was restricted to companies legally registered in about same period (1990-2000) *i.e*. companies of reasonably similar age – in order to create premises to currently face the succession situation: to decide on transferring the company management (with or without ownership transfer) to their heirs.

As size, the focus was specifically on small and medium-size companies – according to the European standards by number of employees (EU, 2003). Noteworthy, these ceilings (small firms more than 10 and less than 50 employees; medium-sized enterprises between 50 and 250) apply to individual firms only. A firm that is part of a larger group may need to include staff headcount /turnover/balance sheet data from that group too. However, for the purpose of the current study, the categorisation is made by the individual firm's staff headcount only.

Letters of invitation were sent to more than 100 companies with the above characteristics, and 17 answered and accepted to be interviewed. The corona-virus crisis – that has occurred in Romania in February 2020 and was associated with successive series of restrictions – made the process more difficult, just companies from Bucharest area were investigated (all were registered as limited liability companies) and only the results of complete interviews with 5 companies are presented (*Table 2*).

For confidentiality reasons, simply the initials of the company are mentioned.

Table 2: List of selected companies, by age and size (EU, 2003)

No.	Company	Age [year established]	Categorization by size [no. employees]
1	ORZ	1990	Micro
2	GDD	1991	Micro
3	MPR	1993	Micro
4	CAN	1993	Small
5	CPH	1999	Medium

The research methodology included both secondary and primary research. The secondary research consisted mostly on literature survey but also group's and group members' documents (external sources). The primary research consisted of observation and interviews with executives of the selected companies.

The interviews were conducted around the interview guide, as specific instrument developed for this purpose (Table 3).

Table 3: The structure of the interview instrument (interview guide) – the sections related to the company lifecycle and management practices (B) and succession process and management conflicts (C)

Section	Level I (main)	Level II (detailed)	
A	Identification data	1	Company (age, size, *etc*.)
		2	Company manager
B		3	Stage of the organization lifecycle

Section	Level I (main)	Level II (detailed)	
	Stage and phase of the organization lifecycle	4	Phase of the growth stage – management practices
	Other: open commentaries about the company organization lifecycle and *management practices* (company specific)	5	About the stage of the organization lifecycle
		6	About the phase of the growth stage
		7	About the management practices and their evolution
C	Succession process and management conflicts	8	Type of succession
		9	Management conflicts – their roots, parties involved, management level, intensity
	Other: open commentaries about the succession process and *management conflicts* (company specific)	10	About the succession process
		11	About the management conflicts and their evolution

Because of the specificity of the interview matter – distance, as well as the overlap of the summer vacation period and the unfortunate *coronavirus* pandemic crisis – the interviews were all-types (face-to-face, by e-mail and online), distributed in several chunks of time each, spread over a period of several months. As result of objective conditions, the interviews have progressed at different pace; in other words, the interview map was covered in various percentage from company to company. The data presented in this paper were collected over a period of four months (September – December 2020).

At the time of producing this paper (February 2021), the data processing is still in progress; nevertheless, the results – related to the management practices during the growth phases and management conflicts along succession process – are shared in this paper.

4. Results and discussions

The results of the study are systematically presented, company by company, in such a manner to be comfortable to identify the specific management practices of the five companies and, then, on these bases, the growth phase is assessed (correspondence – as shown in *Table 1*).

Table 4: The growth phases of the companies, by their management practices – as assessed by their executives

Management practices	Growth phase, by companies									
	ORZ		GDD		MPR		CAN		CPH	
	bp*	ap	bp	ap	bp	ap	bp	ap	bp	ap
Management focus is on:	4	2	2, 3	2	4, 5	4	1, 2	2, 5	1, 2, 3	1, 2, 3
Organizational structure is:	2	2	4	4	2, 4	2	2	1, 2	2, 4	2, 4
Style of the top management is:	2	2	2	2	3	3	3, 5	1, 3, 5	1, 3	1, 3
Control system is based on:	1	1	5	5	1, 5	1, 5	3, 5	3, 5	1, 3	1, 3
Management reward system:	2	3	4	4	2	3	2, 3	2, 3	2, 3	2, 3
Overall conclusion	2	2	2→4	2→4	2→4,5	~3	2→3	2→3	3	3

* Growth phases (1, 2, 3, 4, 5) in two instances: bp = before pandemic; ap = after pandemic

The decisions of picking the characteristic attribute/s of specific management practices are made by the company founders, all acting in executive roles. The results are presented in *Table 4*.

Analysing the results of interviews with the company executives (*Table 4)*, and comparing them with the Greiner model (*Table 1*), the conclusion is that just one company is in *Phase 3 (Growth by delegation)* and one in *Phase 2* (*Growth by direction*), while the other three companies are in different types and/or phases of transition from *Phase 2* to superior phases – either to *Phase 3* or jumping directly to higher phases (*Phase 4* or even *Phase 5*).

Surprisingly, processing the information provided by the company executives, it looks that, for companies *older than two decades* (in the range 21 … 30 years), *the age does not influence too much the overall phase of growth*, showing an average profile around growing by delegating (phase 3). Another argument supporting this observation is that the oldest (ORZ) and the youngest company (CPH) – difference: nine years of age – display opposed than expected phases of growth: the oldest is in the least advanced growth phase (growth by direction) and the youngest in a more advanced (growth by delegation).

The expected common knowledge would be that company management needs to adapt or even reinvent itself in case of crisis, in order to limit its economic effects; in case of the current pandemic crisis, there are the effects of the associated isolation measures, too. The cases investigated show that management practices have been influenced by the Covid-19 pandemic differently: from absolute rigidity (*the management reward system remained unchanged* in all companies investigated) or almost rigidity (the *top management style unchanged in four* out of five companies) to clear sensitivity to pandemic (*management focus has changed in four* out of five companies investigated). The other two management practices (*organizational structure* and *control system*) display moderate sensitivity to pandemic.

In general, the management practices largely vary, company by company and practice by practice, each case needing particular discussion. Same resolution applies in case of the three most significant changes of the respective management practices post- *versus* pre-pandemic (*Table 4*, marked in yellow colour).

The interview with the executive director of ORZ company (*Table 4*) shows that their firm evolves predominantly in *Phase 2* of the Greiner model (*Table 1*), namely *Growth by direction*, for three management practices (organizational structure, style of top management and management reward system), being concerned with organization consolidation (*Phase 4*) but also with the monitoring of the company's market results (*Phase 1*). Currently, due to the pandemic effects, management practices focus on the operations efficiency (*Phase 2*) and the control of salary expenditures through individual bonuses (*Phase 3*).

The results of interview with the GDD executive show that company has characteristics specific to *Phase 2* (*Growth by direction* – for management focus and style of the top management) and *Phase 4* (*Growth by coordination* – for organizational structure and management reward system). The management focus is on operations efficiency (*Phase 1*) and mutual goal setting (*Phase 5*). This uncharacteristic combination may require further in-depth analysis to clarify whether a rapid transition to a higher phase is attempted or an innovative management style is experienced. Interview notes point to the last option. In addition, as a microenterprise, the delegation is not a solid option by now.

The director of the MPR publishing house appreciates that the company evolves from *Phase 2* for the organizational structure and management reward system to *Phase 4* for management focus and organizational structure and to *Phase 5* for management focus and control system. Style of the top management corresponds to *Phase 3 (Growth by delegating)*. Here, too, there is an 'original' combination of management practices, compared to the Gainer model, suggesting the intention of a rapid transition to a higher phase, but also maintaining control over market results in this difficult period for the industry. It looks like coronavirus pandemic made the management practices more coherent (towards the *Phase 3*).

The general manager of CAN publishing house, which has a national visibility, appreciates that at the moment the company is in the `reinvention` phase according to his vision. From the results of the interview, the company presents characteristics of both *Phase 2 (Growth by direction* – for three management practices: management focus, organizational structure and management reward system) and Phase 3 (*Growth by delegating* – for style of top management, control system and management reward system). Before the pandemic, four management practices were mixed, but now all practices are mixed to best deal with the current crisis situation. Thus, the style of the top management combines components of *Phases 1, 3 and 5* (entrepreneurial, delegation and participatory) and the control system has a component of *Phase 3* (report & profit centre) and one of *Phase 5* (mutual goal setting). In addition, the practice of management reward system combines *Phase 2 and 3* (salary & merit increases and individual bonuses). In this case, there is an original management style, stimulating and participatory at the same time, overall evolving from *Phase 2* to *Phase 3*.
The founder of CPH, the only medium-sized company (according to number of employees), said in an interview that he didn't make changes in management practices due to the pandemic effects because the book publishing

currently provides only 3% of the company's turnover (the main part is provided by other printing activities). Analysing the results of the interview and comparing them with the Greiner model, we conclude that the company mainly presents the characteristics of *Phase 3 (Growth by delegating* – for four management practices: management focus, style of the top management, control system and management reward system). In three management practices, the company evolves from *Phase 2 (Growth by direction* – management focus, organizational structure and management reward system) to *Phase 3*, all management practices being mixed. Thus, the management focus is on the first three phases, the system control is also done through market results, and the organizational structure has a *Phase 2* component (centralized & functional) and a *Phase 4* component (line staff & product groups).

To note that "breach" situations between the phases of the management practices are not uncommon, for various reasons – from lack of management skills to management creativity. If for young companies, the cause could be too high pace of development or, simply, the lack of management experience, in other cases (as the cases investigated), the reason resides in internal conflicts and/or external crises and turbulences. On the other hand, the Greiner model should be referred to just as an orientation tool, not as a rigid 'Bed of Procrustes'.

The differences between the 5 companies are not justified by their age – because all are very similar form this standpoint (established 1990-2000), and are not young companies anymore. In addition, they are active in the same industry and sharing industry features. Consequently, the differences might be the result of managers' different individual approach and/or local market influences and even different cultural prints. In addition, mixed management practices seem to be characteristic of mature companies, with complex activity in various branches and types of products.

Table 5 presents a synthesis of results of interviews, related to the section C (*Table 3*) of the interviews, regarding the management conflicts that appeared during the succession process (Niculescu, Stănciulescu and Niculescu, 2020).

Table 5: Examples of management conflicts identified during succession process

Conflict type		**Conflict intensity***			
		D	L	S	C
Parties [or levels] in conflict	Owner** – to – owner	Long-term Strategic view (CAN)	Management strategy (CAN)	Change of interest of the minority shareholder (MPR)	–
	Owner – to – managers	–	Management style, Personnel policy (CAN)	Acceptance of the successor as general manager (CAN)	Disinterest and lack of involvement of managers (MPR)
	Owner – to – specialists	New product & Editorial style (CAN)	–	Short-term working decisions; Technology & Personnel policy (CAN)	–
	Owner – to – staff	–	Working decisions & Personnel policy (MPR)	–	Internal behavior Personnel policy (CAN, MPR, ongoing)

* D=different views/opinions, L=latent conflicts, S=solved conflicts, C=conflicts with significant consequences

** Owners: either funder or successor

Analysis the results of interviews shows that only one company (CAN) carried out the succession and during and after this process there were certain divergences and conflicts that the successor had to resolve.

The founder of MPR also points out a number of conflicts in the company, including: change of minority partner (the founder's sister replaced by his wife) due to change of interest in the business, conflicts with managers due to their weak involvement in the company and staff on reasons for production discipline (compliance with rules and deadlines).

Conflicts between founder and successor or between the partners were resolved through dialogue and personal agreements. In the relationship between the successor (as general manager) and the managers of the CAN company, the conflicts were resolved amicably by imposing clear performance rules, and those who did not respect them were released from office.

The successor (general manager) imposes a code of conduct in the company and establishes the consequences borne by the employees in case of non-compliance. The rules and restrictions of the code of conduct create conflicts between employees and decision makers in the company, which have intensity and consequences proportional to the hierarchical difference between the parties to the conflict.

The conflicts presented in *Table 5* have a certain degree of generality for the family companies in the publishing industry, but also for those in the technology companies. Most businesses in the publishing industry in Romania are on the verge of achieving the first succession of the business, a process that generates divergences and even conflicts between the people involved. Therefore:

- Founder-successor conflicts appear due to the different vision on the company's development strategy. The founder has an entrepreneurial vision of growing the company, with little emphasis on its restructuring and modernization which are main objectives for successors.

- The successors in the publishing industry, generally beneficiaries of a higher technical-economic education, focus on restructuring the company and streamlining its activity.

- Conflict resolution is done according to the work style of each manager, through amicable agreement, imposing hierarchical decisions, appealing to the internal code of conduct, and ultimately dismissing those who oppose the decision of the general manager.

5. Conclusions and managerial implications, limitations and further research

The objectives of this explorative study are fully matched: the management practices of the surveyed set of companies as well as their growth phases and lifecycle stages were identified. The research was based on, and the results are in line with the significant literature in the area. Using a mix of research methods, the management practices and growth phases of the selected companies were assessed qualitatively, yet objectively, observing the relevant experience in this area.

Yet this study is only a segment of a larger research project, which covers a considerable period of almost three decades (1990-2020). The authors present the results of the current situation (2020) of the growth phase the companies have reached, from the perspective of their management practices and management conflicts that might emerge during succession process. Thus, the prospective of more complex study of how the management practices and strategic changes, entrepreneurial behaviour and lifecycle stage or growth phase are all intertwined. This is actually the merit of this study: although based on existing models, it is exploring the relationships management practices and growth phase, as well as the management conflicts during succession process, by piloting an investigation of a set of small companies, active in a single industry (book printing).

The management implications are significant, mostly for the family-owned businesses that reached the succession timing, and are facing potential conflicts of management. Although very limited as number of cases, the analysis of the initial results regarding the management conflicts suggests that *it could be a correlation between conflict intensity and the management level: higher the hierarchical level, less intense the conflict is.* In other words, *intensity of the management conflict may depend on the gap between the management levels involved in that conflict* – which is a matter of further studies.

As part of larger research work-in-progress, there are inherent limitations as: number of the companies surveyed, from a single one industry. They all represent promising research areas to be further explored – still focused on small and/or medium-sized enterprises. Further identification of other managerial issues – as strategic changes and/or entrepreneurial behaviour (Şişu and Scarlat, 2020), while assessing management practices and growth phase, are also reachable research objectives for future studies.
The paper conclusions and implications are important for theorists as well as business owners, investors, and managers – helping them to make appropriate strategic decisions and adopt the best management practices – as well as founding entrepreneurs facing current or potential situation of transferring the management of the

business to their heirs. The lessons learnt from the cases analysed are actually useful for all managerial levels, and applicable not only in the book publishing industry.

References

Churchill, N.C. and Lewis, V.L. (1983) "The Five Stages of Small Business Growth", *Harvard Business Review*, Vol. 61, No. 3, May-June 1983, pp 30–50. [Reprint HBR 83301]

EU (2003) EU Recommendation No.2003/361: Commission Recommendation of 6 May 2003 concerning the definition of micro, small and medium-sized enterprises, notified under document number C(2003) 1422. [online] Retrieved from: http://data.europa.eu/eli/reco/2003/361/oj Accessed 17 July 2020.

Greiner, L.E. (1972) "Evolution and Revolution as Organizations Grow", *Harvard Business Review*, July-August 1972, pp 37–46.

Greiner, L.E. (1998) "Revolution Is Still Inevitable" [an update to Greiner (1972)], *Harvard Business Review*, May-June 1998. [online] Retrieved from: https://hbr.org/1998/05/evolution-and-revolution-as-organizations-grow Accessed 25 July 2020.

Hanks, S. (1990) *An empirical examination of the organizational life cycle in high technology firms*, Doctoral dissertation, The University of Utah, Salt Lake City, UT.

Kimberly, J. and Miles, R. (1980) *The Organizational Life Cycle*, Jossey-Bass Publishers, San Francisco.

Lester, D., Parnell, J. and Carraher, S. (2003) "Organizational life cycle: A five-stage empirical scale", *International Journal of Organizational Analysis*, Vol. 11, No. 4, pp 339–354.

Lester, D. and Parnell, J.A. (2020) "Firm size and environmental scanning pursuits across organizational life cycle stages", *Journal of Small Business and Enterprise Development*, Vol. 15, No. 3, pp 540–554.

Mintzberg, H. (1984) "Power and Organization Life Cycles", *Academy of Management Review*, Vol. 9, No. 2, pp 207–224.

Niculescu, S., Stănciulescu, G.D. and Niculescu, A. (2020) "Management conflicts in technology-based family businesses", *FAIMA Business & Management Journal*, Vol. 8, Issue 4, December 2020, pp 33–43.

Scarlat, C. and Şişu, M. (2019) "Strategic changes along the lifecycle of small international organizations. A case from Romania", in Kiril Todorov and Jan Degadt (Editors): Youth and Women Entrepreneurship in Challenging International (Global) Business Environment [Proceedings of the Ninth International BAMDE Conference, 11-14 June 2018, Varna, Bulgaria]. Sofia, Bulgaria: Bulgarian Association for Management Development and Entrepreneurship (BAMDE), pp.157–169.

Scarlat, C. and Şişu, M. (2021) "Studying the lifecycle of an international group: A closer look at growth phases of its companies". *U.P.B. Scientific Bulletin*, Series D, Vol. 83, No. 1, pp 293–304.

Stevenson, H.H. and Jarillo-Mossi, J.C. (1986) "Preserving Entrepreneurship as companies grow", *Journal of Business Strategy*, Vol. 7, No. 1, pp 85–94.

Şişu, M. and Scarlat, C. (2019a) "Strategic Changes in an International Group and their Influence on Strategies of Group Firms during the Growth Stage of their Lifecycle", *ICMIE Series No.9*, November 2019 [Proceedings of the 9th International Conference of Management and Industrial Engineering – ICMIE 2019: "Management Perspectives in the Digital Transformation", November 14th-16th, 2019, Bucharest, Romania], pp 409–418.

Şişu, M. and Scarlat, C. (2019b) "Strategic Changes at Group Level and their Impact on Management Practices of Group Members along the Phases of their Growth Stage", *ICMIE Series No.9*, November 2019 [Proceedings of the 9th International Conference of Management and Industrial Engineering – ICMIE 2019: "Management Perspectives in the Digital Transformation", November 14th-16th, 2019, Bucharest, Romania], pp 398–408.

Şişu, M. and Scarlat, C. (2020) "Entrepreneurial behaviour of an international group", *FAIMA Business & Management Journal*, Vol. 8, No. 4, pp 19–32.

Zone, S. (2013) "Management System and Organizational Life Cycle: A Qualitative Study", *International Journal of Business and Management Studies*, Vol. 5, No. 1, pp 448–460.

The Role of Mentoring for Women Entrepreneurs in a Rural Context

Alison Theaker
School of Management, University of Bath, UK
At2313@bath.ac.uk
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Abstract: This paper aims to examine whether mentoring is effective in supporting women in a rural context to engage in entrepreneurial activity. It seeks to contribute insights to the development of institutional support programmes, and thus bridge the gap between policy and practice as well as creating value, employment and community involvement. There is no clear definition of what constitutes rural enterprise in the UK, a rural enterprise is simply a business registered at an address in an area defined as rural by the Department of Rural Affairs. A useful classification of rural entrepreneurship distinguishes "rural entrepreneurship" (RE) and "entrepreneurship in the rural" (EIR). The latter uses the rural context simply as a location. The former is embedded in the rural context. An interpretivist approach was adopted using a qualitative research design. One-off in-depth interviews were conducted with a sample of 24 women who operate in some of the most common areas for women entrepreneurs and 6 of their mentors. Quota sampling was combined with a purposive approach to select those who had had experience of mentoring. Upbringing was found to be a major influence on whether women engaged in entrepreneurship. Most stated that there had been no suggestion that this was a possibility from their schooling. With regards to mentoring, most expressed the view that it was "vital". Most were very pragmatic about seeking out practical advice. The most significant form of mentoring was found to be peer mentoring, from women's business networks, professional associations and online networks. Bearing in mind the small sample size, the findings indicate a more targeted approach to mentoring programmes should be taken. Peer mentoring has not been explored in depth. More could be done to support established businesses rather than a focus on start ups. In addition, the curriculum could be broadened to include recognition of entrepreneurship as a valid career path.

Keywords: mentoring, women entrepreneurs, gender, rural enterprise

1. Introduction

Whilst the number of women-owned enterprises has been increasing substantially in recent decades, women still lag behind men in the creation of new enterprises. Mentoring is a form of support that is suggested as particularly relevant to women entrepreneurs as it is flexible and bespoke to the mentee, and provides a role model in the form of a successful women business owner (Laukhuf and Malone, 2015; McMullan and Price, 2012). It is suggested that this is especially important where societal stereotypes see the entrepreneur as typically male, and women have to manage this disconnect with their own desires and experience (Kobeissi, 2010; Wilson and Tagg, 2010). Further, women may tend to have other ambitions for their business than purely growth, so success comes with different criteria (Baker and Welter, 2017;Horvoka and Dietrich, 2011; Sharafizad and Coetzer, 2015), and this has influence upon the mentoring relationship.

The role of mentoring for entrepreneurs in a rural economy has not been specifically addressed, which is surprising given that it is known that the entrepreneur is subject to the norms of the location in which they are based. (Deller, Kures and Conroy, 2019; Nelson, Santana and Wood, 2016; Webster, 2017).

This study seeks to understand the importance of mentoring for women entrepreneurs in a rural economy. It aims to contribute to the debate about the suitability of mentoring for women in particular by undertaking a qualitative study with women entrepreneurs living in Devon who have experienced mentoring. A sample of mentors was also interviewed in order to gain a complete view of the mentoring relationship.

The experience of mentoring and whether or how this links to business success for women entrepreneurs has not been examined by previous researchers, although claims are made for its importance (Overall and Wise, 2016; Sarri, 2011; Terjesen and Sullivan, 2011). Also, although studies have been conducted in a variety of settings, the experience of women who are in a rural economy has tended to focus on developing rather than developed countries. In addition, the exact components of successful mentoring have not been determined. This study will further the current debate, as well as contributing to the development of institutional support programmes to better serve those women who seek to become entrepreneurs.

2. Literature review

Several studies have addressed how a rural environment may affect entrepreneurship but many of these have been situated in developing economies (Patridou and Glaveli, 2008; Stefan, 2014; Odoul et a.l,2017; Naminse, Zhuang and Zhu, 2019). Enabling women's entrepreneurship has been suggested as a major element to increase economic activity in such areas. Indeed, policy in developed countries has also emphasised women's entrepreneurship as a solution to underdeveloped areas. This leads to questions of what is meant by "entrepreneurship" and what influence context has on women's experience of entrepreneurship.

Entrepreneurship theory has concentrated on what some refer to as "nexus" entrepreneurs, "externally financed non-family, profit-focused growth ventures in developed economies.. .run by ..educationally and economically privileged men with their eyes on the prize of a lucrative 'exit' event" (Baker and Welter, 2017:170). Because the stereotypical picture of an entrepreneur is male, women have to deal with the contradiction between their feminine identity and being a business owner (Swail and Marlow, 2018).

Context can provide particular opportunities but also set boundaries for those who wish to engage in entrepreneurship (Welter, 2011). Welter (ibid) defines dimensions of context as: business; social; spatial and institutional (ibid). Other types of context could be environmental and cultural. For women, entrepreneurship can imply "breaking out of the norms" (Berg, 1997:265 in ibid: 171). Often women start home-based businesses, which may be viewed as leisure activities or "lifestyle" businesses. This does not take into account the spatial context which may restrict women's ability to conduct business outside the home.

In 2016 the Federation of Small Businesses (FSB) in the UK conducted a survey to look at the importance of women's entrepreneurship to the UK economy. The report found that women-led businesses were concentrated in several sectors: real estate (27%); health and social work (18%); community, social and personal services (18%). Wholesale and retail was another significant sector (16%). The flexibility of running one's own business was a major draw for women, who could continue to be more involved in childcare and family life. The FSB found that whilst women entrepreneurs faced the same challenges as male-led SMEs, there were particular areas of concern. Mentoring was key in helping entrepreneurs to grow their business, and for women it was particularly important to develop self-confidence in their own skills and abilities (FSB, 2016:15).

There is no clear definition of what constitutes rural enterprise. In the UK, a rural enterprise is simply a business registered at an address in an area defined as rural by the Department of Rural Affairs (DEFRA) which is based on population density. A rural entrepreneur could be simply "an individual who manages a venture in a rural setting" (Henry and McElwee, 2014:5).

A useful classification of rural entrepreneurship is whether they are exhibiting "rural entrepreneurship" (RE) or "entrepreneurship in the rural" (EIR). The latter uses the rural context simply as a location and tends to be concerned with profit and mobility. The location of the enterprise is simply due to advantages for the business and the entrepreneur. This enterprise could take place anywhere and could be moved if the entrepreneur wished it. It does not involve engagement between the enterprise or its human actors and the location. The former on the other hand is embedded in the rural context and has a close relation with it. It could not be moved to another location without changing its nature completely. There may be other motivations for running the enterprise, not just financial returns, such as personal, societal or cultural aspirations. The entrepreneur may utilise local social networks to serve local development and may feel a sense of responsibility for their community. For both types of entrepreneur, spatial context is paramount (Korsgaard, Muller and Tanvig, 2015).

Nelson, Santana and Wood (2016) differentiated businesses into joia (jewel) or bijuteria (trinket) classifications. The joia or boutique model was more likely to be run by those characterised as 'corporate refugees' who had moved to the area, attracted by the cultural atmosphere and setting. They often saw their businesses as a way to pursue a rural lifestyle, seeking to preserve the historic nature of the town. Those with an individualistic mindset were more likely to be native business owners who were focussed on profit and tended to run bijuteria enterprises, viewing their businesses as a way of maximising profit.

Some researchers have suggested that women entrepreneurs in particular benefit from institutional support and that this is vital to their success. Institutions set out the "rules of the game" that shape an individual's behaviour and beliefs (Meyer and Scott, in Kazumi and Kawai, 2017:347) and it is "essential for female

entrepreneurs to gain institutional approval" (ibid:349). Women who receive support in this way may feel more confident and be able to deal with any negative constraints attached to perceptions of women entrepreneurs.

Mentoring has been classified as "a formal learning relationship within an organisational context," where "mentors support and challenge the mentees to recognise their career potential", with the result that "both parties perceive they are learning and gaining from the relationship (Jones, 2012:59). Other research suggests that "the purpose of mentoring is to learn from the experience of others" and mentors have "been there and done that" (Pawson in Sarri, 2011:722). St Jean (2012:202) adds that the mentor is a person who is in a "position of authority", who "kindly watches over a younger individual".

St Jean (2012: 206) devised a conceptual framework which sets out nine roles for the mentor. The reflector gives the mentee feedback, reflecting the image they portray to others enabling the mentee to identify strengths and weaknesses. The second role of reassurance gives the mentee the ability to put things into perspective and relieve stress. The motivator encourages and helps the mentee to build self-confidence. The fourth role is that of confidant, which may develop over time. These four roles are classed as psychosocial functions. The mentor also helps the mentee to be integrated in the business community by introducing them to contacts. Another role is that of information support, passing on knowledge of management, legal and industry considerations. The mentor may also confront the mentee's ideas, encouraging deeper reflection and improved problem solving. The role of guide is the fourth function which is included in the career-related category of mentor roles. Finally, the mentor may act as a role model. This framework provides a useful tool to measure the most effective elements of the mentor function in the proposed study with women entrepreneurs.

Women mentors can provide essential role models for those women who are starting their businesses. The European Commission (2000 in McMullan and Price, 2012)) states that "mentoring programmes would be beneficial for women entrepreneurs", and should use "successful women entrepreneurs as mentors" (ibid:199). Mentors were able to challenge them, discover their strengths and use them, helping women align their personal and business goals (Laukhof and Malone, 2015).

3. Methodology

Given that this study is examining the experience of women entrepreneurs, the identification of objective entities would not be possible. The interpretivist approach seeks to understand how people construct their world and is concerned with symbolic interactions as a "continuous process of interpreting the social world around us" (Saunders et al. 2007:107). Much of the previous research has adopted the need to justify findings by taking an objective stance, but this has also resulted in a concentration on the "nexus" view of entrepreneurship (Baker and Welter, 2017). This study, in aiming to explore the role of mentoring in female entrepreneurs working in a rural context, will do this through examining the lived experience of women entrepreneurs which has been under-reported in mainstream entrepreneurship theory. As, "Knowledge is…linked to experience" (Caine et al, 2020:3), the participants' view of the mentoring relationship they have experienced leads onto a qualitative approach.

Qualitative research "aims at understanding the phenomenon or event under study from the interior" (Flick:2009:65). It has been criticised as "fiction, not science" (Denzin and Lincoln, 2005:8) with the inference that it exhibits soft scholarship rather than hard science. However, because this project is concerned with capturing the views of individuals and securing rich descriptions, it fits qualitative models and does not follow an objective, scientific approach (ibid:10).

Narrative research begins with the lived experience of individuals and focuses on collecting participants' stories. It presumes that worlds are constructed through stories, and that by identifying these in research, one can understand how a social world is constituted. It is best for capturing detailed life experiences of a small number of individuals. "A narrative… requires three elements: an original state of affairs, an action… and the consequent state of affairs," (Czarniawska, 2011:12). An analysis of these narratives could create a description of themes that are common to all stories. The experiences are also set within the personal, social and historical context of culture, occupation and gender.

The geographical area for the participants is the South Devon Area of Outstanding Natural Beauty (AONB) and the area covered by the South Hams District Council. These two areas are situated in the southern part of Devon,

UK. They fall into the classification of 'rural' as being outside settlements with less than 10,000 households (DEFRA, 2011). The areas contain both mixed farming developments, sparse but clustered settlements and dramatic coastlines which attract a high number of tourists and incomer residents (AONB, 2020).

One-off in-depth interviews were conducted with a sample of women who operate in some of the most common areas for women entrepreneurs identified by the FSB research (2016). Quota sampling was combined with a purposive approach to select women entrepreneurs who had had experience of mentoring at some stage in their entrepreneurial journey. There was also an element of convenience sampling in that several participants were known to the researcher. In addition, snowball sampling identified a sample of mentors, matched with their mentees from the wider sample.

Cresswell (2007) suggests interviewing should continue until the data are saturated and no further issues are identified with subsequent interviews. Guest, Bunce and Johnson (2006) put forward a radical justification that 12 interviews should be enough to reach data saturation. They found that the majority of themes in their research (73%) were identified in the first six interviews, with a further 21% identified from the next six. Twelve women who are native to the rural context and twelve who are incomers were interviewed, with a further six interviews with mentors. It is recognised that this is a small sample.

Braun and Clarke (2012) suggest breaking data down into three steps: searching for and identifying themes to develop broad topics; reviewing themes in relation to the complete set of data and referring to the research questions; and defining and naming themes to provide a coherent story. Their approach is linked to that of Gioia, Corley and Hamilton (2012) who set out a method to bring what they term "qualitative rigor" to the presentation of qualitative, inductive research (ibid:15). An initial thematic analysis was conducted, and the Gioia et al.(ibid) template applied.

4. Findings

Initial review of the data showed that there were many similarities and differences between the experiences of the participants. Ages ranged from 35 to 68, with the majority (12) of women being in their 40s. Success criteria had stipulated only that women had been in business for more than 3 years. Several participants (7) had been in business for 3-4 years, a similar number had been in business 5-10 years, and a few (3) had been in business for more than 20 years. The latter category included a serial entrepreneur who had run 4 businesses during this time, one who had taken over a family business and run that consistently and another who had run several businesses at the same time and also undertaken freelance work.

Businesses included both products and services. Only 5 of the participants actually made products, and these covered food and drink, and clothing and footwear. Four were in property related businesses, including holiday accommodation and estate agency. The majority delivered a variety of services, from physiotherapy and other health related businesses (hypnotherapy, nutrition, hypnotherapy, kinesiology, fitness training, personal development) to business services (video production and public relations, social media strategy, coaching). One participant was a celebrant, another was an independent vet, and another ran a variety of social care businesses. A quarter of participants ran several businesses.

Mentoring had been accessed in several ways. Some had taken advantage of funded programmes at start up stage, In fact, three of the participants had had the same mentor from a local programme run by Business Information Services (BIP). Another had accessed mentoring through the FSB, which was also free. Several had accessed advice through their professional associations. A few had taken the step of paying for professional coaching and mentoring. This tended to happen at a mature stage of business. Peer mentoring was accessed by the majority of participants.

Snowball sampling accessed six mentors, who were aged between 44 and 73. Half of these had participated in free to deliver programmes, half carried out these services professionally. In terms of gender, 4 of the mentors were women and 2 were men.

Initial thematic analysis was carried out according to the recommendations of Braun and Clarke (2006). Transcripts were transferred into word files to enable the identification of codes. Codes were then collated into themes, with data tables being drawn up for each participant to ensure that relevant data was identified. Six

themes were identified: upbringing; motivation to become an entrepreneur; elements of mentoring; gender; rural context; success (Table 1).

Table 1: Thematic analysis

Theme	Codes
Upbringing	Expectations to be a housewife Parent entrepreneur Entrepreneurship as reaction to mother's domestic role No expectations to have business at school
Motivation to be entrepreneur	Never wanted to work for anyone else again Business meant - Something other than a mother Time with family Living in rural area was motivational as surrounded by entrepreneurs Relative showed what could be done in business
Elements of mentoring	Mentors don't tell, help to find out Professional association specific mentoring Mentoring vital at start up Right person gives good advice with no judgement Look with different eyes Mentors as guides Bounce ideas off Ask questions Look up to Golden nuggets someone who has been there and done it somebody to be accountable to Building confidence Challenging Looking at things differently Giving confidence to take the next step Empowered
Gender	Gender not important Complex male female mentor relationship Right mentor for right person Value from both male and female mentors
Rural context	Choose to be rural Living in rural area was motivational Rural area hard to find connections Online everything more possible Rural location but have to be city minded Customers prefer local provider
Success	Time with family What is important Success criteria changed Connection with people important Be happy, love what you do Teach others what you know Driven by success Success get out of bed and be excited

A Gioia et al (2006) data structure was then drawn up(Table 2).

Table 2: Data structure using Gioia et al. (2006) method

1st order concepts	2nd order themes	Aggregate dimensions
Brought up in 80s Women in business on TV Mum homemaker, rebelling against that School not very motivational Working class background Couldn't be unemployed Raised to be a wife	Early influences	Entrepreneurial enablers

1st order concepts	2nd order themes	Aggregate dimensions
No expectations to have business at school		
Parents always ran their own business Dad was a manufacturer Family business Entrepreneurship as reaction to mother's domestic role Parent business – hard work	Parent occupation	
Inspiration from successful female relative Image of independent business women	Role models	
Living in rural area was motivational as surrounded by entrepreneurs Running business in rural area accepted	Environment	
Driven by success Fantasised about own business Wanted to have product Risk taker	Inner qualities	Motivation
Connection with people important Happiness Provide what is needed Get out of bed and be excited Inspire others	Definition of success	
Look with different eyes Confidential advice Knowledge and experience Mentors don't tell, help to find out Bounce ideas off Ask questions Learn from mistakes Look up to Mentors as guides Information, observation	Qualities of mentor	Mentoring
Professional association specific mentoring Peer mentoring Mother encouragement vital NEA scheme mentoring	Sources of mentoring	
Gender unimportant Value from both male and female mentors Right person gives good advice with no judgement Men think big Like mentoring from woman Complex male female mentor relationship	Gender of mentor	

5. Discussion

The influence of upbringing was clear. Nearly half of the participants had parent entrepreneurs. This was both an enabler – "I've grown up with my parents always having run their own business and my friends' parents so I guess it's always part of how I saw things being done" - and a discourager – "My dad was a builder. We struggled for money when I was younger and I had seen him working really hard." Some rebelled against what they saw as a domestic role – "I wanted to be something other than a mother, that can't be my only role." Other role models were important also – "My aunt, she was senior vice president of Nestlé and was voted top woman in a man's world in 1973. My motivation to succeed in business came from her"; "Shoulder pads were big when I looked at the women on TV who were in business. When I was about 14, I bought a blouse with massive shoulder pads and wore it when I was on work experience. The women always looked independent and I really liked that."

At the same time, expectations of starting a business were not present at school. “When I was at school it was very much you went to school, you'd get your grades then you get your A-levels, some people go to university and then go and get a job and get paid it was just that cycle. Maybe meet a partner and get a property and get married and that's how it was.”

The majority of women had found their experience of mentoring positive, with one declaring it was “100% vital”. Several referred to “golden nuggets” of advice. All nine of St Jean’s (2012) role were mentioned: looking at things differently (reflector); giving confidence to take the next step (reassurance); somebody to be accountable to (motivator); confidential advice (confidant); specific advice from professional associations (contacts); good advice and process mentoring (information support);challenging; guide; someone who has been there and done it (role model). Many participants cited peer mentoring as especially important. “A leading women UK conference… they were talking about how peer to peer to peer support was so important and how women support women and build them up and how helpful that can be.” “There would be (other businesses) asking things like, did you realise you could do this or call me if you want to do this. That was absolutely fantastic and I felt supported.” “The value that I get from that is remarkable because it is specific to my business.”

In terms of context, only 6 participants practiced any form of RE, with the majority delivering EIR (Korsgaard et al, 2015). The rural context was both a negative (harder to find connections, still have to be city minded) and a positive (choose to be rural). Since the COVID-19 pandemic, many had changed their business model to deliver services online and this “made everything more possible”. This also seemed to remove the differentiation between incomers and natives (Nelson et al.,2016) although one hospitality participant felt that customers preferred a local provider.

6. Conclusion

The study suggests the importance of a parent entrepreneur role model may counter the “nexus” (Baker and Welter, 2017) view of entrepreneurship. Whilst supporting the main elements of the St Jean (2012) mentoring model, the importance of peer mentoring was suggested as an additional consideration. Both of these findings could benefit from further research. As the sample of entrepreneurs was small, a broader study could develop these findings.

References

AONB (2020) *Special Qualities*. Available at: https://www.southdevonaonb.org.uk/special-qualities/deeply-rural-rolling-patchwork-agricultural-landscape/# (Accessed: 27 June 2020).

Baker, T. and Welter, F. (2017) 'Come on out of the ghetto, please! – Building the future of entrepreneurship research', *International Journal of Entrepreneurial Behavior & Research*, 23(2), pp. 170-184.

Braun, V. and Clarke, V. (2012) 'Thematic Analysis', in Cooper, H. (ed.) *APA Handbook of Research Methods in Psychology*: American Psychological Association, pp. 57-72.

Caine, V., Estefan, A. and Cladinin, D. J. (2020) *Narrative Enquiry*. Sage

Calza, F., Go, F. M., Parmentola, A. and Trunfio, M. (2018) 'European rural entrepreneur and tourism-based diversification: Does national culture matter?', *International Journal of Tourism Research*, 20(5), pp. 671-683.

Cresswell, J. W. (2007) *Qualitative Enquiry and Research Design*. Sage.

Czamiawska, B. (2011) *A Narrative Approach to Organisational Studies*. Sage.

DEFRA (2011) *Rural Urban Classification*. Available at: https://www.gov.uk/government/collections/rural-urban-classification. (Accessed: 27 June 2020.

Deller, S., Kures, M. and Conroy, T. (2019) 'Rural entrepreneurship and migration', *Journal of Rural Studies*, 66, pp. 30-42.

Denzin, N. K. and Lincoln, Y., S (1994) *Handbook of Qualitative Research*. 2nd edn.

Flick, U. (2014) *An introduction to qualitative research*. Fourth edition. edn. Sage

Foss, L., Henry, C., Ahl, H. and Mikalsen, G. (2018) 'Women's Entrepreneurship Policy Research: A 30 Year review of the evidence', *Small Business Economics*.

FSB (Federation of Small Businesses) (2016) *Women in Enterprise: the untapped potential*. Available at: https://www.fsb.org.uk/docs/default-source/fsb-org-uk/fsb-women-in-enterprise-the-untapped-potential. (Accessed 19 December 2018)

Gioia, D. A., Schultz, M. and Corley, K. G. (2000) Organizational identity, image and adaptive instability', *Academy of Management Review*, 25(1), pp. 63-81.

Guest, G., Bunce, A. and Johnson, L. (2006) 'How Many Interviews are enough? An experiment with data saturation and variability', *Field Methods*, 18(1), pp. 59-82.

Hawkins, P. and Smith, N. (2006) *Coaching, mentoring and organizational consultancy: supervision and development.* Maidenhead: Open University Press.

Henry, C. and McElwee, G. (2014) 'Defining and conceptualising rural enterprise', in Henry, C. (ed*.) Exploring rural enterprise: New Perspectives on research, policy & practice,* Emerald, pp. 1-8.

Hovorka, A. J. and Dietrich, D. (2011) 'Entrepreneurship as a gendered process', *The International Journal of Entrepreneurship and Innovation*, 12(1), pp. 55-65.

Jones, J. (2012) 'An analysis of learning outcomes within formal mentoring relationships', *International Journal of Evidence Based Coaching and Mentoring*, 10(1), pp. 57-72.

Kazumi, T. and Kawai, N. (2017) 'Institutional support and women's entrepreneurial self-efficacy', *Asia Pacific Journal of Innovation and Entrepreneurship*, 11(3), pp. 345-365.

Kobeissi, N. (2010) 'Gender factors and female entrepreneurship: International evidence and policy implications', *Journal of International Entrepreneurship*, 8(1), pp. 1-35.

Korsgaard, S., Muller, S. and Tanvig, H. W. (2015) 'Rural entrepreneurship or entrepreneurship in the rural - between place and space'*, International Journal of Entrepreneurial Behaviour and Research*, 21(1), pp. 5-26.

Laukhuf, R. L. and Malone, T. A. (2015) 'Women Entrepreneurs Need Mentors', *International Journal of Evidence Based Coaching & Mentoring*, 13(1), pp. 70-86.

McMullan, L. and Price, A. (2012) 'We don't need no education: the role of mentoring in the wider enterprise eco-system', *International Journal of Gender and Entrepreneurship*, 4(2), pp. 196-205.

Naminse, E. Y., Zhuang, J. and Zhu, F. (2019) 'The relation between entrepreneurship and rural poverty alleviation in China', *Management Decision*, 57(9), pp. 2593-2611

Nelson, R. E., Santana, A. and Wood, M. S. (2016) 'Sociocultural Context, Entrepreneur Types, Mindsets and Entrepreneurial Action in Tiradentes, Brazil', *Models of Start-up Thinking and Action: Theoretical, Empirical and Pedagogical Approaches Advances in Entrepreneurship, Firm Emergence and Growth*. Emerald Group, pp. 33-74.

Oduol, J. B. A., Mithöfer, D., Place, F., Nang'ole, E., Olwande, J., Kirimi, L. and Mathenge, M. (2017) 'Women's participation in high value agricultural commodity chains in Kenya: Strategies for closing the gender gap', *Journal of Rural Studies*, 50, pp. 228-239.

Overall, J. and Wise, S. (2016) 'The Antecedents of Entrepreneurial Success: A Mixed Methods Approach', *Journal of Enterprising Culture*, 24(3), pp. 209-241.

Petridou, E. and Glaveli, N. (2008) 'Rural women entrepreneurship within co-operatives: training support', *Gender in Management: An International Journal*, 23(4), pp. 262-277.

Petridou, E. and Kyrgidou, L. P. (2013) 'Developing women entrepreneurs' knowledge, skills and attitudes through e-mentoring support', *Journal of Small Business and Enterprise Development*, 20(3), pp. 548-566.

Sarri, K. K. (2011) 'Mentoring female entrepreneurs: a mentors' training intervention evaluation', *Journal of European Industrial Training*, 35(7), pp. 721-741.

Saunders, M., Lewis, P. and Thornhill, A. (2006) *Research methods for business students*. 4th ed. edn. Harlow: Financial Times Prentice Hall.

Sharafizad, J. and Coetzer, A. (2016) 'Women business owners' start-up motivations and network content', *Journal of Small Business and Enterprise Development*, 23(2), pp. 590-610.

St-Jean, E. (2012) 'Mentoring as Professional Development for Novice Entrepreneurs: Maximizing the Learning', *International Journal of Training and Development*, 16(3), pp. 200-216.

Swail, J. and Marlow, S. (2018) ''Embrace the masculine; attenuate the feminine' – gender, identity work and entrepreneurial legitimation in the nascent context', *Entrepreneurship & Regional Development*, 30(1-2), pp. 256-282.

Terjesen, S. and Sullivan, S. E. (2011) 'The role of developmental relationships in the transition to entrepreneurship', *Career Development International*, 16(5), pp. 482-506.

Webster, N. A. (2017) 'Rural-to-rural translocal practices: Thai women entrepreneurs in the Swedish countryside', *Journal of Rural Studies*, 56, pp. 219-228.

Welter, F. (2011) 'Contextualizing Entrepreneurship—Conceptual Challenges and Ways Forward', *Entrepreneurship Theory and Practice*, 35(1), pp. 165-184.

Wilson, F. and Tagg, S. (2010) 'Social constructionism and personal constructivism', International Journal of *Gender and Entrepreneurship*, 2(1), pp. 68-82.

Business Model Innovation Success in the Fourth Industrial Revolution

Chanté van Tonder[1], Chris Schachtebeck[1], Cecile Nieuwenhuizen[2] and Bart Bossink[3]
[1]Department of Business Management, College of Business and Economics, University of Johannesburg, South Africa
[2]DHET-NRF SARChI Entrepreneurship Education, College of Business and Economics, University of Johannesburg, South Africa
[3]Science, Business & Innovation, Faculty of Science, Vrije Universiteit Amsterdam The Netherlands
chantevt@uj.ac.za
cschachtebeck@uj.ac.za
cecilen@uj.ac.za
b.a.g.bossink@vu.nl
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Abstract: In order for businesses to respond to new and emerging technologies, secure future growth and stay competitive in disruptive market shifts, they may employ innovative business models. Businesses of all sizes, ages and from all industries are acting more entrepreneurially by initiating innovative changes to their existing business models or introducing completely new business models to respond to these disruptions. In recent years, researchers and practitioners have paid more attention to the topic of business model innovation (BMI), with literature focusing on BMI as a transformation and renewal opportunity. Over the past few years, the process of successfully achieving and fostering BMI has been researched; however, we have identified a research gap in terms of a lack of systematic guidelines for what is required to achieve BMI and how this can be done. Furthermore, previous studies have mainly focused on large businesses and not small and medium-sized enterprises (SMEs), which are regarded as the driving force of most economies. This study adopted a qualitative research approach by systematically reviewing existing BMI processes. The guiding research question of this study is: *How can SMEs achieve BMI?* To answer this research question, the review focused on the activities, steps and tools needed to successfully realise BMI. Besides providing an overview on the process of achieving BMI success, special attention was placed on how these processes have been adapted over the last decade to accommodate the opportunities presented by technology and digitalisation within the Fourth Industrial Revolution in which businesses find themselves today. The results indicate that the most common BMI frameworks are the Business Model Canvas, the St. Gallen Business Model Navigator and the Cambridge business model innovation framework. Additionally, only a few studies incorporate digital technologies as a single dimension into the BMI framework, which is identified as a major gap in the literature. This paper contributes to the body of knowledge on BMI processes and outlines how SMEs can successfully achieve BMI in light of the Fourth Industrial Revolution. The topic is in need of additional insight and development, and recommendations for future research are thus provided.

Keywords: business model innovation, small and medium-sized enterprises (SMEs), fourth industrial revolution, entrepreneurial

1. Introduction

Over the past few decades, technological changes have resulted in many new opportunities, such as greater flexibility, proactiveness and customisation of products and services. Yet, these changes have also resulted in many challenges, such as changing customer preferences, legal requirements and uncertainty among businesses on how to use and implement these technologies due to their complexity and the sheer speed at which technological changes occur (Lerch and Gotsch, 2015; Rachinger et al*,* 2018). However, businesses of any size and from any industry can extract further value from new and emerging technologies through suitable business models (Chesbrough, 2010); therefore, technological innovation is regarded as a key driver for business model innovation (BMI) (Baden-Fuller and Haefliger, 2013). Businesses should respond to external opportunities and threats by adapting their business models (Saebi et al*,* 2016). Small and medium-sized enterprises (SMEs) are regarded as the driving force of most economies, contributing to job creation, economic development and growth (Bouwman, de Reuver and Shahrokh, 2017). Nonetheless, the rapid changes in the business environment, in particular, technological changes, have placed enormous pressure on SMEs to keep up in order to remain competitive in the market. Due to this, there is increased interest among researchers and practitioners to study BMI from the perspective of SMEs (Bouwman et al*,* 2017).

The concept of business models and/or the tools that support BMI are not widely known by SMEs, and the available tools seem to be unsuitable and complex, due to their many iterations (Heikkilä et al*,* 2016). The Fourth Industrial Revolution is providing an opportunity for entrepreneurs to design new business models that allow them to create a sustainable competitive advantage (Casadesus-Masanell and Ricart, 2011). Despite these opportunities presented by the digital age, SMEs still lag behind in redesigning their business models or adopting new ones (Barjak, Niedermann and Perret, 2014). With this study, the authors aim to contribute to the filling of this research gap, by conducting a systematic literature review covering the period 2011–2021, to answer the following question: *How can SMEs achieve business model innovation?* Answering this question is important if researchers want to contribute to the development and growth of SMEs by providing a simplistic BMI process to be adopted by SMEs. As scholars, it is also important to share knowledge on how entrepreneurship within SMEs can contribute to innovative business models, enabling SMEs to compete successfully in the Fourth Industrial Revolution.

2. Theoretical background

2.1 Business model innovation

The term *innovation* has been defined by Schumpeter (1943, p 132) as new combinations, stating that it is "an untried technological possibility for producing a new commodity or producing an old one in a new way, by opening up a new source of supply of materials or a new outlet for products, by reorganizing an industry and so on". It can therefore be concluded that innovation in business entails the implementation of something new or significantly improved by that business (Heikkilä et al*,* 2016). Bouwman et al (2017) define the concept of *business model* as the business logic that describes how the business creates and captures value for both the customer and the business. Entrepreneurs should understand business models and the opportunities and challenges they may present, as these can assist in better decision making, resulting in a higher chance of success (Trimi and Berbegal-Mirabent, 2012). *BMI*, on the other hand, describes how a business identifies new ways of creating and capturing value (Foss and Saebi, 2017). Björkdahl and Holmen (2013) agree, stating that BMI is not merely a product, service or process innovation, but includes much broader types of innovation, such as a new way in which a business can create value, offer new products or services, thus resulting in customers' viewing the business in a new light and new ways of interacting with the business and its operations. Table 1 shows various BMI definitions as identified in the literature.

Table 1: Definitions of business model innovation

Author(s)	Definition
Timmers (1998, p 4)	"…an architecture of the product, service and information flow, including a description of the various business actors and their roles; a description of the potential benefits for the various business actors; a description of the sources of revenues"
Chesbrough and Rosenbloom (2002)	(1) value proposition, (2) target markets, (3) internal value chain structure, (4) cost structure and profit model, (5) value network and (6) competitive strategy
Björkdahl and Holmen (2013, p 215)	"…a new integrated logic of how the firm creates value for its customers (and users) and how it captures value"
Amit and Zott (2015, p 346)	"… describes how a focal firm taps into its eco-system to perform the activities that are necessary to fulfil the perceived customer needs "
Wirtz et al*,* (2016, p 6)	"…a simplified and aggregated representation of the relevant activities of a company"

Source: Adapted from Peric et al (2017, p 3)

2.1.1 Business model innovation processes

Bouwman et al (2012) report that many studies have included methods, frameworks and tools that facilitate and support the implementation of BMI. These tools and processes are mainly built on business model ontologies. Berends et al (2016) argue that business models have both cognitive and action dimensions, which makes BMI a complex process. Despite this, the BMI process generally consists of initiation, ideation, experimentation and implementation (Heikkilä et al*,* 2017). Teece (2010) suggests that if a business seeks to design and implement a sustainable business model, it should not only focus on product innovation, but also on the business model design and the different options that are available, based on the customer needs and technological trajectories. Johnson, Christensen and Kagermann (2008) agree that a business model should be designed with customer needs in mind. Some of the most common BMI frameworks includes the business model

CANVAS (Osterwalder and Pigneur, 2002), STOF (service, technology, organizational and finance) (Bouwman et al*,* 2008), VISOR (value proposition, interface, service platform, organising model, and revenue/cost) (El-Sawy and Pereira, 2013) and the St. Gallen Business Model Navigator (Gassmann, Frankenberger and Csik, 2013). Osterwalder and Pigneur (2002) designed the well-known business model CANVAS, which includes key partners, key activities, value proposition, customer relationships, customer segments, key resources, channels, cost structure and revenue streams. The VISOR framework was developed by El-Sawy and Pereira (2013) and included some of the CANVAS elements; however, the authors developed the VISOR framework as a unified business model innovation framework specifically aimed at the digital space. It includes the following elements: value proposition, interface, service platforms, organising model and revenue model. Digitalisation can open up new possibilities and opportunities to create new products, services and therefore ultimately new business models, yet the influence of digitalisation on BMI is still unclear. Some of the challenges include lack of understanding of the drivers and outcomes of BMI, the connection between digitalisation and BMI and how businesses can exploit the use of new technologies (Mezger, 2014).

2.1.2 Business model innovation and Industry 4.0

Kaggermann (2015) believes that the Fourth Industrial Revolution (also referred to as Industry 4.0) will be the driver of the next wave of innovation. Industry 4.0 is defined by Schumacher, Nemeth and Sihn (2019) as technological advancements driven by the internet and support technologies that allow the integration of technologies with physical objects, humans, production processes and all organisational facets, creating a new type of intelligent, connected and agile value chain. Some of the features related to Industry 4.0 are real-time capability, interoperability and the horizontal and vertical integration of production systems through information and communication technology (ICT) systems, which will allow businesses to respond to current market challenges. The rapid advancements in the digital age are breaking down traditional barriers and transforming the ways in which businesses create value currently. New value creation involves changes to production systems, new product and services offering, new and improved customer relationships and the creation of a more cooperative environment (Arnold, Kiel and Voigt, 2016). Bouwman et al (2017) claim that technological disruptions have a direct impact on a business, with technological developments being the fastest trend in business history. It is therefore crucial for SMEs to be able to change and adapt to these new technologies and identify how this can impact their business model. SMEs also need to stay abreast of how competitors are incorporating and using technologies within their business models (Gibson and Jetter, 2014). Consequently, new and adapted business models are needed, which is why many researchers and practitioners emphasise the need to rethink existing business models to focus on Industry 4.0 (Gerlitz, 2016). In conducting their study, Rachinger et al (2018) found that digitalisation has a positive effect on the value proposition; these findings are in agreement with Linz et al (2017), who claimed that customers are the driving force of digitalisation.

3. Methodology

3.1 Literature resources

Identifying the most relevant literature, a search strategy was followed, which included several steps, such as identifying relevant literature databases, defining key search words and strings and retrieving an initial list of articles to be included in the study. Identifying relevant articles and accessing a wide range of literature are essential when conducting a systematic review; therefore, the literature databases were selected before starting the search. We selected IEEE Xplore, Science Direct, Scopus and Web of Science, based on their scientific relevance and their suitability for sourcing academic articles from multidisciplinary databases from the years 2011 to 2021. The chosen timeframe is relevant, as some of the first publications to measure digitalisation were made in 2011 by Friedrich et al (2011).

3.2 Search string and study selection

Considering the different terms used to describe business model innovation, we used several terms to search for published work. After several tests, the primary search strings used were: “business model innovation framework” *or* “business model reinvention” *or* “business model innovation process” *or* “business model innovation tools” *or* “business model innovation activities” *and* “SMEs”. Inclusion and exclusion criteria were used to select the most relevant studies and allows the researchers to remove subjectivity of the data collection

process. The exclusion criteria disqualified studies that did not meet the inclusion criteria in Table 2, as well as studies that did not develop a BMI framework, nor measured the BMI level of SMEs.

Table 2: Inclusion criteria

Phase	Criteria
Primary screening	Written in English Search keywords identified in the title or text of displayed search result Publication year 2011–2021 Publication type that included review/research articles, chapters, books and conference papers
Secondary screening (abstracts, keywords)	Conceptualising business model innovation Addressing business model innovation in a company context Full-text article available
Final screening (full text assessment for eligibility)	Criteria used for Secondary Screening Studies that analysed business model innovation and/or developed a framework/tools on how to achieve business model innovation within SMEs

The primary screening of articles turned up 1060 studies, followed by the secondary screening, which resulted in 261 studies. These studies were manually assessed to determine suitability and eligibility for inclusion of each article, against the final screening phase in Table 2. This resulted in only 32 studies being retained.

3.3 Data extraction

The final set of studies was analysed to extract business model innovation frameworks, along with information regarding the consideration and usage of technology within the model and each study itself. The 32 retained studies represented 21 different business model innovation frameworks. Special attention was placed on the research focus, the theoretical lens used for the framework development and focus on Industry 4.0.

4. Findings and discussion

The study aimed to identify existing BMI frameworks for SMEs in order to acknowledge that the need to identify existing data is a crucial step in the adaption and development of new BMI frameworks that place specific emphasis on Industry 4.0. Figure 1 contains a structured visualisation of the results of the systematic review, illustrating a thematic map with 34 key themes of BMI. There are six main branches, which represent the thematic areas identified. Extending from these thematic areas are sub-branches, representing second-order themes. The numbers indicated alongside each second-order theme refer to the number of studies found to classify it, based on the study's research focus. What follows are brief discussions of the research focus, the theoretical lens used for the framework development and a focus on Industry 4.0.

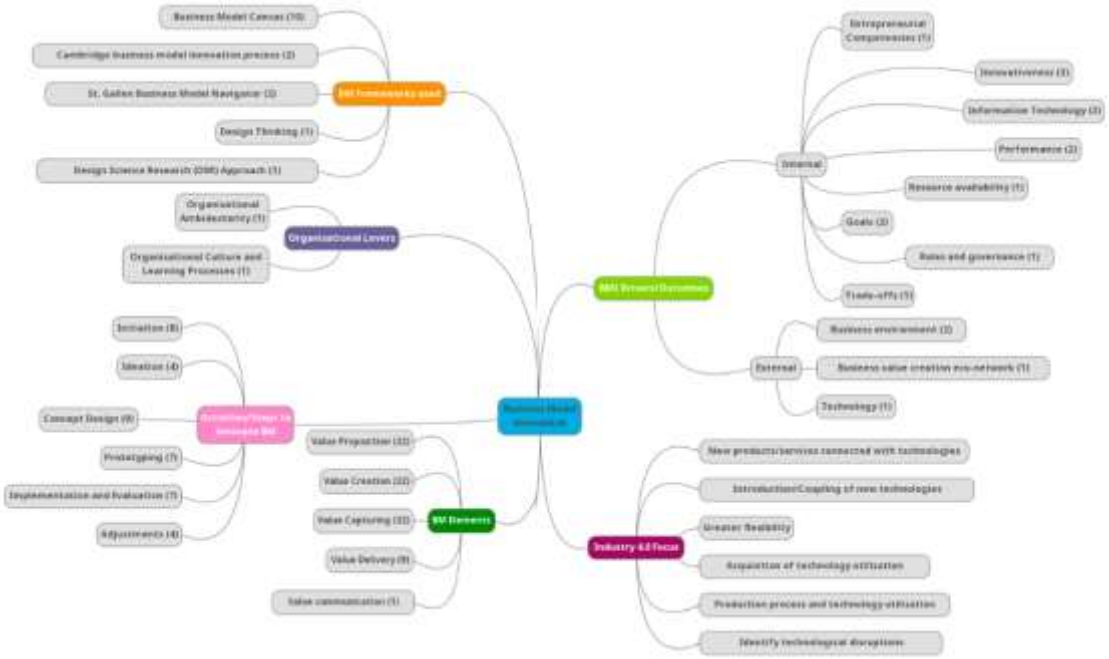

Figure 1: Thematic map of the business model innovation concept

4.1 Research focus: Business model innovation framework

There are many drivers that force and/or stimulate businesses to innovate their business models, such as changes in customer needs, new and disruptive technologies, cost pressures and constant need for differentiation (Schneider and Spieth, 2013). The drivers and outcomes have been classified as either internal or external. The business environment has been identified as an external driver that influences the level of BMI of a SME (Marolt et al*,* 2018; Pucihar et al*,* 2019; Zott and Amit, 2007). Internal drivers have also been identified by numerous authors which includes goals and objectives (Wittig, Kulins and Weber, 2017), entrepreneurial competencies (Eriksson et al*,* 2019) and technology (Marolt et al*,* 2018; To, Au and Kan, 2019). Eriksson et al (2019) studied the importance of entrepreneurial competence and the impact it has on business performance and BMI. The authors developed a framework that combines entrepreneurial competences of Mitchelmore and Rowley (2010) and the BMI framework of Foss and Saebi (2017), allowing entrepreneurs to identify, develop and commercialise new ideas, which is critical for BMI. Wiitig et al (2017) identified two organisational levers to assist in the BMI process using the concept of ambidexterity, defined as the way in which a business exploits existing activities, while exploring new ways and understanding how organisational culture and learning processes should be shaped.

4.2 Theoretical lens used for the framework development

The Business Model Canvas, which was most commonly used in the reviewed studies, consists of nine dimensions: key partners, key activities, value proposition, customer relationships, customer segments, key resources, channels, cost structure and revenue streams. The St. Gallen Business Model Navigator of Gassmann et al (2013) was also used in a few studies and includes four central dimensions: who, what, how and value. The design thinking approach used includes five characteristics: a human-centred approach, a strong integration of experimenting with artefacts, collaboration in multidisciplinary teams, an integrative and holistic view on complex problems, and a characteristic six-step process, which is based on Plattner (2009). Lastly, the design science research (DSR) approach, based on Gregor and Hevner (2013), is commonly used in information systems (IS) and includes seven activities: introduction, background, method, artifact description, evaluation, discussion and conclusions. The Cambridge business model innovation framework consists of eight steps: ideation, concept design, virtual prototyping, experimenting, detail design, piloting, launch, adjustment and diversification. These steps are commonly used in the development of BMI frameworks, with Heikkilä et al (2017) further associating initiation, ideation, experimentation and implementation with BMI processes. Table 3 summarises the findings of the research focus and the theoretical lens used for the framework development of the 32 included studies.

Table 3: Overview of the reviewed studies and their findings

Research focus *Number of studies (n)*	Theoretical lens used for the framework development	Number of occurrences
Development of a new BMI framework *n* = 12	The Business Model Canvas of Osterwalder and Pigneur (2002)	5
	Developed a framework based on a literature review conducted	4
	The Business Model Canvas and the St. Gallen Business Model Navigator of Gassmann et al (2013)	1
	Design thinking based on Plattner (2009)	1
	The Design Science Research (DSR) approach based on Gregor and Hevner (2013)	1
Investigate BMI within SMEs by identifying internal and external factors affecting BMI, drivers and outcomes of BMI or applying an existing BMI framework *n* = 14	The Business Model Canvas of Osterwalder and Pigneur (2002)	5
	The Cambridge business model innovation framework	2
	Developed a framework based on a literature review conducted	4
	The business model canvas and the St. Gallen Business Model Navigator (Gassmann et al*,* 2013)	1
	Adapted the business model framework of Foss and Saebi (2017) by adding entrepreneurial competences to the model	1
	The framework of Johnson et al (2008)	1
Conduct a systematic review *n* = 6	Reviewing and comparing existing BMI frameworks by focusing on the drivers, success factors, tools and building blocks for BMI	6
Total *N* = 32		

Table 3 shows the most commonly used frameworks for BMI, namely, the Business Model Canvas, the St. Gallen Business Model Navigator and the Cambridge business model innovation framework. Heikkilä et al (2016) agree

that the business model canvas is one of the most popular tools used in BMI research. Overall, from the studies that developed their own framework (either based on literature or adapted from existing business model frameworks), the following main elements of a business model were included: *value proposition, value creation, value capturing* and *value delivery.*

4.3 Industry 4.0 focus

The study conducted by Aagaard et al (2018) built a new business model tool, which aimed at mapping the Internet of Things into the business model. The authors used the business model canvas as a theoretical lens and added four additional elements, namely, *device, connectivity, cloud* and *application.* This framework is similar to the VISOR framework of El Sawy and Pereira (2013), which aims to reach a unified business model framework for digital platforms and consists of the value proposition for targeted customer segment, the revenue and cost model, the interface that relates to the user experience, the service platforms that enable delivery and lastly, the organisational model used for processes and relationships. Marolt et al (2018) added technology to their BMI model, claiming that technology is one of the dimensions that would influence the level of BMI, resulting in BMI outcomes and ultimately impacting the overall performance of an SME. Special attention was paid to the extent to which the selected studies focused on Industry 4.0. These findings are summarised in Table 4.

Table 4: An Industry 4.0 focus of the review studies

Number of studies (*n*)	Industry 4.0 focus
n = 18	These studies made reference to the importance of technology to be incorporated in the development of the BMI framework. The studies mainly focused on product and service innovation using technology, introducing and coupling technologies into the business model, acquisition of technology and knowledge (Kilintzis et al*,* 2020), production process and technology utilisation (Eriksson et al*,* 2019) and identifying technological disruptions (Coskun-Setirek and Tanrikulu, 2020).
n = 9	These studies did not include reference to technology
n = 5	These studies referred to the importance of technology in the study itself, but not in the development of the framework.
Total *N* = 32	

The findings shown in Table 4 recognise a gap in literature. Despite the reference made to the importance of technology and using technology to address customer needs, respond to dynamic market changes and keep abreast of competitors, limited studies have incorporated technology as a single dimension in BMI framework development to highlight the role that technology should play in the value proposition of a business.

5. Conclusion

The purpose of this study was to present a systematic literature review of studies on BMI for SMEs published in the period 2011–2021. The researchers sought to answer the question: *How can SMEs achieve BMI?* The findings were presented as a thematic map that included 34 key themes of BMI. The review revealed that the most commonly used BMI framework is the Business Model Canvas, followed by the St. Gallen Business Model Navigator and the Cambridge business model innovation framework. Additionally, while the majority of the studies made reference to the importance of technology in a business, limited studies incorporated technology (more specifically, digital technologies) as a dimension into a BMI framework to emphasise the importance that digital technology plays in satisfying the needs of the customer. The value proposition should be built around the needs of the customer, and value creation should be centred around the adoption and use of digital technologies. This has been identified as a major gap in literature, and future studies should develop BMI frameworks that highlights digital technologies as a dimension in the framework. It is crucial to develop a framework that is simplistic, flexible, easy to use and replicable to various industries and business sizes. These frameworks should also be validated on SMEs to identify to what extent SMEs are incorporating digital technologies into their business models. Finally, another avenue for future research studies is the role of entrepreneurial thinking in the development of new business models to accommodate the opportunities and challenges presented by the Fourth Industrial Revolution.

References

Amit, R. and Zott, C. (2015) "Crafting business architecture: The antecedents of business model design", *Strategic Entrepreneurship Journal,* Vol 9, No 4, pp 331–350.

Arnold, C., Kiel, D. and Voigt, K.I. (2016) "How the industrial internet of things changes business models in different manufacturing industries", *International Journal of Innovation Management,* Vol 20, No 8, p 1640015.

Baden-Fuller, C. and Morgan, M.S. (2010) "Business models as models", *Long Range Planning*, Vol 43, No 2, pp 156–171. https://doi.org/10.1016/j.lrp.2010.02.005

Barjak, F, Niedermann, A. and Perret, P. (2014) "The Need for Innovations in Business Models", [policy brief], European Commission DG Research and Innovation, University of Applied Sciences and Arts North-Western Switzerland, http://eucases.eu/fileadmin/RIPolicies/documents/BMI/Policy_Brief/BMI_Policy_Brief_final_v2_5_with_errata.pdf

Berends, H., Smits, A., Reymen, I. and Podoynitsyna, K., (2016) "Learning while (re)configuring: Business model innovation processes in established firms", *Strategic Organization,* Vol 14, No 3, pp 181–219.

Björkdahl, J. and Holmén, M., (2013) "Business model innovation–the challenges ahead", *International Journal of Product Development,* Vol. 18, No. 3, pp 213-225.

Bouwman, H., de Reuver, M. and Shahrokh, N. (2017) "The impact of digitalization on business models: How IT artefacts, social media, and big data force firms to innovate their business model", in *Proceedings of the 14th International Telecommunications Society (ITS) Asia-Pacific Regional Conference*, Kyoto.

Bouwman, H, Faber, E, Haaker, T, Kijl, B & de Reuver, M. (2008). "Conceptualizing the STOF model", in H Bouwman, H de Vos & T Haaker (eds), Mobile service innovation and business models. Springer, Berlin - Heidelberg - New York, pp. 31-70. https://doi.org/10.1007/978-3-540-79238-3

Bouwman, H., De Reuver, M., Solaimani, S., Daas, D., Haaker, T., Janssen, W., Iske, P. and Walenkamp, B. (2012). "Business models tooling and a research agenda". *Proceedings of the 25th Bled e-Conference*, Bled, Slovenia

Casadesus-Masanell, R. and Ricart, J.E. (2010) "From strategy to business models and onto tactics", *Long Range Planning*, Vol. 43, No. 2, pp 195–215. https://doi.org/10.1016/j.lrp.2010.01.004

Chesbrough, H. (2010) "Business model innovation: opportunities and barriers", *Long Range Planning,* Vol. 43 No. 2, pp 354–363.

Chesbrough, H. and Rosenbloom, R.S. (2002) "The role of the business model in capturing value from innovation: Evidence from Xerox Corporation's technology spin-off companies", *Industrial and Corporate Change*, Vol. 11, No. 3, pp 529–555.

Coskun-Setirek, A. and Tanrikulu, Z. (2020). "Digital innovations-driven business model regeneration: A process model", *Technology in Society,* Vol. 64, No. 2021, p 1–17. https://doi.org/10.1016/j.techsoc.2020.101461

El-Sawy, O. A., and Pereira, F. (2013). *Business Modelling in the dynamic digital space: An ecosystem approach.* Springer, Heidelberg, New York.

Eriksson, T., Halla, H., Heikkilä, M. and Kalliomäki, H. (2019) "Bridging entrepreneurial competencies and business model innovation: insights on business renewal in the small horticulture businesses in Finland", *Agricultural and Food Science,* Vol. 28, No. 3, pp 112–125.

Foss, N.J. and Saebi, T. (2017) "Fifteen years of research on business model innovation: How far have we come, and where should we go?", *Journal of Management*, Vol. 43, No. 1, pp 200–227.

Friedrich, R., Le Merle, M., Grone, F. and Koster, A. (2011) *Measuring industry digitization: Leaders and laggards in the digital economy.* Booz & Co, London.

Gassmann, O., Frankenberger, K. and Csik, M. (2014) *The business model navigator: 55 models that will revolutionise your business*. Pearson, UK.

Gerlitz, L. (2016) "Design management as a domain of smart and sustainable enterprise: business modelling for innovation and smart growth in Industry 4.0", *Entrepreneurship and Sustainability Issues,* Vol. 3, No. 3, p 244.

Gibson, E. and Jetter, A. (2014) "Towards a dynamic process for business model innovation: A review of the state-of-the-art", in *Proceedings of the Portland International Center for Management of Engineering and Technology; Infrastructure and Service Integration*, Kanazawa, Japan, July.

Heikkilä, M., Bouwman, H., Heikkilä, J., Haaker, T., Lopez-Nicolas, C. and Riedl, A. (2016) "Business Model Innovation Paths and Tools", in *Proceedings of 29th Bled e-Conference Digital Economy*, Bled, Slovenia.

Johnson, M.W., Christensen, C.M. and Kagermann, H. (2008) "Reinventing your business model", *Harvard business review,* Vol. 86, No. 12, pp 57–68.

Kagermann, H. (2015) "Change through digitization—Value creation in the age of Industry 4.0", in H. Albach, H Meffert, A Pinkwart, R Reichwald (eds), Management of permanent change. Springer Gabler, Wiesbaden, pp 23-45. doi 10.1007/978-3-658-05014-6

Kilintzis, P., Samara, E., Carayannis, E.G. and Bakouros, Y. (2020) "Business model innovation in Greece: Its effect on organizational sustainability", *Journal of the Knowledge Economy*, Vol. 11, No. 3, pp 949–967.

Lerch, C. and Gotsch, M. (2015) "Digitalized product-service systems in manufacturing firms: A case study analysis", *Research-Technology Management,* Vol. 58 No. 5, pp 45–52.

Linz, C., Müller-Stewens, G. and Zimmermann, A. (2017) *Radical Business Model Transformation: 1159 Gaining the Competitive Edge in a Disruptive World*, Kogan Page, London, Philadelphia, PA and New Delhi.

Marolt, M., Lenart, G., Borstnar, M.K., Vidmar, D. and Pucihar, A. (2018) "SMEs Perspective on Business Model Innovation", in *Proceedings of the 31th Bled e-Conference on Digital Transformation – Meeting the Challenge,* Bled, Slovenia.

Mitchelmore, S. & Rowley, J. (2010) Entrepreneurial competencies: A literature review and development agenda. *International Journal of Entrepreneurial Behavior & Research* Vol. 16, pp 92–111. https://doi.org/10.1108/13552551011026995

Osterwalder, A., & Pigneur, Y. (2002) "An e-Business model ontology for modelling e- Business", in *Proceedings of the 15th Bled Conference on E-Commerce*, Bled, Slovenia.

Pucihar, A., Lenart, G., Kljajić Borštnar, M., Vidmar, D. and Marolt, M. (2019) "Drivers and outcomes of business model innovation—Micro, small and medium-sized enterprises perspective", *Sustainability,* Vol. 11, No. 2, p 344.

Rachinger, M., Rauter, R., Müller, C., Vorraber, W. and Schirgi, E. (2019) "Digitalization and its influence on business model innovation", *Journal of Manufacturing Technology Management*, Vol. 30, No. 8, pp 1143–1160.

Schumacher, A., Nemeth, T. and Sihn, W. (2019) "Roadmapping towards industrial digitalization based on an Industry 4.0 maturity model for manufacturing enterprises", *Procedia Cirp*, Vol. 79, No. 2019, pp 409–414.

Schumpeter, J. (1943) *Capitalism, Socialism and Democracy,* 2003 edition, Taylor & Francis, London.

Teece, D.J. (2010) "Business models, business strategy and innovation", *Long Range Planning,* Vol. 43, No. 2, pp 172–194.

Timmers, P. (1998) Business models for electronic markets. *Electronic markets,* Vol. 8, No. 2, pp 3–8.

Wirtz, B.W., Pistoia, A., Ullrich, S. and Göttel, V. (2016) "Business models: Origin, development and future research perspectives", *Long range planning,* Vol. 49, No. 1, pp 36–54.

Wittig, A., Kulins, C. and Weber, C. (2017) "Toward a best practice framework in business model innovation", in *2017 IEEE Technology & Engineering Management Conference (TEMSCON),* July, pp 86–93.

Zott, C., & Amit, R. (2007) "Business Model Design and the Performance of Entrepreneurial Firms", *Organization Science,* Vol. 18, No. 2, pp 181–199. https://doi.org/10.1287/orsc.1060.0232

Influence of Digital Economy Factors on the Development of Human Capital in the Regions of Russia

Maxim Vlasov[1] and Kachan Yan[2]
[1]Ural Federal University, Ekaterinburg, Russia, Institute of Economics, Ural Branch of the Russian Academy of Sciences, Russia
[2]Ural Branch of Russian Academy of Sciences, Yekaterinburg, Russia
mvlasov@mail.ru
kachan.yanf@gmail.com
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Abstract: The digital economy is growing and developing rapidly, especially in Russia. However, the basic metrics may differ in other areas, especially concerning human capital. The purpose of this article is to assess digital technologies for human capital, identify the correlation dependences of factors between digital economic and human capital, and factors that have the greatest impact on the development of human capital in various regions of the Russian Federation. As an analysis, during the study, 8 federal districts of the Russian Federation were taken to assess the impact of digital technologies on human capital through the formation of various correlation factors. As a research method, quantitative analysis. The data source is the database of the Federal State Statistics Service. As a result of the study, the authors proved that the factors of digital economic development have a significant impact and contribute to the development of human capital; the factors that had the greatest and least impact were identified, and from the data obtained, the regions were identified where the greatest relationship between the digital economy and capital. The practical significance of links with the use of results using digital technologies to increase the level of the human capital of economic agents at all levels of management. The theoretical significance of the study is the identification of regional socio-economic systems, which affects the increase in the level of human capital.

Keywords: digital economy, human capital, innovation, digitalization, regional development, regional economy

1. Introduction

The scientific and technological revolution, which began in the middle of the twentieth century, put forward science as a leading factor in economic growth, which influenced the strengthening of the role of man in production. Today, for the effective development of production, instead of simple labour with its basic functions, it is necessary to use complex highly qualified personnel capable of performing a wide range of functions and operations and requiring a high level of professional training, experience, and creativity. Modern employers are fighting among themselves for these workers because they do their jobs much faster and more efficiently (Kianto et al, 2017).

Most employers have realized that it is necessary not only to attract highly skilled workers but also to constantly invest in them. In turn, employees must be prepared for continuous acquisition of new knowledge and quick retraining, as well as for self-improvement. Thus, in the economy, there is a transition from the use of simple production labour to highly qualified human resources endowed with special physical and mental abilities, which bring income to the owner and the company (Pohjola et al, 2002).

The result is a change in human consciousness - both individual and collective. In the new conditions of post-industrial development, a post-industrial personality is being formed, which becomes the central link in global social changes. In this context, the concept of human capital development attracts the attention of the world expert community, various international organizations, state institutions, the media, public organizations, etc. In recent years, this concept has been actively developing in many countries of the world, has become the subject of discussion at various international conferences and congresses, is used in public administration of different countries, in the educational and cultural spheres (Sikora et al, 2006).

The purpose of the study is to identify factors, concepts, and hypotheses for the development of human capital in the modern digital economy.

In the 21st century, digitalization of all aspects of a person's life, both material and intangible, is taking place, and first of all, digitalization affects the person himself, both an individual and society as a whole, especially if we consider a person from the point of view of human capital in various organizations. To correctly operate with

these concepts, we first need to define human capital and how it is understood by various authors. For instance, Arvanitis et al (2009) refer to human capital as a whole to production factors, Chu et al (2006) refer to human capital to knowledge, experience, level of mobility, skills, the experience of employees, and leadership of the entire organization and so on.

All authors generally agree with each other in the definition of the concept of human capital, consider it from different angles and from different sides, which makes it possible to understand this definition more deeply and apply it to different areas. The only drawback is that all authors interpret human capital as a set of certain features, functions, features, this is all correct, but they all forget to mention that human capital is, first of all, people and only then a set and combination of various factors. In this paper, the authors will understand human capital as an intangible asset or quality that is not listed in the company's balance sheet. It can be classified as the economic value of a worker's experience and skills. This includes assets like education, training, intelligence, skills, health, and other things that employers value, such as loyalty and punctuality (Goldin et al, 2020). In a sense, human capital can be understood as the bearer of technological knowledge that underlies scientific and technological progress. Human capital plays a decisive role in the development of new technologies and is an important factor in their effective use (Frank, 1996). Human capital management is essential for hiring, managing, training, and retaining talented and high performing employees (Shafuda et al, 2020). Human capital management plays an important role in orienting a new employee in the system. Boring and pointless introductory programs lead to confusion, and the employee eventually loses interest in the organization. Therefore, employees need to update their knowledge overtime to cope with changing situations.

On average, total human capital costs account for nearly 70 percent of a company's operating expenses. Despite how much employees are worth, many companies do not invest properly in an employee development plan, namely their human capital (Fonseca et al, 2019). World experience shows that a person as such plays an increasingly important role in the development of a modern information society. In recent years, there has been serious interest in the problems of improving the quality and efficiency of using human potential both in the scientific community and in authoritative international organizations (UN, UNESCO, World Bank, etc.). This concept is increasingly used not only in connection with the analysis of the processes of socio-economic development of various countries and regions of the world but also in connection with the need to solve environmental, demographic, and several other fundamentally new problems of the further development of civilization, one of which is information inequality between people, countries, and regions of the world in the actively emerging new environment of the world community. Intangible asset, human capital is the labour force that the company hires. Human capital is a combination of employee competencies and their commitment to the organization in which they work. According to Becker (1996), economists may refer to the workforce as “human capital” because their combination of skills, health, values, and knowledge is seen as an asset. Further, we can give examples of several factors, in addition to education, that most affect the development of human capital: competence, knowledge, organizational development, risk. The world economy has undergone fundamental structural changes brought about by the globalization of business and the revolution in information and communication technologies (Chowdhury et al, 2014). The New Economy is an excellent economic structure that is the result of these two trends. This economy has set new rules and new ways of doing business, and its fundamental feature is the ubiquity of IT. Economics in general terms means the production, distribution, and consumption of certain goods and services that can satisfy human needs. The main factor of the economy is production. In production, there is a final product, which the production is aimed at, and the associated costs and the task of the economy in this case is to reduce all costs to a minimum. Nowadays, there are many ways to reduce costs, but with the advent of a new economy - the digital economy - it became possible to significantly reduce costs (Sadeghi et al, 2020).

The digital economy includes, as its main component, the economy in the form of its known types, as well as digital information and communication technologies as a tool for increasing the efficiency of production processes, distribution, and consumption of the results of human economic activity, thereby forming a new type of economy. The digital economy is becoming a productive economic system capable of producing useful products that can satisfy specific needs. For workers, greater flexibility in working hours can come from lower job quality, higher-income volatility, less access to social protection, and greater responsibility for skills development (Melville et al, 2004). For firms, lower labour costs and greater access to a global pool of virtual workers can erode their human capital. To address these challenges, governments and social institutions should improve their ability to identify emerging labour market trends and explore ways to design existing labour market and safety nets programs in which eligibility is tied to standard employment patterns to maintain worker-

employer relationships. at the proper level in the digital economy. After conducting a literary review on the above topics, the authors came to the following conclusion: the influence of the digital economy on human capital has not been fully studied in modern literature.

To analyse the impact of the digital economy on human capital, the authors identified the following hypotheses:

- 1. The digital economy creates more jobs.
- 2. The digital economy creates a new type of job.
- 3. The digitalization of the economy provides more opportunities for remote education.
- 4. The digitization of the economy increases labour productivity.
- 5. The digitization of the economy makes knowledge more accessible to people.

2. Methodology

The methodological framework of the research is strategic management theory, the principles of public and municipal governance, as well as the theoretical and practical foundation of regional governance. The research methods include common procedures of collecting, processing, and analysing economic evidence, modelling human capital increment processes, and methods of economic sociology and statistics. To establish the relationships between digital technologies and human capital, we conduct correlation analysis and determine the connection between the amount of each type of digital resources and the outcome of human capital in regional economic systems.

3. Results

How the proportion of organizations that provided additional training for employees in the ICT field affects the volume of investments for the purchase of ICT equipment. The calculations showed a high correlation coefficient between these two parameters (0.77), which indicates a high dependence and the influence of one parameter on the other. A simple conclusion follows from this, if the organization provides additional training to employees in the field of information and communication technologies, therefore, this area is very important for the healthy functioning of the company. Perhaps the activities of this organization are directly or indirectly related to ICT, respectively, an increase in investment in the purchase and renewal of ICT equipment will have a positive impact on the organization's activities.

How the proportion of students enrolled in educational programs of higher education - bachelor's, specialist's, master's programs affects the number of personal computers per 100 employees of organizations. There is also a high relationship between the two indicators and the correlation coefficient is 0.94. From this, the following conclusion can be drawn: students who receive higher education in undergraduate, specialist, and graduate programs mainly receive professions related to intellectual work. In the 21st century, no intellectual work is complete without the use of computers, therefore, organizations, to provide the most comfortable working conditions for graduates, need to purchase computer equipment and have at least 1 PC per employee.

Table 1: "Correlation number of computers per 100 employees of organizations" and human capital factors

Federal district		The proportion of students enrolled in programs for training mid-level specialists,%	The proportion of students enrolled in educational programs of higher education - bachelor's, specialist's, master's programs,%	Share of organizations that provided additional training for employees in the field of information and communication technologies (ICT), in the total number of surveyed organizations,%
Central Federal District		-0,372655601	0,698062251	0,826001738
Northwestern Federal District		0,254849077	0,622786248	0,634030747
Ural federal district		0,624422953	0,943622517	0,566130844
North Caucasian Federal District		0,246102022	0,878813739	0,43357717
Volga Federal District		0,169175994	0,507967975	0,64623028
Northern federal district		0,159140599	0,440675101	0,760139261
Southern Federal District		-0,333421228	0,206103617	1

Federal district		The proportion of students enrolled in programs for training mid-level specialists,%	The proportion of students enrolled in educational programs of higher education - bachelor's, specialist's, master's programs,%	Share of organizations that provided additional training for employees in the field of information and communication technologies (ICT), in the total number of surveyed organizations,%
Far Eastern Federal District		-0,166423943	-0,043037337	0,133831832

As follows from the results of the analysis of the data presented in the table, digital technologies make it possible to ensure the development of human capital factors. The largest factor of the digital economy such as "The number of personal computers per 100 employees of organizations, pieces" has on such a factor of human capital as "The share of organizations that conducted additional training for employees in the field of information and communication technologies (ICT), in the total number of surveyed organizations, % ", Between which there is a strong stable correlation. There is also an average correlation between the factor of the digital economy as "The number of personal computers per 100 employees of organizations, pieces" and such a factor of human capital as "The proportion of students enrolled in educational programs of higher education - bachelor's, specialist's, master's programs,%" ... Thus, we can conclude that the factor of the digital economy "The number of personal computers per 100 employees of organizations, pieces" is the driver of the development of higher and additional education, that is, human capital.

Table 2: Correlation coefficient of the digital economy factor "The volume of investments in fixed assets aimed at the acquisition of information, computer and telecommunication equipment" and human capital factors

Federal district	The proportion of students enrolled in programs for training mid-level specialists,%	The proportion of students enrolled in educational programs of higher education - bachelor's, specialist's, master's programs,%	Share of organizations that provided additional training for employees in the field of information and communication technologies (ICT), in the total number of surveyed organizations,%
Central Federal District	-0,696534282	0,66861405	0,947481893
Northwestern Federal District	-0,140925732	0,888735033	0,805173889
Ural federal district	0,530434997	0,365403415	0,771024234
North Caucasian Federal District	0,346333536	0,298998251	0,188804312
Volga Federal District	0,298614756	0,214948152	-0,1393998
Northern federal district	-0,30392285	0,168233191	0,439796835
Southern Federal District	0,092252491	-0,421248458	-0,192029668
Far Eastern Federal District	0,625066133	0,699017955	-0,242056348

From the analysis of the data presented in Table 2, the authors conclude that the factors of the digital economy have a high impact on the development of human capital.

Table 3: Correlation coefficient of the digital economy factor "The share of organizations using personal computers in the total number of surveyed organizations, %" and human capital factors

Federal district	The proportion of students enrolled in programs for training mid-level specialists,%	The proportion of students enrolled in educational programs of higher education - bachelor's, specialist's, master's programs,%	Share of organizations that provided additional training for employees in the field of information and communication technologies (ICT), in the total number of surveyed organizations,%
Central Federal District	-0,230181526	0,390083032	0,51809455
Northwestern Federal District	-0,263236473	-0,371058487	0,294597722

Federal district	The proportion of students enrolled in programs for training mid-level specialists,%	The proportion of students enrolled in educational programs of higher education - bachelor's, specialist's, master's programs,%	Share of organizations that provided additional training for employees in the field of information and communication technologies (ICT), in the total number of surveyed organizations,%
Ural federal district	0,653393582	0,544089686	0,504306377
North Caucasian Federal District	-0,193636909	-0,193449928	0,15590765
Volga Federal District	0,035088179	0,078184194	-0,054125232
Northern federal district	-0,2093363	-0,485452982	0,191793543
Southern Federal District	0,419353915	0,179366383	0,20123146
Far Eastern Federal District	-0,425179354	-0,41919287	0,305929884

From the analysis of the data presented in Table 3, the authors conclude that such a factor of the digital economy as "The share of organizations using personal computers in the total number of surveyed organizations,%" has a very weak impact on the development of human capital and only contributes to the development of such a human factor. capital as “The share of organizations that conducted additional training for employees in the field of information and communication technologies (ICT), in the total number of surveyed organizations,%”.

4. Discussion

As a result of the study, the authors draw the following conclusions.

First, the factors of the digital economy have a significant impact and contribute to the development of human capital. Hanna (2020) state that the digital economy consists of 3 main components, namely:

- 1) Infrastructure of e-business, which includes software, hardware, telecommunications, and human capital;
- 2) Electronic business (ways of doing business, processes that the organization performs through computer networks);
- 3) E-commerce (movement of goods via the Internet, for example, selling a book on the Internet).

As we can see, human capital is an integral part of the digital economy, therefore, all the factors considered in the article, to one degree or another, affect human capital.

Secondly, the greatest influence on human capital is exerted by such a factor of the digital economy as “The number of personal computers per 100 employees of organizations, pieces”, and the smallest “The share of organizations that have conducted additional training for employees in the field of information and communication technologies (ICT),” in the total number of surveyed organizations,% ”. This can be explained as follows: the share of small and medium-sized businesses in Russia's GDP for 2019 is 20.2%, which means the number of employees is up to 250 people. One study found that organizations with fewer than 250 employees were less likely to provide computer training to employees than larger businesses, but the same study shows that increasing the number of workers using computers can increase production by 5.4%. The study also states that non-manufacturing organizations also benefit from machine learning gains in productivity, but no exact numbers are provided. Hence, it follows that the factor "The share of organizations that conducted additional training of employees in the field of information and communication technologies (ICT) in the total number of surveyed organizations,%" is an underestimated factor and if small and medium-sized businesses pay attention to this and begin to invest more resources in computer training for at least 60% of its employees, it can gain an advantage over competitors through increased productivity.

Third, the greatest interconnection between the digital economy and human capital is observed in the Central, Northwestern, and Ural federal districts. The smallest in the southern federal district.

The theoretical significance of the study consists in deriving hypotheses about the impact of the digital economy on human capital in general and obtaining correlation dependences of the influence of factors of the digital economy on factors of human capital.

The practical significance can be formulated as follows since the actual data for 2019-2020 were taken. on the factors of human capital and the digital economy in all federal districts of the Russian Federation, based on the calculations obtained, it is possible to make calculations for other factors, when they play a large role in a certain region of the country, draw appropriate conclusions and apply new approaches in practice.

Since the influence of the digital economy on human capital has not been fully studied in modern literature, the direction of further research by the authors will be aimed at an even deeper study of this influence, as well as the influence of the digital economy on other aspects of the life of people and organizations in general.

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References

Arvanitis, S., Loukis, E. N. (2009) Information and communication technologies, human capital, workplace organization and labor productivity: A comparative study based on firm-level data for Greece and Switzerland, Information Economics and Policy

Becker, G. (1994) Human Capital: A Theoretical and Empirical Analysis with Special Reference to Education, [online], https://www.nber.org/books/beck94-1

Chu, P. Y., Lin, Y. L., Hsiung, H. H., Liu, T. Y. (2006) Intellectual capital: An empirical study of ITRI, Technological Forecasting and Social Change

Chowdhury S., Schulz E., Milner M., Voort D. (2014) Core employee based human capital and revenue productivity in small firms: An empirical investigation, Eastern Michigan University, Department of Management, 466 Owen Building, 300 West Michigan Avenue, Ypsilanti, MI 48197, USA

Fonseca T., Faria P., Lima F. (2019) Human capital and innovation: the importance of the optimal organizational task structure, World Maritime University, Sweden

Frank, C. (1996) The impact of human capital on labor productivity in manufacturing sectors of the European Union, ROA Research Memorandum 2E, Maastricht University, Research Centre for Education and the Labour Market

Goldin, C., Katz, L. (2020) The Incubator of Human Capital: The NBER and the Rise of the Human Capital Paradigm, NBER working paper series

Hanna, N.K. (2020) Assessing the digital economy: aims, frameworks, pilots, results, and lessons, Journal of Innovation and Entrepreneurship

Kianto A., Sáenz J., Aramburu N. (2017) Knowledge-based human resource management practices, intellectual capital and innovation , Journal of Business Research, Lappeenranta University of Technology (LUT), School of Business and Management, Skinnarilankatu 34, 53850 Lappeenranta, Finland

Li, J., Sikora, R., Shaw, M. J., Tan, G. W. (2006) A strategic analysis of inter organizational information sharing, Decision Support Systems

Melville, Kraemer, Gurbaxani. (2004) Review: Information Technology and Organizational Performance: An Integrative Model of IT Business Value, MIS Quarterly

Pohjola, M. (2002) The New Economy: Facts, impacts and policies, Information Economics and Policy

Sadeghi P., Shahrestani H., Kiani K. H., Torabi T. (2020) Economic complexity, human capital, and FDI attraction: A cross country analysis, Department of Economic, Science and Research Branch, Islamic Azad University, Tehran, Iran

Shafuda, C. P., De, U. K. (2020) Government expenditure on human capital and growth in Namibia: A time series analysis, Journal of Economic Structures

Business and Product Innovation: Design for a Strategy or Strategy for a Design

Lynne Whelan, Louise Kiernan, Kellie Morrissey and Niall Deloughry
University of Limerick, Ireland
Institute of Technology Carlow, Ireland
Lynne.Whelan@itcarlow.ie
Louise.Kiernan@ul.ie
Kellie.Morrissey@ul.ie
Niall.Deloughry@ul.ie
DOI: 10.34190/EIE.21.092

Abstract: Design driven innovation has a product focus, whilst design strategy is applied to the broader business context. Both approaches are embedded in a similar theoretical basis, which is derived from the innovation process of divergent/convergent thinking. The research question is how do the processes differ in application and implementation? The purpose of this research is to understand the nuances of approach in the processes which determine the various outcomes. The methodological approach was research through design, engaging with four SME owner/managers; two through facilitated design driven innovation with a product focus the other two through facilitated strategic design focusing on the broader business context for innovation opportunities. The data was collected through design workshops and analysis was carried out through visual mapping. The findings indicate emphasis on different tools in the early research phase of the process determine specific outcomes. User focus shifts to the interplay of broader stakeholder needs in strategic design for business as opposed to end user focus in product innovation. Assessment of stakeholder needs in traditional business mentoring has a focus on return of investment whereas the design approach extends to analyze the business ecosystem, interconnectedness, human drivers, and motivations including the owner/manager's vision, aspirations, and capabilities. The findings indicate that these human insights play a significant role in the viability of innovation. The implications are that many designers are attuned to beginning with the end user focus but in strategic design for business innovation we do not necessarily know who those end user groups are. The process is open to identifying many possible innovative routes for growth which may involve entirely new user groups or a new business model. These findings may assist designers in developing appropriate toolkits and methods of delivery and assist owner/managers in understanding and accessing these processes.

Keywords: strategic design, innovation, strategy, processes

1. Introduction

This paper presents a literature review on the Irish policy context of developing design skills in Ireland to realize its potential to become a leading nation in design. Discourse on strategic design is reviewed which highlights a gap in the knowledge in relation to how organizations access and implement business and product innovation as an actionable process or approach. Data is collected in a research through design approach, from four small to medium enterprises (SMEs) as they engage in design strategy for business and product innovation. The data is analyzed through visual mapping of the processes which captures the tools used and the resulting outcomes. The findings indicate nuanced differences in the application of strategic design approach which impacts the final outcomes from the engagements. This paper aims to inform business leaders and government entities which support and promote emerging design demands across the business landscape in the actionable methods and processes for accessing and implementing design for business and product innovation.

2. Literature review

2.1 Irish policy context

In 2017 the Irish government, through the Expert Group for Future Skills Needs (EGFSN), released the first in a series of reports on design in Ireland. 'Winning by Design' notes the shift in design from being associated with aesthetics to design thinking which informs strategies for major organizations (EGFSN, 2017). The EGFSN continued to engage with stakeholders in identifying needs and in 2020 released 'Together for Design'. This report specifically looks at the enterprise demand for digital, product and strategic design skills in Ireland to measure the provision of these skillsets within education (EGFSN, 2020). The most recent report was published in February 2021; 'Design Practice in Ireland' which was commissioned by Design Skillnet funded by Department of Further and Higher Education, research Innovation and Science, and presents a snapshot of design in Ireland

that will inform a training and development map for the following three years (Skillnet Ireland, 2021). The report highlights the crucial and urgent view of the necessity to "provide the right training, for the right people at the right time if Ireland is to realize its potential and become a leading nation in design" (Skillnet Ireland, 2021). The report signals the skills gaps and unfulfilled training needs. Business and management skills are most sought after by designers seeking to have influence as leaders and who are involved in solving complex business problems. This is the area of strategic design which encompasses a broad and holistic approach that can be applied to any sector. It is not limited to design agency space but is fragmented across in-house enterprise sector and this is noted as a challenge to categorize, understand and measure. The in-house enterprise sector is representative of many SMEs in Ireland which whilst being nimble due to their size must also engage the managers and employees in applying themselves to multiple roles including strategy and innovation.

2.2 Innovation processes for business and product

Strategic design is an approach applied to business and product innovation; two closely linked business and product processes are lean production and agile. The origin of lean production dates to the 1930s and the Toyota Production System, however lean was introduced to a worldwide audience in 1991 through the publication of the book 'The Machine that Changed the World' (Womack, 1991). Since then, the lean approach has also been applied to start up models to produce minimum viable product (MVP). The aim of lean start up is to build a continuous feedback loop with customers during product development cycles (Maurya, 2012). Lean is focussed on product and production improvement or for start-up purposes, in developing and testing a solution. This differs to a design approach as design thinking is applied to the *rationale* for developing a product/service; described by IDEO consultancy as "a human-centered approach to innovation (IDEO, 2021). Agile is an approach which looks at how to make and scale your solution, it is described as the ability of an organisation to adapt or mobilize quickly, be nimble and empowered to act (Wouter, 2018). Agile differs from design approach as it is a method to solve predefined problems while design thinking focuses on finding the right problem to solve. Agile methods focus on the "how" of project delivery, breaking up the planning and scope of work into smaller units (IBM, 2018). There are obvious overlaps in design thinking, lean and agile methods for business and product management and innovation. One model that assist in defining the application of all three methods is the Gartner model. The Gartner model demonstrates design thinking applied to customer problem and places lean and agile as methods for developing customer solutions.

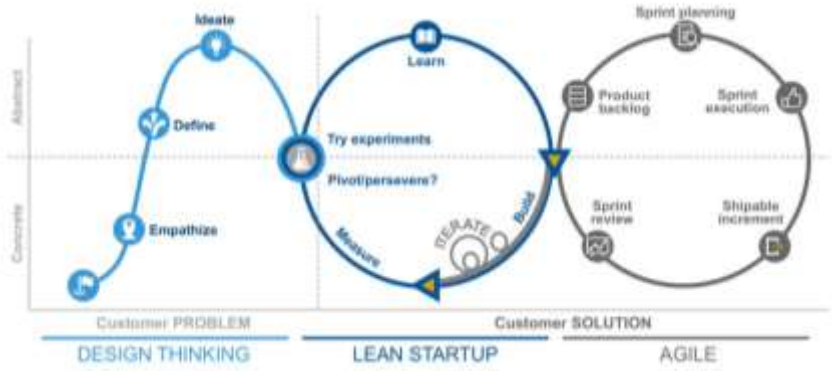

Figure 1: Gartner model of combining design thinking, lean and agile (Gartner 2016)

This paper is looking specifically at strategic design and in considering the Gartner model, strategic design for innovation would appear to further extend the design thinking approach and have elements of all three processes approached as a holistic overview of people, processes, and business model. Strategic design is described by the Observatory of Public Sector Innovation as; "an integrative and holistic practice respective of the interconnected and fluid nature of relationships between people, things and organizations" (OECD, 2020). The demand for strategic design can be linked to a paradigm shift in economic demands, "we are moving from the Industrial Age of production economy to the Knowledge Age of innovation-based economy" (Whelan, 2016). This shift is witnessed in the emergent globalization of markets, knowledge, and communication. The requirements for the past production-based economy were steeped in uniformity, repetition, and efficiency: however, a knowledge-based economy requires critical thinkers and a new approach to achieve innovation for future growth. Strategic design is the design response which has emerged as an approach that encompasses big picture interconnectedness and a context of relationships across a broad network. Giulia Calabretta highlights the importance of strategic design through its demonstrated uptake in large corporations such as Apple, PepsiCo

and Microsoft (Calabretta G, 2018). In addition, business consultancies such as McKinsey and Accenture have acquired entire design agencies, indicating a response to an industry demand for strategic design. Design thinking and strategic design are recognized and accepted approaches in leading innovation activities in large global organizations, SMEs and start-ups can equally benefit from the approach. The challenge appears to be how to access the thinking and translate it into actionable outcomes within a SME. As Michalke describes it "implementation of design thinking remains a challenge particularly for SMEs due to the approach being substantially different from established business processes and mindsets" (Michalke, 2019). Sean Mc Nulty, Chairman and Director of Dolmen Design, highlights that "innovation management is not the same as operational management, it is a different mindset, different set of tools and a different culture" (McNulty, 2021)

3. Research question

Strategic design applied to business innovation and strategic design applied to a product focus, are embedded in a similar theoretical basis, which is derived from a process of convergent/divergent thinking. In understanding the nuances of these approaches, it may assist designers in developing strategic design responses and make them more accessible to SMEs. The research question is how do the processes differ in application and implementation from each other and from traditional business mentoring approaches?

4. Methodology

The research is approached in a research through design methodology. This is a qualitative research approach that uses design practice to inform research (Frayling, 1993). Innovation is a key driver in the knowledge economy and embedded in Ireland's future strategies for growth. Relationships between enterprise and HEIs are actively encouraged and enabled through a variety of mechanisms. One such initiative that brings together Enterprise and HEIs are the Technology Gateways in Ireland. There are currently fifteen Gateways located in Institutes of Technology throughout the country, supported by the Institutes of Technology and Enterprise Ireland and each with their own set of specialisms in research. This research was carried out in the Design + Technology Gateway in Institute of Technology Carlow which specializes in design research, design driven innovation and strategic design. The lead researcher works full time in the Gateway as part of a design team who have worked with 68 SMEs throughout 2020 in design led processes for innovation. The insights gained from the experience indicated different nuanced approaches in different processes which impacted specific outcomes.

The research design was to select two SMEs that were typical of design driven innovation (DDI) process, in other words seeking new product development and two SMEs that were typical of the strategic design process (SDI), seeking growth strategies for the business. Each SME owner/manager participated in four workshops facilitated by two design strategists (Table 1).

Table 1: Research design for workshops

Location	Design Studio & Remotely through video call
Participants	Design Strategist x2, owner/manager x1
Time	2 hoursx4 workshops
Duration	6-8 weeks per SME (X4 SMEs)
Methods	Visual drawing/text on white wall, post-it notes, colored pens. Use of design toolkit
Total organizations and sectors	4 SMEs, corporate services, distillery, IOT, healthcare

The workshops took place in a design studio with large whiteboard walls which enable the visual capture of the process and through online digital workshops with digital whiteboard captures of data (Figure 2). Colored markers, post-it notes, print outs and images are used as a mixed media approach to data capture (Figure 2). The visualization of the information aims to create a shared context and holistic view of data captured. The objective was to map the information captured and the tools used at each stage of a four-stage design process, to better understand the nuances in approach and resulting outcomes to address the research question.

The process is based on the theoretical innovation process of divergent and convergent thinking. In design this is referred to as design thinking and the theoretical process as the 'double diamond' approach. The double diamond approach is a graphical way of describing the series of divergent and convergent thinking and was developed by the Design Council (Design Council, 2005). This theoretical approach is translated into the business landscape through a design led innovation process which has been developed by the design strategy team in the

Design+ Technology Gateway in Institute of Technology Carlow (Figure 2). The process is accessed through a refined toolkit which combines business tools, design tools and tools newly developed by the team which responded to an identified business need. The tools differ from templates in that they are flexibile and can be used in different ways unlike a template which is predefined.

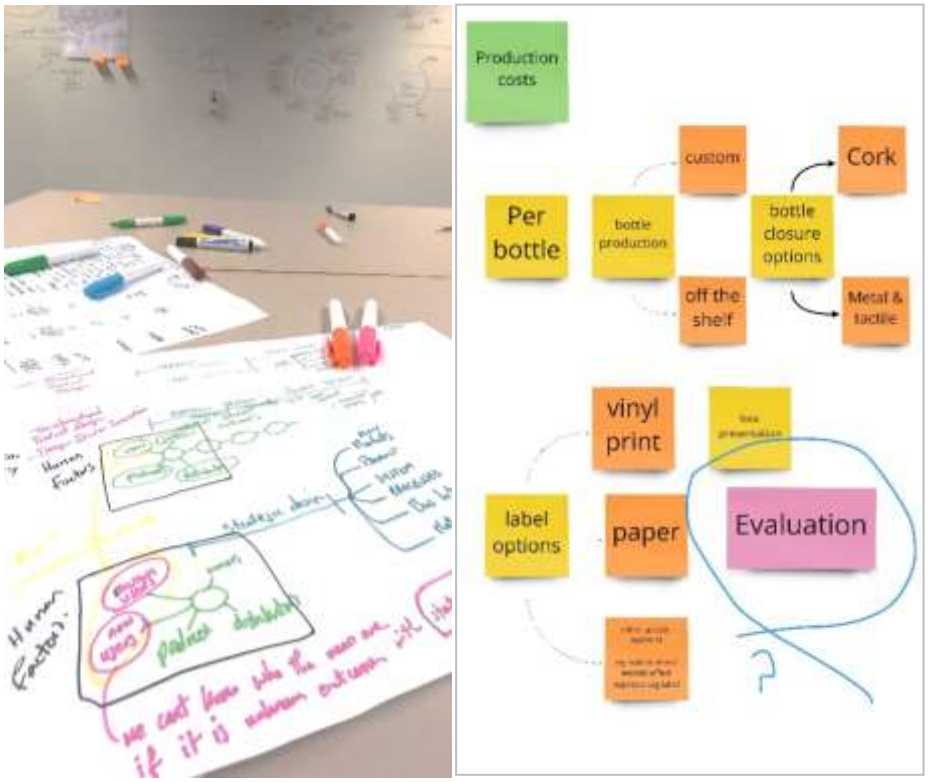

Figure 2: Mixed media data capture in design studio and digital whiteboard (authors own)

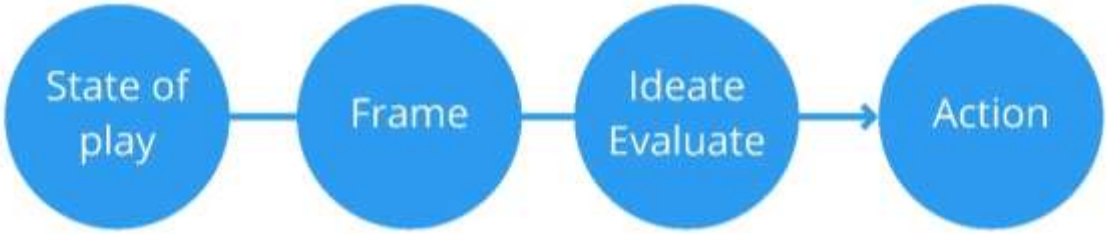

Figure 3: Design+ innovation process (authors own)

4.1 Data collection

SME 1 presented the challenge of gaining user insight on a new product concept through user testing. This was a design for product innovation engagement as there was a clear new product development requirement. The product concept was a social media tool for SMEs. A prototype had been developed but the business model was still unclear as the final iterations of the product were still under way. The design strategists brought the owner manager through the four-stage process beginning with state of play. This stage maps the eco system of the proposed product. Emphasis was placed on the end user needs, looking at what problem the product was solving. To fully understand these user needs a plan for a focus group was developed. This involved eight volunteers organized by the SME to participate and facilitated by the design strategist using three tools from the toolkit: persona tool, the user journey map, and the framing tool. The persona tool captures of the background and position of the participant which may have an influence on their responses. The user journey captures the participants experience of using the product. The framing tool captures their ideas and recommendations of what they would like the product to be. The design strategist and SME carried out a follow workshop which analyzed the information gathered in the focus group through grouping the responses into commonalities and developing insights. The insights highlighted that 3 of the participants would have liked a simpler version of the product at a lesser price, 2 participants thought the existing model was fine 3 participants would have liked a

higher level of product which could provide data analysis even at a higher cost. This analysis was framed into 'how might we statements' which creates an actionable response to generating new ideas. The third workshop was with the SME and design strategist and worked on generating new ideas around theses statement. The new ideas were evaluated and iterated using the usability, feasibility and viability model. The result was a tiered system of offering at three different price points targeting different user needs through the same base model product. The fourth workshop developed a strategic roadmap with steps to implementation and development to market launch.

SME 2 presented the challenge of communication with end users of product features and benefits. This was also a design for product innovation engagement as there was a clear emphasis on user engagement with the product. The product was a luxury healthcare item which was sold through a complex supply chain of distributors primarily to nursing homes and hospitals. The first workshop with the design strategists and the SME mapped the existing state of play of the business including the existing user's needs, the product offering, the supply chains, and existing communications. The second workshop focused on framing what was working, what was not, identifying issues, causes and developing 'how might we statements' to prepare for the generation of new ideas. The third workshop focused on generating new ideas utilizing the ideation tools which prompt new ways of thinking about existing products and challenge the application of the product in different environments and sectors. Desk research and end user interviews were also conducted by the SME outside of the workshops. The idea to bring the product mainstream in addition to the healthcare sector was evaluated through the usability, feasibility and viability model as a potential opportunity which not only solves the complex supply chain issues but opens a potentially large mainstream retail/online national and international market. The strategic roadmap was developed in the fourth workshop to indicate the next steps which were primarily research based to develop the concept. The SME ultimately went on to develop kit versions of the product to appeal to mainstream audiences which was launched online.

SME 3 presented the challenge of developing a business model for a newly developed product for a startup company. This was a strategic design for business innovation engagement as the focus and challenge presented was to innovate in the business model development. The product was a distilled alcohol product, the recipe and production process had been researched and tested. The owner/manager was now unsure of next steps as there were multiple possibilities around how to proceed. The first workshop captured the state of play around the business idea. This mapped out the production processes, the routes to market and the identified target market. The owner/managers *capability* in the sector was captured and indicated an experience in the sector and a passion for the industry and product. The owner/managers *vision* for the company was captured as being produced in Ireland and sold in USA through distributors as this is the common distribution model for such products. However, when digging further into the *aspiration* of the owner/manager, they did not see themselves as solely running a production/distribution model as a daily job, they aspired to be part of a community of users with a creative input to running events and developing specialized batches of product version 2.0, 3.0 etc. The vision, aspiration, and capability (VAC) of the owner/manager was not aligned with the revenue model. Workshop two framed the challenge into 'how might we' statements. New ideas were generated, and research was conducted into alternative models in other industries. A new model was identified and evaluated as meeting the VAC of the owner manager *and* providing a unique consumer experience. The product response changed to meet the needs of the user group in the new model and the process of design driven innovation around the product begins. The final workshop created a strategic roadmap for the next stage of development which was further research into the possible revenue streams around a hybrid model of membership/distributor and user needs.

SME 4 presented the challenge developing a growth strategy for an existing and established business in the corporate services sector. This was a strategic design for business innovation engagement as the emphasis was on innovating through the business model to develop appropriate growth strategy. The first workshop mapped the existing state of play of the business including offering, clients, market sectors, supply chain, resources, and capacity for growth. The owner/managers VAC was also captured. The initial vision was presented as growing the company to a specific revenue amount. In examining this more carefully and considering the aspirations, it revealed that the owner/manager was innovation focused and wished to develop the core asset value of the company for selling the company and to explore other opportunities to build alternative businesses applying the skills and expertise gained in building this business to optimum. This was framed as the challenge in workshop two. The generation of new ideas in workshop three was now focused on ways to increase asset value as opposed to just hitting new markets or selling more. Building repeat customer base and developing the business

intelligence would be the first steps. Data analytics was considered and evaluated as an opportunity to develop business intelligence. A roadmap was developed in the fourth workshop which broke down the next steps into short-, medium- and long-term strategy. The short term to research and implement data analytics to improve business intelligence through use of data to develop a refined and optimized business model. The medium term to exhaust opportunities with existing client base by utilizing new business intelligence to map their needs for additional products and services to build on repeat sales and retention before attacking new markets. The longer-term vision to identify new business opportunities and build towards sale of existing business.

4.2 Analysis

The data captured throughout the workshops was analyzed through visual mapping (Figure 3). The four SMEs each went through the same four stage process which is based on the same principle of wide exploratory research and narrow framing. The analysis was aimed at identifying:

- The design tools used.
- User inputs (end users vs corporate).
- Time spent/emphasis of specific tools.
- Outputs, outcomes, and impacts.

The objective was to identify how the implementation of the process differed for strategic design approach to product innovation versus strategic design approach applied to the broader business context. The visual mapping was first carried out on the dry erase white wall and identified the tools used at each stage of the process for design strategy for product development and design strategy as applied to the business (Figure 3)

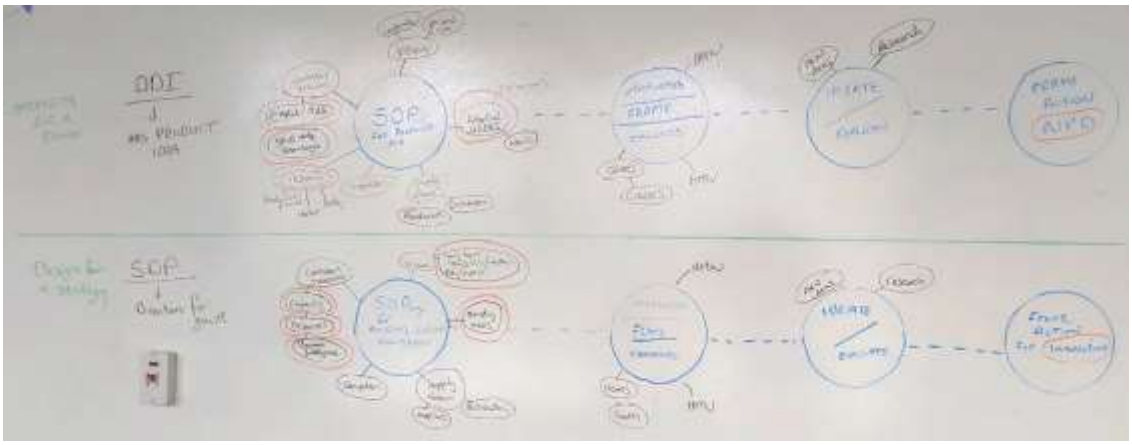

Figure 4: Visual mapping of tools used at each stage of the process (authors own)

Further refinement of this mapping was created on MIRO digital whiteboard and the areas of most emphasis in the process were identified. In mapping the tools used it was possible to highlight differences in the approach and tools used which could be considered in the context of strategic design for big picture systematic changes and strategic design for product innovation (Figures 4 and 5).

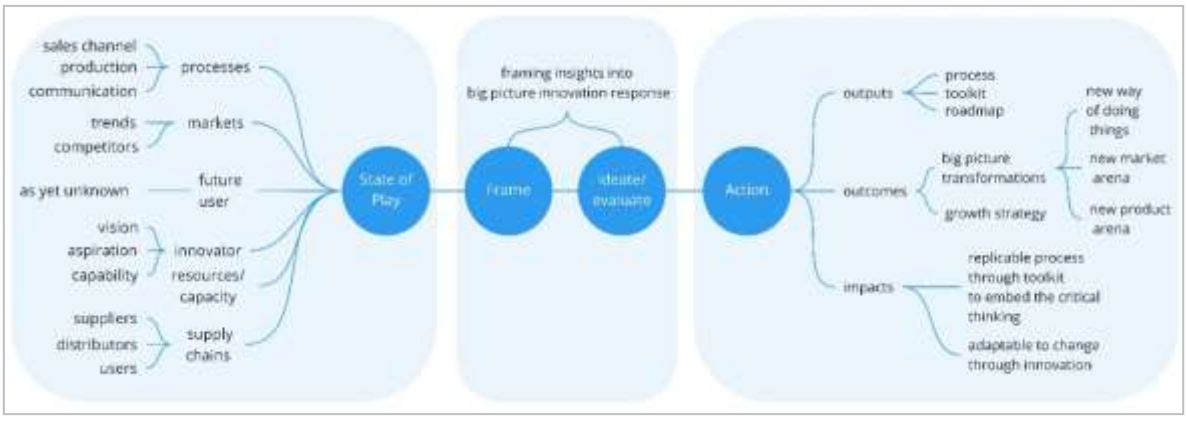

Figure 5: Mapping of strategic design process for business innovation (authors own)

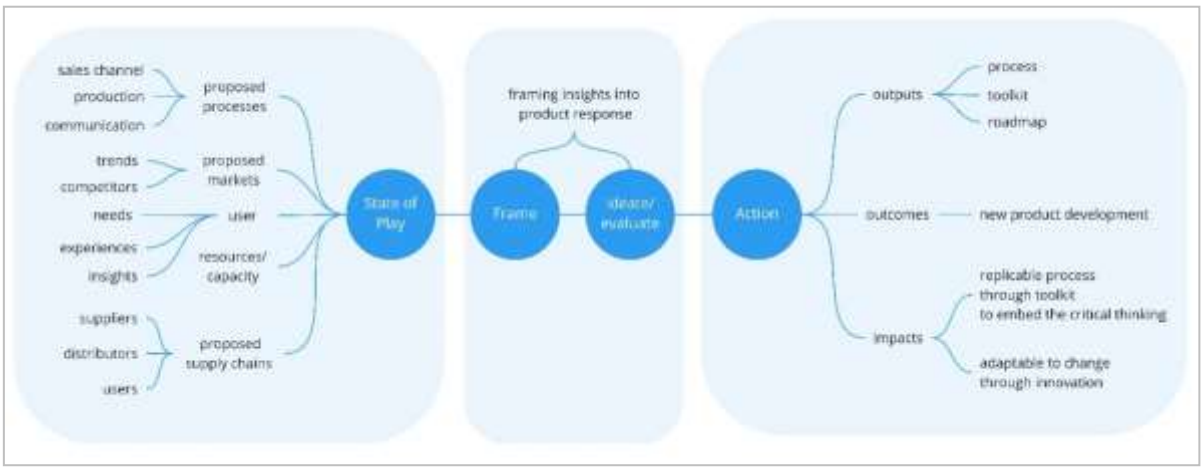

Figure 6: Mapping of strategic design process for product innovation (authors own)

5. Findings

The research aimed to map the strategic design approach for business innovation and strategic design approach for product innovation to identify the nuances of implementation from each other and from traditional business modelling. This may inform designers and organizations in best practice approaches to innovation. The findings from mapping the two process across four SMEs, highlights that within a design strategy approach to product innovation, the business eco system is mapped around the product with a focus on the user needs and experiences to produce insights that can be translated into a meaningful product with a viable business model. In design strategy approach to business innovation, the future user is unknown.

If the process is restricted to existing users, it will limit the opportunities for transformational big system changes which may result in new ways of doing things, new market arenas or new product arenas to develop into. Therefore, the business eco system is mapped to identify areas of opportunity, the mapping includes the interplay between the business model, the existing user groups, the broad stakeholder needs, environments, processes, and experiences. This is a key insight to the nuanced difference in approaches. If an organization is looking for big picture transformational changes and was to begin with existing user needs it would limit the possibilities of multiple potential outcomes which may include new product arena. Following the implementation of a strategic design approach to the business innovation, if a new product area *is* identified, the focus then shifts to the user needs around the concept area to develop the most meaningful product response. In the same way if a startup company has developed a user centered meaningful product and is now developing a growing business model the focus can shift to strategic design for business innovation approach. This cycle of innovation between both approaches provides an adaptability and sustainability of business model which is innovative, competitive, and responsive to change. This differs to traditional business modelling which describes how a company creates and captures value such as: value proposition, pricing, organization, supply chain (Kavadias, 2016). In strategic design the focus extends beyond the business modelling to the interconnectedness of the business modeling with the environments, and the human drivers of stakeholder needs, including SME vision, aspiration, and capability. The vision is where the innovation or idea stems from, the aspiration is where the drive to develop a solution lies and the capability is the ability of the owner/manager or team to deliver it.

6. Conclusion

The research shows the strategic design process applied to product and business innovation encompasses the human insights of design thinking, the processes of lean and the adaptive business modelling of agile in a singular 'big picture' approach. However, there are nuanced differences in approach when applying strategic design to new product development and to business innovation. The research shows that in applying strategic design for new product development, organisations must begin with understanding user needs to extract insights that can be translated into product response. This is combined with understanding the relevant processes of production and a business model that encompasses the appropriate return of investment but that considers all human drivers associated. In applying strategic design to business innovation, the end user is yet unknown. Strategic design for business innovation begins with unknown outcomes, open to all possibilities and the creation of new ideas to be truly innovating. This is reflected in the broader outcomes which result in not only new products but

new ways of doing things, new thinking. This is an important step in understanding the difference between strategic design for business innovation and strategic design for product innovation. This also impacts the intersections between strategic design engagements and the follow-on development required. In strategic design for product innovation a clear product concept with extensive rationale is developed which can be communicated to the product design team or development engineers. In strategic design for business innovation the varied outcomes are more complex, and this indicates a potential challenge area for companies and designers to navigate. The strategic roadmap developed by the design strategist supports this intersection by framing the steps to implementation, resources required, timeframes, milestones, participation scope and key decision points into a visual infographic.

This acts as the communication tool at the intersection between the design strategy engagement and the follow-on development teams, providing a shared context and clear direction. This indicates the strategic roadmap has a significant role within the process for a successful strategic design engagement for business innovation. In considering the limitations to the study, four SMEs were engaged in the process, a wider range of SMEs may provide more conclusive insights. The study took place in the Design + Technology Gateway, applying the four-stage process developed by the design strategy team; looking at other best practice models of applying design strategy may provide new insights. The authors background as a design strategist within the team introduces a level of subjectivity to the research. The future research aims to focus on measuring the success factors of strategic design engagements over a twelve-month period, policy drivers and strategic design in higher education.

References

Calabretta G, G. G. (2018). *Strategic Design.* Amsterdam: BIS Publishers.
Design Council. (2005). *Eleven Lessons.* Retrieved from Design Council: https://www.designcouncil.org.uk
EGFSN. (2017). *Winning by Design.* Dublin: Expert Group on Future Skills Needs National Skills Council .
EGFSN. (2020). *Together for Design.* Dublin: Expert Group on Future Skills Needs.
Frayling, C. (1993). *Research in Art & Design.* London: Royal College of Art.
Gartner. (2016). *Combine design thinking, lean and agile.* Retrieved from Gartner.com: http://gartner.com
IBM. (2018). *Agile, meet design thinking.* New York: IBM Corporation.
IDEO. (2021). *Design Thinking*. Retrieved from IDEO: https://designthinking.ideo.com/
James P Womack, D. T. (1991). *The Machine that Changed the World.* New York: Harper Perennial.
James P Womack, D. T. (2003). *Lean thinking.* Simon & Schuster.
Kavadias, S. (2016). The Transformative Business Model. *Harvard Business Review*.
Maurya, A. (2012). *Running Lean.* Sebastopool: O'Reilly Media Inc.
McNulty, S. (2021). Strategic Design in HEI. *Strategic Design in HEI.* Dublin: Irish Research & Development Group.
Michalke, S. (2019). Implementation of Design Thinking in an SME . *ISPIM Innovation Conference.* Florence.
OECD. (2020). *Strategic Design.* Retrieved from Observatory of Public Sector innovation: https://oecd-opsi.org/guide/strategic-design/
Skillnet Ireland. (2021). *Design practice in Ireland .* Dublin: Dept of Further and Higher Education.
Verganti, R. (2009). *Design Driven Innovation.* Cambridge: Harvard Business Press.
Whelan, L. (2016). Timeline- the Foundations of Regional Techncial Colleges in Irealnd to the emrgence of Technological Universities. *International Journal fro Cross Disciplinary Subjects in Education* , Vol 9 .
Wouter, A. (2018). *The Five trademarks of Agile Organizations.* McKinsey & Company.

Masters Research Papers

Innovation Strategies for Adaptation of Organizations in a VUCA World

Márbia Araújo, Luciana Reis and Isabela Morais
Universidade Federal de Ouro, Preto (UFOP), João Monlevade, Brazil
marbia.araujo@aluno.ufop.edu.br
lucianapaula@ufop.edu.br
isabela.morais@ufop.edu.br
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Abstract: Startups are inserted in a VUCA world, characterized by aspects of volatility, uncertainty, complexity, and ambiguity, having to respond quickly to sudden changes and turbulent environments. The drivers of innovation are fundamental elements in determining innovation strategies. For a better adaptation of organizations to the VUCA world, innovation becomes a key element, allowing them to respond quickly and with better performance in the market. Recent studies suggest that effectuation has a positive effect on innovation strategies and has been defined as a decision-making process used by entrepreneurs who are specialists in conditions of uncertainty. Therefore, this paper aims to identify which drivers and innovation strategies impact the adaptation of organizations in a VUCA world in the light of the principles of effectuation. There is a gap in the literature on how effectuation contributes to the innovation strategy in organizational contexts, mainly in high-tech enterprises, and which innovation drivers allow these organizations to adapt to the VUCA world. From a literature review, a theoretical model was developed. This shows the internal and external drivers, which depending on how they are used by organizations, can contribute to adaptability to the VUCA world. To validate the theoretical model, a case study was carried out in two Brazilian fintechs. The results show how and which innovation strategies contribute the most, and which effectuation principles are most used for fintech's adaptability. This study contributes to innovation strategy research and provides deeper insight into the missing links between innovation management and decision-making in a VUCA world.

Keywords: innovation drivers, innovation strategy, effectuation, VUCA world

1. Introduction

Organizations are inserted in a dynamic and turbulent environment (Frynas, Mol, and Mellahi, 2018). They need to respond quickly to sudden changes. The VUCA world, which means Volatility, Uncertainty, Complexity, and Ambiguity, represents the environment experienced especially by technology companies (Jaiswal and Manoj, 2019). The COVID-19 pandemic is an example of turbulent environments that shows how organizations are not prepared to adapt and react quickly. “The COVID-19 crisis came like any other natural disaster, finding people and organizations unprepared for disruptive power and social nexus” (Bratianu and Bejinaru, 2021, p. 1).

Companies can use different decision-making approaches to guide the paths to achieve their goals, innovate and adapt to the VUCA world. Among these approaches, the article will study effectuation and causation, as two logics of the decision-making process. Studies point to the use of both logics, ambidexterity, as a way to contribute to innovation processes, for exploration and exploitation (Bai et al., 2021; Evers and Andersson, 2021).

These logics directly affect the management of innovation strategies and, consequently, the performance of companies during their adaptations in the VUCA world. Thus, it is important to analyze how companies have dedicated themselves to the practice of innovation as a strategy, since innovation is vital for economic development and business growth, value creation and competitive advantage (Ramukumba, 2017; Rocha, 2018) The literature also points out that there is an incipience of how and where to use effectuation and its relationship with innovation management (Frederiksen and Brem, 2017; Futterer, Schmidt, and Heidenreich, 2018; Guo, 2019; McKelvie et al., 2019; Roach, Ryman and Makani, 2016; Sarasvathy, 2001). Thus, in this context, this research seeks to answer the following questions: How and what innovation strategies do fintechs use to adapt to the VUCA world? Does effectuation help in this innovative adaptation process? How and what effectuation principles are used?

Therefore, this study aims to identify which drivers and innovation strategies impact the adaptability of fintechs in a VUCA world in light of the effectuation principles. Besides, this research is important for the innovation area, highlighting strategies that can guide the decision-making process and the best performance of organizations in the competitive market.

2. Theoretical framework and hypotheses

2.1 Innovation strategies and adaptation to the VUCA world

Companies are creating adequate innovation management, specifically with quick and timely responses, to deal with a dynamic context (Frynas, Mol, and Mellahi, 2018). Each component of the VUCA world, shown in Table 1, influences the formation of this dynamic context.

Table 1: Components of the VUCA world

Component	Meaning
Volatility	Relatively unstable change
Uncertainty	A lack of knowledge of whether an event will have meaningful ramifications
Complexity	Many interconnected parts form an elaborate network of information and procedures
Ambiguity	Cause and effect are not understood, and there is no precedent for making predictions on what to expect

Source: Adapted from Frynas, Mol, and Mellahi (2018)

Innovation strategies are developed through drivers. According to Leo and Tello-Gamarra (2020), innovation drivers are composed of internal and external factors and, depending on the way they are used, guide the organization towards innovation. Based on the structure of service innovation drivers proposed by Leo and Tello-Gamarra (2020), a literature review was carried out to determine the internal and external strategic drivers that contribute to the achievement of innovation in organizations. Therefore, Table 2 shows the strategies and their respective drivers.

Table 2: Innovation strategies. Source: Author's elaboration

Drivers	Strategies	References
Employees	The company has an employee who is responsible for establishing an observation and direct contact with customers.	Larivière et al. (2017)
	The company constantly trains its employees to develop innovative activities and use new technologies.	Kariyapperuma (2016); Leo e Tello-Gamarra (2020); Silva et al. (2019); Sosa Pérez et al. (2017); Tuzovic et al. (2018)
	The selection and recruitment process of the company considers the innovative profile of the candidate.	Leo e Tello-Gamarra (2020); Tuzovic et al. (2018)
	The company uses integrated teams to develop its activities.	Dangelico (2016); Johansson, Raddats e Witell (2019); Kariyapperuma (2016); Ozorhon e Oral (2017); Silva et al. (2019); Sosa Pérez et al. (2017); Tuzovic et al. (2018)
Innovation	The company has innovation as a strategic element for its consolidation in the market.	Kariyapperuma (2016); Leo e Tello-Gamarra (2020); Ozorhon e Oral (2017); Silva et al. (2019); Sosa Pérez et al. (2017)
	The company communicates its innovation strategies to its employees.	Leo e Tello-Gamarra (2020); Silva et al. (2019); Sosa Pérez et al. (2017)
Innovation	The company has partnerships with research institutions or external R&D (Research and development) contracts.	Dangelico (2016); Leo e Tello-Gamarra (2020); Silva et al. (2019)
	The company has an internal R&D center to create new knowledge and technologies.	Dangelico (2016); Kariyapperuma (2016); Leo e Tello-Gamarra (2020); Ozorhon e Oral (2017); Revilla, Rodríguez-Prado (2018); Yan et al. (2018)
Knowledge Management	The company manages its learning to adapt to new market changes based on previous experiences.	Kariyapperuma (2016); Ozorhon e Oral (2017); Paez-Logreira, Zamora-Musa e Velez-Zapata (2016); Salunke, Weerawardena e Mccoll-Kennedy (2019); Silva et al. (2019); Soto-Acosta, Popa e Martinez-Conesa (2018); Taghizadeh, Rahman e Hossain (2018)
	The company documents the knowledge generated by the relationship with its	Ozorhon e Oral (2017); Paez-Logreira, Zamora-Musa e Velez-Zapata (2016); Salunke, Weerawardena e Mccoll-Kennedy (2019); Soto-Acosta, Popa e Martinez-Conesa (2018)

Drivers	Strategies	References
	customers, suppliers, and other external partners.	
	The company maps out the experiences and skills of its employees.	Kariyapperuma (2016); Ozorhon e Oral (2017); Paez-Logreira, Zamora-Musa e Velez-Zapata (2016); Salunke, Weerawardena e Mccoll-Kennedy (2019)
Culture	The company promotes an organizational climate in favor of innovation.	Kariyapperuma (2016); Leo e Tello-Gamarra (2020); Ozorhon e Oral (2017); Silva et al. (2019); Sosa Pérez et al. (2017); Tuzovic et al. (2018); Yan et al. (2018)
	The company has reward programs for innovative suggestions.	Leo e Tello-Gamarra (2020); Silva et al. (2019); Sosa Pérez et al. (2017)
	The company constantly analyzes the possible future risks of activities, projects, and launches of new products or services.	Leo e Tello-Gamarra (2020)
	The company develops a leadership spirit in its employees.	De Guimarães, Severo e Vieira (2017); Ozorhon e Oral (2017); Silva et al. (2019); Sosa Pérez et al. (2017); Yan et al. (2018)
Structure	The company renews and adapts its resources (physical, financial, and human).	Dangelico (2016); De Guimarães, Severo e Vieira (2017); Ozorhon e Oral (2017); Revilla, Rodríguez-Prado (2018); Silva et al. (2019); Soto-Acosta, Popa e Martinez-Conesa (2018); Tuzovic et al. (2018); Yan et al. (2018)
	The company renews and adapts its processes.	De Guimarães, Severo e Vieira (2017); Kariyapperuma (2016); Ozorhon e Oral (2017); Silva et al. (2019); Tuzovic et al. (2018)
	The company renews and adapts its technologies.	De Guimarães, Severo e Vieira (2017); Gupta e Nanda (2015); Ozorhon e Oral (2017); Revilla, Rodríguez-Prado (2018); Soto-Acosta, Popa e Martinez-Conesa (2018); Tuzovic et al. (2018); Yan et al. (2018)
Sustainability	The company promotes social responsibility actions in the medium and long term.	Dangelico (2016); Martinez-Conesa, Soto-Acosta e Palacios-Manzano (2017); Ozorhon e Oral (2017)
	The company promotes environmentally sustainable actions in the medium and long term.	Dangelico (2016); De Guimarães, Severo e Vieira (2017); Ozorhon e Oral (2017); Varadarajan (2017)
Customers	The company captures and understands the customer's experiences, feedback, and needs in relation to its product or services.	Dangelico (2016); De Guimarães, Severo e Vieira (2017); Johansson, Raddats e Witell (2019); Kariyapperuma (2016); Larivière (2017); Leo e Tello-Gamarra (2020); Leonidou et al. (2018); Ozorhon e Oral (2017); Salunke, Weerawardena e Mccoll-Kennedy (2019); Taghizadeh, Rahman e Hossain (2018); Tuzovic et al. (2018)
Customers	The company encourages its customers to participate in its development projects.	Dangelico (2016); Johansson, Raddats e Witell (2019); Larivière (2017); Leo e Tello-Gamarra (2020); Ozorhon e Oral (2017); Salunke, Weerawardena e Mccoll-Kennedy (2019); Silva et al. (2019); Taghizadeh, Rahman e Hossain (2018); Yan et al. (2018)
Suppliers	The company maintains good relations with its suppliers.	Dangelico (2016); Leo e Tello-Gamarra (2020); Leonidou et al. (2018); Silva et al. (2019); Tuzovic et al. (2018)
	The company has a system for evaluating the performance of its suppliers.	Leo e Tello-Gamarra (2020)
Competitors	The company participates in experience sharing networks with its competitors.	Leo e Tello-Gamarra (2020); Ozorhon e Oral (2017); Silva et al. (2019)
	The company constantly monitors the market to direct its technological developments.	Leo e Tello-Gamarra (2020); Silva et al. (2019)(Leo and Tello-Gamarra, 2020)
Government and Society	Changes in society behavior impact the company's management processes.	Dangelico (2016); Leo e Tello-Gamarra (2020); Silva et al. (2019); Soto-Acosta, Popa e Martinez-Conesa (2018)
	Government incentives and barriers impact the company's management processes.	Dangelico (2016); Gupta e Nanda (2015); Leo e Tello Gamarra (2020); Leonidou et al. (2018); Ozorhon e Oral (2017); Silva et al. (2019)

In summary, since the discussions suggests that innovation management allows organizations to respond more quickly and with better performance in a VUCA world, this leads to the following hypothesis:

H1: *Innovation strategies have a positive effect on adapting the organization to the VUCA world.*

2.2 Effectuation as a moderate variable between innovation and adaptability in the VUCA world

Effectuation and causation are two alternative decision-making principles. The causation process focuses on selecting means to achieve a certain goal, while the effectuation analyzes the available means to achieve the effects (Henninger et al., 2020).

Guo (2019) highlights that effectuation is a theory that has spread in the area of entrepreneurship, and that has also gained relevance in the areas of strategy and innovation, allowing companies to develop innovation strategies with limited resources and under a context of uncertainty.

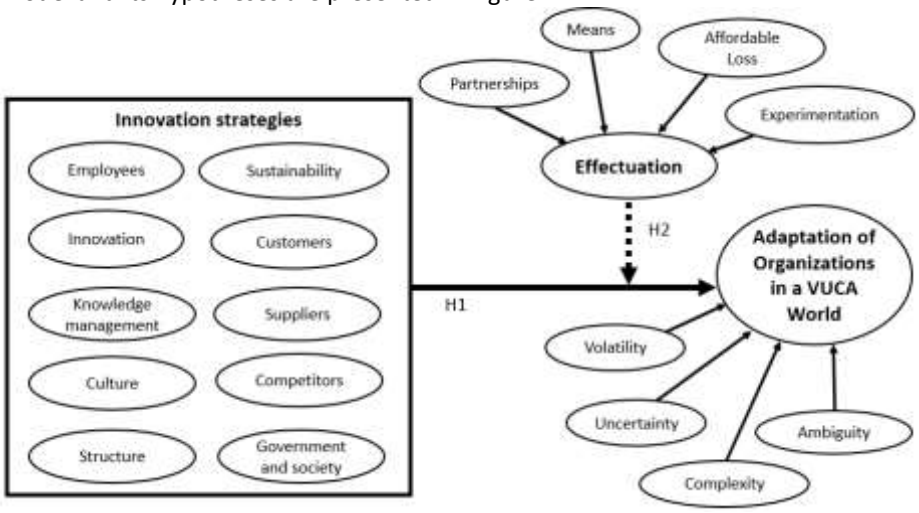
In this description of effectuation, it is possible to see the centrality of its concept concerning the innovation processes. In the same way, Roach, Ryman, and Makani (2016) and Futterer, Schmidt, and Heidenreich (2018) define the aspects of effectuation in:

- Means: use resources and key questions for guidance, such as “what do I know”, “who am I” and “who do I know”. Within environments with limited and uncertain or contingent resources, the resources of means provide new possibilities and innovations;
- Experimentation: leads to new approaches and seeks to enhance the “surprises” that result from the design process;
- Partnerships: stakeholders are used as a way to provide support and work together to share experiences and mitigate the risks inherent in the innovation process;
- Affordable loss: calculation of losses versus the unpredictability of gains.

In summary, since “effectuation has a positive effect on innovation strategy” (Guo, 2019, p. 4), and “effectuation has been defined as a decision-making process used by expert entrepreneurs under conditions of uncertainty” (Lingelbach et al., 2015, p. 5), it is assumed that effectuation can also begin in the VUCA world. Thus, the following hypothesis is proposed:

H2: *Effectuation plays a positive moderating role in the relationship between innovation strategies and the organization's adaptation to the VUCA world.*

The research model and its hypotheses are presented in Figure 1.



Source: Author’s elaboration

Figure 1: Research model

3. Methodology

Fintechs were selected as the objects of this research because they are inserted in an environment filled with innovation and technological solutions, having to respond quickly and manage their decisions in an increasingly VUCA world of changes and dynamism in the financial market.

Therefore, a case study was carried out with two Brazilian fintechs. Online interviews were conducted with professionals who work daily with innovation, being the product owner at fintech A, and a partner, and a customer success manager at fintech B. Each interview lasted an average of 1 hour and 15 minutes. Table 3 shows the characteristics of the companies.

Table 3: Fintechs' characteristics

Characteristics	Fintech A	Fintech B
Number of employees	50 to 99	More than 99
Size	Medium	Large
Actuation segments	Investments	Loan and debt negotiation
Foundation	2011	2018
Products	Investment strategies and automated investment in the stock market	Anticipation of federal precatories

Source: Author's elaboration

For data analysis, tables were structured containing the constructs presented in the research model. Thus, a comparison will be made between the strategies used by fintechs A and B.

4. Results

The interviews were transcribed, and the interviewees' responses were summarized. Tables 4, 5, and 6 show the comparative results between fintechs A and B.

Table 4: Innovation strategies used in fintech A and B

Drivers	Strategies	Fintech A	Fintech B
Employees	Has a customer success area as an employee contact channel with customers	X	X
	Conducts practices for exchange of experiences between employees as a form of training	X	X
	Conducts innovation challenges in the selection process for new employees	X	
	Created a specific sector for the engagement of its employees		X
	Partners with universities to select interns		X
	Has multifunctional teams in the stages of product management and development	X	X
Innovation	Uses disruptive innovation as a way to consolidate itself in the market	X	
	Uses technological innovation as a way to consolidate itself in the market	X	X
	Uses multifunctional teams, Scrum methodology, and meetings to align all employees on innovation strategies and technologies	X	X
	Partners with universities	X	X
	Originated a company in the same group, a quantum fund, only focused on R&D	X	
	Has a laboratory with people from different areas who are responsible for carrying out R&D		X
	Each sector carries out R&D activities	X	
Knowledge Management	Constantly carries out retrospectives of its completed projects, seeking to develop action plans with possible improvement and learning practices	X	X
	The customer success team talks to customers and records feedback and improvements. Thus, the team reports to the other areas possible problems and solutions that can satisfy customers	X	X
	Uses a standard template to map its employees' tacit knowledge	X	
	Records videos with its customers about positive past experiences with the company		X
	Maps its employees' experiences through an organizational climate survey		X

Drivers	Strategies	Fintech A	Fintech B
Culture	Uses the managing objectives and key results method (OKR) and, thus, each area defines how it will innovate and for what reason	X	
	Emphasizes transparency as a company value in the onboarding process, and constantly encourages employees to present new projects and ideas		X
	Encourages the hiring and promotion of employees who innovate	X	X
	Has special awards related to the general performance of its employees	X	
	Quarterly, the company offers courses to its employees that have tendency to innovate		X
	Analyzes risks and how to mitigate them	X	X
	Has already hired outsourced consultants or has leadership improvement practices for managers	X	
	Stimulates the career development of its employees, opening opportunities in the future for them to become leaders		X
Structure	Renews and adapts its resources, such as equipment, infrastructure, and renovations to improve the work environment	X	X
	Every quarter the company seeks to review and adapt its processes to better adapt or expand the business	X	
	Has a partnership with an executive university to develop the business skills of its employees		X
	Seeks to renew and adapt its technologies through R&D	X	X
	Elaborates its entire technological structure when they founded the company with cloud services and call recording		X
Sustaina-bility	Promotes competitive innovation dynamics, where the employees who win the dynamic receive part of the prize and the social institutions receive the other part	X	
	Seeks to carry out socially responsible actions and campaigns with donations to social institutions and encourages the participation of its employees		X
Customers	Has a contact channel on Telegram with almost 3,000 subscribers	X	
	Allows customers to choose which is the best means of communication to contact them		X
	Conducts individual conversations with users through the Google Meet platform, seeking to better understand their needs through interview techniques	X	
	Uses net promoter score (NPS) as an indicator to assess customer satisfaction and collect feedback to improve the user experience	X	X
	Recorded videos from its customers' previous experiences		X
	Seeks to collect and understand the reasons for the cancellation of the service or product to make future improvements	X	
	Performs a testing and validation stage, in which it encourages the participation of consumers, who collaborate for free and provide feedback and suggestions	X	
	Has a laboratory with employees who carry out tests of new products, services, or processes, looking for the optimal product to meet the customer's needs		X
Suppliers	Maintains a long-lasting relationship with suppliers and requests new demands from them	X	X
	Validates information received through codes	X	
Compe-titors	Monitors the market and analyzes and plans its medium- and long-term strategies	X	X
	Engages in benchmarking with partner companies	X	X
	Participates in events with its competitors	X	
Government and Society	The company constantly seeks to adapt its management processes due to the impacts related to society's behavior	X	
	Maps risks and adapts its management processes to government-related impacts	X	X

Source: Author's elaboration

Table 5: Effectuation strategies used in fintech A and B

Constructs	Strategies	Fintech A	Fintech B
Means	Plans its future projects	X	X
	Adapts available means and resources, such as codes and past experiences	X	
	Uses new features		X
Experimentation	Experiments in some areas where interaction with the user is possible, so that the product is validated before its launch	X	
	Has a laboratory that tests new products, services, or processes, seeking to meet the needs of its customers		X
Partnerships	Believes that partnerships reduce risks, generate value, and create new opportunities	X	X
Affordable Loss	Seeks to minimize its losses through studies of risks, prices, and returns	X	X
	Takes risks in the market, as it believes that the business is attractive even if there are government barriers		X

Source: Author's elaboration

Table 6: Adaptability strategies used in fintech A and B

Constructs	Strategies	Fintech A	Fintech B
Volatility	Uses agile methodologies	X	X
	Meets frequently to improve the alignment of information and plan future actions	X	X
Uncertainty	Constantly monitors the market, risks, and opportunities	X	X
	Researches for information about its competitors	X	
	Analyzes if there is any deviation in the market data that could impact the company		X
Complexity	Restructures its infrastructure, processes, and resources	X	X
Ambiguity	Has a laboratory with a cross-functional team that seeks to carry out experiments and proposes new discoveries and projects		X
	Has a discovery and delivery process, in which it seeks to meet the customer's needs based on experiments and validations of the product for them	X	

Source: Author's elaboration

The results show that fintech A seeks more technological and disruptive innovation strategies. It is looking for a more pioneering differential in the market, monitoring, and making more contact with its competitors and partners, and establishing greater involvement and proximity to its consumers, making them more collaborative. fintech B seeks more employee engagement, technological, and incremental innovation strategies, aimed at more efficiency, more customers, and greater consolidation in the market.

During the interview, fintech A informed that it believes that the strategies related to employees are the most impactful for the innovation and adaptability of companies to turbulent contexts. The way an employee will be selected and recruited and whether he will adapt to the company's culture that will make a difference in alignment with the company's growth prospects. For fintech B, strategies related to organizational culture are the most impactful, as the way the company provides an attractive culture to its employees will make a difference in engagement for the company's growth prospects.

5. Discussion, implications, limitations, and conclusions

In general, although fintechs A and B operate in different segments of the financial market, both have similar innovation-oriented practices adapting to the VUCA world, corroborating with the studies in Table 2, such as the use of start-up methodologies (*e.g.,* agile methodology), experimentations, innovation culture, structure, and stakeholders. However, strategies related to environmental sustainability are non-existent in both fintechs.

Analyzing the data collected, it was observed that some principles of effectuation help in the innovative adaptation process. Specifically, fintech A uses more effectuation strategies than fintech B, and both use

effectuation and causation in means and strategies of affordable loss, similar to what was mentioned in the study by Lingelbach et al. (2015) who believe that the joint use of effectuation and causation in the innovation process depends on the sector studied.

Thus, this study contributes to some interesting theoretical gaps and opportunities for future research: What characteristics and factors of fintechs influence the joint use of effectuation and causation? What makes one fintech use effectuation more than others? Does the type of innovation used by the company, such as disruptive innovation, cause it to use more effectuation principles? Do the characteristics of the entrepreneur, such as the instinct to believe in your own business, influence the choice between effectuation and causation?

As in the study by Bennett and Lemoine (2014), strategies such as restructuring and using experimentation, information, and agile methods were effective ways of dealing with the VUCA world in fintechs A and B. During the COVID-19 pandemic, both fintechs focused on restructuring their resources. Fintech A focused on adapting internal processes to improve the alignment of information among its employees, while fintech B focused on improving the engagement of its employees. Although the VUCA world is full of turbulence and dynamism, both companies believe that the COVID-19 pandemic has had positive impacts, such as the growth of the financial market and better maturation of their respective companies.

Therefore, this study demonstrated "which" and "how" the strategies provide greater adaptability of fintech to a VUCA world. It limited itself to qualitatively validating the conceptual model, bringing quantitative research as future opportunities, whether in the fintech market or other organizations.

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References

Bai, W. et al. (2021) 'The role of business and social networks in the effectual internationalization: Insights from emerging market SMEs', Journal of Business Research. Elsevier Inc., 129(March), pp. 96–109. doi: 10.1016/j.jbusres.2021.02.042.

Bennett, N. and Lemoine, G. J. (2014) 'What a difference a word makes: Understanding threats to performance in a VUCA world', *Business Horizons*, 57(3), pp. 311–317. doi: 10.1016/j.bushor.2014.01.001.

Bratianu, C. and Bejinaru, R. (2021) 'COVID-19 induced emergent knowledge strategies', *Knowledge and Process Management*, 28(1), pp. 1–7. doi: 10.1002/kpm.1656.

Dangelico, R. M. (2016) 'Green Product Innovation: Where we are and Where we are Going.', *Business Strategy and the Environment*, 25(8), pp. 560–576.

Evers, N. and Andersson, S. (2021) 'Predictive and effectual decision-making in high-tech international new ventures – A matter of sequential ambidexterity', International Business Review. Elsevier, 30(1), p. 101655. doi: 10.1016/j.ibusrev.2019.101655.

Frederiksen, D. L. and Brem, A. (2017) 'How do entrepreneurs think they create value? A scientific reflection of Eric Ries ' Lean Startup approach', *International Entrepreneurship and Management Journal*, 13(1), pp. 169–189. doi: 10.1007/s11365-016-0411-x.

Frynas, J. G., Mol, M. J. and Mellahi, K. (2018) 'Management innovation made in China: Haier's Rendanheyi', *California Management Review*, 61(1), pp. 71–93. doi: 10.1177/0008125618790244.

Futterer, F., Schmidt, J. and Heidenreich, S. (2018) 'Effectuation or causation as the key to corporate venture success? Investigating effects of entrepreneurial behaviors on business model innovation and venture performance', *Long Range Planning*. Elsevier Ltd, 51(1), pp. 64–81. doi: 10.1016/j.lrp.2017.06.008.

de Guimarães, J. C. F., Severo, E. A. and Vieira, P. S. (2017) 'Cleaner production, project management and Strategic Drivers: An empirical study', *Journal of Cleaner Production*. Elsevier Ltd, 141, pp. 881–890. doi: 10.1016/j.jclepro.2016.09.166.

Guo, R. (2019) 'Effectuation, opportunity shaping and innovation strategy in high-tech new ventures', *Management Decision*, 57(1), pp. 115–130. doi: 10.1108/MD-08-2017-0799.

Gupta, H. and Nanda, T. (2015) 'A quantitative analysis of the relationship between drivers of innovativeness and performance of MSMEs', *International Journal of Technology, Policy and Management*, 15(2), pp. 128–157. doi: 10.1504/IJTPM.2015.069202.

Henninger, P. et al. (2020) 'Effectuation vs. Causation: Can established firms use start-up decision-making principles to stay innovative?', *International Journal of Innovation Management*, 24(1). doi: 10.1142/S1363919620500024.

JAISWAL, N. J. and Manoj (2019) 'Paytm and Its Entrepreneurial Journey in A Vuca Business World', *Advances In Management & Digital Sciences*, 1(1), pp. 206–222.

Johansson, A. E., Raddats, C. and Witell, L. (2019) 'The role of customer knowledge development for incremental and radical service innovation in servitized manufacturers', *Journal of Business Research*. Elsevier, 98(February), pp. 328–338. doi: 10.1016/j.jbusres.2019.02.019.

Kariyapperuma, K. A. S. K. (2016) 'Knowledge Management for Service Innovation: A Study of Sri Lankan Business Service Organizations', *NSBM Journal of Management*, 1(2), p. 21. doi: 10.4038/nsbmjm.v1i2.10.

Larivière, B. et al. (2017) "'Service Encounter 2.0": An investigation into the roles of technology, employees and customers.', *Journal of Business Research*, 79(June), pp. 238–246.

Leo, R. M. and Tello-Gamarra, J. (2020) 'Drivers of service innovation: proposal of a theoretical model', *Revista de Administração Mackenzie*, 21(3), pp. 1–28.

Leonidou, E. *et al.* (2018) 'An integrative framework of stakeholder engagement for innovation management and entrepreneurship development', *Journal of Business Research*. doi: 10.1016/j.jbusres.2018.11.054.

Lingelbach, D. *et al.* (2015) 'The innovation process in emerging economies: An effectuation perspective', *International Journal of Entrepreneurship and Innovation*, 16(1), pp. 5–17. doi: 10.5367/ijei.2015.0172.

Martinez-Conesa, I., Soto-Acosta, P. and Palacios-Manzano, M. (2017) 'Corporate social responsibility and its effect on innovation and firm performance: An empirical research in SMEs', *Journal of Cleaner Production*. Elsevier Ltd, 142(December 2017), pp. 2374–2383. doi: 10.1016/j.jclepro.2016.11.038.

McKelvie, A. *et al.* (2019) 'The measurement of effectuation: highlighting research tensions and opportunities for the future', *Small Business Economics*, 54(3), pp. 689–720. doi: 10.1007/s11187-019-00149-6.

Ozorhon, B. and Oral, K. (2017) 'Drivers of Innovation in Construction Projects', *Journal of Construction Engineering and Management*, 143(4), pp. 1–9. doi: 10.1061/(ASCE)CO.1943-7862.0001234.

Paez-Logreira, H., Zamora-Musa, R. and Velez-Zapata, J. (2016) 'Relation analysis of knowledge management, research, and innovation in university research groups', *Journal of Technology Management and Innovation*, 11(4), pp. 5–11. doi: 10.4067/S0718-27242016000400002.

Ramukumba, N. (2017) Building an organisational self-disruption capability for a competitive advantage: an investigation of the organisational antecedents, Master of Business Administration, University of Pretoria.

Revilla, E. and Rodríguez-Prado, B. (2018) 'Bulding ambidexterity through creativity mechanisms: Contextual drivers of innovation success', *Research Policy*. Elsevier, 47(9), pp. 1611–1625. doi: 10.1016/j.respol.2018.05.009.

Roach, D. C., Ryman, J. A. and Makani, J. (2016) 'Effectuation, innovation and performance in SMEs: an empirical study', *European Journal of Innovation Management*, 19(2), pp. 214–238. doi: 10.1108/EJIM-12-2014-0119.

Rocha, R. O. (2018) 'Innovation strategies for information technology startups: an analysis in the Northeast region of Brazil', masters thesis, Federal University of Sergipe.

Salunke, S., Weerawardena, J. and McColl-Kennedy, J. R. (2019) 'The central role of knowledge integration capability in service innovation-based competitive strategy', *Industrial Marketing Management*. Elsevier, 76(April 2017), pp. 144–156. doi: 10.1016/j.indmarman.2018.07.004.

Sarasvathy, S. D. (2001) 'Causation and Effectuation: Toward a Theoretical Shift from economic inevitability to entrepreneurial contingency', *Academy of Management Review*, 26(2), pp. 243–263.

Silva, M. T. *et al.* (2019) 'Dimensions of innovation in the public sector: a case study in the city halls of western Paraná', *Brazilian Journal of Development*, 5(11), pp. 25650–25675. doi: 10.34117/bjdv5n11-223.

Sosa Pérez, N. de la C. *et al.* (2017) 'Interrelación entre gestión de innovación y formación continua del personal como procesos gerenciales', *Retos de la Dirección*, 11(2), pp. 73–92.

Soto-Acosta, P., Popa, S. and Martinez-Conesa, I. (2018) 'Information technology, knowledge management and environmental dynamism as drivers of innovation ambidexterity: a study in SMEs', *Journal of Knowledge Management*, 22(4), pp. 824–849. doi: 10.1108/JKM-10-2017-0448.

Taghizadeh, S. K., Rahman, S. A. and Hossain, M. M. (2018) 'Knowledge from customer, for customer or about customer: which triggers innovation capability the most?', *Journal of Knowledge Management*, 22(1), pp. 162–182. doi: 10.1108/JKM-12-2016-0548.

Tuzovic *et al.* (2018) 'How Do Innovators Stay Innovative ? A Longitudinal Case Analysis Sven Tuzovic , Jochen Wirtz and Loizos Heracleous Accepted for Publication in : Journal of Services Marketing Special Issue on : Customer Engagement in Service Innovation : Theoretical and E', *Journal of Services Marketing*, 32(1), pp. 34–45.

Varadarajan, R. (2017) 'Innovating for sustainability: a framework for sustainable innovations and a model of sustainable innovations orientation', *Journal of the Academy of Marketing Science*. Journal of the Academy of Marketing Science, 45(1), pp. 14–36. doi: 10.1007/s11747-015-0461-6.

Yan, K. Y. *et al.* (2018) 'The drivers of service innovation in insurance industry', *PhD thesis, UTAR*.

Roadmap for the Adoption of Smart Supply Chain

Júlio César Morais Fernandes, Sergio Evangelista Silva and Luciana Paula Reis
Institute of Exact Sciences – ICEA, Federal University of Ouro Preto, João Monlevade, Brazil
julio.fernandes@aluno.ufop.edu.br
sergio.silva@ufop.edu.br
lucianapaula@ufop.edu.br
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Abstract: The industry 4.0 paradigm has emerged as a strong guide for contemporary manufacturing. Despite the use of these technologies in the manufacturing processes, the industry 4.0 technologies also can be incorporated into the integration of the supply chains, which is known as smart supply chain. Currently, there are several available technologies under the industry 4.0 concept, such as blockchain, the internet of things, cloud computing, big data, among others. However, from the point of view of firms, the adoption of industry 4.0 technologies in the supply chain is challenging as it can involve the reformulation of the relationship with tens or hundreds of partners. In real conditions, all these issues should be treated under several constraints such as financial, time, knowledge of technology, among others. As a result, the real attitude to the adoption of industry 4.0 technologies in the supply chain should begin with the assessment of several issues related to the company and its external agents. This article proposes a roadmap to the adoption of industry 4.0 technologies in the supply chain through three main stages. The first one comprehends the assessment of the current technological status of the firm and the evaluation of the next steps to be pursued toward industry 4.0. The second involves the evaluation and prioritization of the partners that the technology defined in step one will be adopted. And the third stage details the actions to the adoption of the industry 4.0 technologies with each prioritized partner. This roadmap was validated in a company during its process to elaborate a guide to the adoption of industry 4.0 technologies with their main partners. Whereas this company has more than one hundred suppliers, this method seems to be very useful. Documental data and six supply chain professionals were interviewed to develop the roadmap and assess its steps. This roadmap appears to be a feasible and applicable tool for supporting firms in the lived dilemmas related to what industry 4.0 technologies to adopt in order to integrate their supply chains and how this process can be developed.

Keywords: TRM, smart supply chain, Industry 4.0, adoption of technology, management of innovation

1. Introduction

The fourth industrial revolution, also known as industry 4.0 is an important topic addressed both in industry and in the academic field (Liao et al., 2017; Chiarello et al., 2018). Indeed, the industry 4.0 technologies encompasses digital technologies to collect data in real-time and analyze it, providing useful information to the manufacturing systems (Lee et al., 2015; Wang et al., 2016). With the advent of the Internet of Things (IoT), services and cloud storage, big data, and analytics, the concept of the industry 4.0 cyber-physical system was created (Wang et al., 2015; Lu, 2017).

In recent years, there has been a growing interest in understanding the use of information technology and these cyber-physical systems in supply chain management (SCM) (Wu et al. 2006; Li et al. 2009; Prajogo and Olhager 2012; Baihaqi and Sohal 2013). The implementation of these technologies in the supply chain contributes to the development of the supply chain integration, which, in turn, can leverage suppliers and customers resources and knowledge leading to superior performance of the company (Tippins and Sohi 2003; Schnetzler and Schönsleben 2007). The application of these technologies in supply chains is captured in the concept of smart supply chain (SSC) (Li 2020).

The current literature on the advantages of industry 4.0 focuses more on the application of these technologies in the context of manufacturing and there is still a certain limited research in the context of supply chain integration (Müller and Voigt, 2018). For instance, Buyukuzkan and Gocer (2018) highlighted that, despite the advantages of industry 4.0 covered in the existing literature, current examples of empirical implementation in supply chain are still scarce. Furthermore, Scuotto et al. (2017) state that there is a lack of evidence-based on supply chain collaboration through the concept of digital transformation. As industry 4.0 moves up the value chain, supply chain partners need to integrate digital pairs from their operations with the goal of creating a digital supply network, (Parrott and Warshaw, 2017), which depends significantly on IT alignment across the value chain (Ghobakhloo and Tang, 2015). Indeed, the objective of this article is to propose a roadmap for the adoption of industry 4.0 technologies in the context of the supply chain, through three main stages, namely: (1)

the assessment of the current technological status of the firm and the evaluation of the next steps to pursue toward industry 4.0; (2) the evaluation and prioritization of the partners that the technology defined in step one will be adopted; and (3) the detailing of the actions to the adoption of the industry 4.0 technologies with each prioritized partner. This roadmap was validated in a company during a process of elaboration of a guide to the adoption of industry 4.0 technologies with their main partners.

This research aims to answer the following research questions: (1) What is the level of internal and external integration of the supply chain? (2) What are the technologies currently used to enable supply chain integration? (3) How should new smart supply chain technologies be incorporated to improve the organization's performance?

As the main contribution, this article introduces a feasible method to companies plan strategically their process to adopt industry 4.0 technologies. This article offers practical and theoretical implications. To practice, it contributes by providing a feasible method to companies plan strategically their process to adopt industry 4.0 technologies. To theory, it evidences the importance of assessing industry 4.0 technologies through a holistic perspective.

2. Literature review

2.1 Technology Roadmap

The Technology Roadmap (TRM) is a technique that allows the company to plan its strategies to adopt new technologies, whereas the future status to be reached is defined based on the current one and the available resources. In this sense, the strategic roadmap carefully identifies and plans all the steps that need to be carried out, as well as the schedule and associated costs and benefits (Ghobakhloo, 2018).

Roadmaps are considered essential models to mobilize companies to evaluate different paths and develop action plans to meet strategic goals (Caritte et al., 2015). They represent methods used for the medium and long term, to guide the development of new technologies, to meet business objectives, mainly in the context of technological innovation (Phaal et al., 2004; Lee and Park, 2005; Amadi- Echendu et al., 2011). A technology roadmap (henceforth roadmap) is usually composed of three main layers (Phaal et al., 2010). The upper layer includes determining factors related to trends, general objectives, and market demand. The middle layer includes determining factors corresponding to the trends described in the upper layer, such as products and services to be developed. And finally, the bottom layer, which is composed of internal and external resources and technologies.

Following the technology management structure suggested by Probert et al., (2000), roadmap represents a powerful technique to support technology management and planning in the company. The roadmap is used to integrate "business strategy, product development, technology, and R&D activities and actions" (Kamtsiou et al. 2015). A roadmap helps in the development and implementation of innovation plans with an emphasis on adapting to changes in technology, market trends, new business opportunities, designs, and processes.

Roadmaps are also used for technology integration and business operation and strategic planning, (Phaal et al., 2001; Saritas and Aylen, 2010; Hsu et al., 2017), governance and technology development practice at the business (Collins et al., 2007; Esslinger, 2011; Vishnevskiy et al., 2016) and supply chain management (Sundarakani et al., 2010). Still in this sense, Kappel (2001) and Rinne (2004) highlight that the roadmaps are used to predict the technology, tools, future products and to identify opportunities for competitive advantage and sustainability.

Several roadmaps have been developed in multiple areas such as manufacturing, social and life sciences, chemistry, service industry, and others (Daim and Oliver 2008; Suh and Park 2009; Andrade Coutinho 2010). This study moves a step forward by building a technology roadmap to support the adoption of technologies for deploying a smart supply chain.

2.2 Smart supply chain

The smart supply chain arises through the use of industry 4.0 technologies and with the exponential growth of sensitive data and the spread of digitized processes (Wu et al., 2016; Zhong et al., 2016). With the emergence

of the mass customization business model, the productive models of the future will demand reconfiguration and integration of the entire supply chain to improve the strategic role of the manufacturing function (Tien, 2011).

The smart supply chain concept involves both internal and external integration. Internal integration recognizes that departments and functional areas (e.g., marketing, purchasing, and R&D) within the company should function as part of an integrated process to accelerate decisions and increase collaboration (Vickery et al., 2003; Flynn et al., 2010). External integration recognizes the importance of strengthening links with other companies, establishing close and interactive relationships with customers and suppliers.

Industry 4.0 also considers the exchange of information and the supply chain integration, synchronizing production with suppliers to reduce delivery times and distortions of information that produce whip effects (Ivanov et al., 2016). For instance, horizontal integration, supported by smart supply chain technologies, involves the exchange of information in real-time with suppliers about production orders and distribution centers (Pfohl et al., 2017). Digital platforms meet this requirement, as they provide easy and fast access on-demand and information displayed in a cloud, integrating suppliers and manufacturers (Angeles, 2009; Pfohl et al., 2017).

The use of IT can facilitate supply chain information flows in an efficient and autonomous way in relation to product availability, stock levels, shipping date, and production status (Bharadwaj, 2000). It can also be used to coordinate collaborative planning, demand forecasts, and production schedules among supply chain partners (Olesen and Myers, 1999; Chae et al., 2005). The main industry 4.0 technologies are composed of the so-called new ICTs, which include internet of Things (IoT), cloud services, big data, and analytics (Wang et al., 2016a; Thoben et al., 2017; Tao et al., 2018).

Ding's (2018) research revealed that the innovations and technologies related to the fourth industrial revolution, facilitate autonomous decision-making for the entire supply chain. In addition, Machado et al. (2020) identified that new industry 4.0 technologies cause a positive impact on sustainable supply chains and on all dimensions related to sustainability (e.g., sustainable circular production system and so on), in an integrated system.

Figure 1 presents some advanced technologies from industry 4.0 that can be implemented in supply chains to enable and leverage internal (intra-organizational) and external (suppliers and customers) integration.

Advanced technologies applied in the smart supply chain: mapped in the literature

Code	Technologies	Application	References
T.1	RFID	Tracking and tracing products in a Warehouse; Real-time tracking of inventory.	(Wu et. al., 2016); (Zhang et. al,. 2018);
T.2	Big Data, AI and Analytics	Reduce channel costs; raise levels of supply chain efficiency, and add economic value by satisfying customers' changing needs.	(Choi et al., 2018); (Giannakis and Louis, 2016); (Choi, 2018, Zhan and Tan, 2020); Arunachalam et al. (2018), Govindan et al. (2018), Sanders and Ganeshan (2019), Baryannis et al. (2019), Chung et al. (2020), and Kraus et al. (2020)
T.3	IoT	Smart and connected products; Mobile communication, adaptive intelligence and machine learning.	Porter and Heppelmann (2014) (Dong, Mingyue, & Guoying, 2017); (Manavalan, E.; Jayakrishna, K. 2019)
T.4	Cloud	Easy on-demand access to information displayed in a cloud, integrating suppliers and manufacturers.	(Pfohl et al., 2017; Angeles, 2009); (Tao et al., 2018a; Thoben et al., 2017; Wang et al., 2016a). (Bifulco et al. 2018); (Barile et al. 2018).
T.5	Blockchain	Visible and transparent information and transactions; Compliance; Smart contract; authenticity, trust and security, reduction of cost, disintermediation, efficient operations and reduced waste; Risk management; confidentiality, privacy, integrity assurance.	(Cole et al., 2019); (Francisco and Swanson, 2018); (Dwivedi et. al., 2020); (Li et al., 2019a); (Philipp et al., 2019; Gurtu and Johny, 2019); (Liu et al., 2019). (Mackey et al., 2019; Yi, 2019)

Figure 1: I4.0 technologies related to SSC

3. Methodology

This research adopted a case study strategy in a steel company. Yin (1981) states that case studies allow the study of a given phenomenon in a real-life context, especially when the boundaries between a phenomenon and its context are not evident. The single case study Siggelkow (2001) allowed us to explore the phenomena emerging from the implementation of industry 4.0 throughout the supply chain. The choice of the company was deliberate since it is digitizing its operations to generate value to the customer and the business in general. The chosen context allowed us to verify the level of internal and external integration of the supply chain and to map the technologies used that enable this integration.

The data collection was based mainly on semi-structured interviews with six professionals from the company's procurement/purchasing team. The participants selected for the interviews are responsible for procurement processes in general, which include the following activities: negotiation, warehouse management, and systems intelligence that assist in digitizing the activities of the Purchasing department.

The interviews were essential for the understanding of future strategic projects regarding the adoption of new technologies and work tools to be implemented in the short, medium, and long terms in the company. Other sources of information were extracted from the company's ERP, such as purchase movement reports and internal documents, such as norms and procedures in the department. In Figure 2 below, an overview of the interviewed participants is presented.

	Professionals interviewed in this research			
	Job Position	Company time	Main responsabilities	Duration of interviews
1	Warehouse Supervisor	Over 5 years	Management and control of warehouse operations.	70 min
2	Supply Intelligence Analyst	Over 10 years	Information systems management.	45 min
3	Supply Intelligence Analyst	Over 5 years	Information systems management.	45 min
4	Purchase analyst	Over 10 years	Negotiation and supply management.	40 min
5	Purchase analyst	2 years	Negotiation and supply management.	40 min
6	Project analyst	2 years	Continuous improvement and project management.	60 min

Figure 2: Overview of respondents

The data were collected and analyzed according to a predefined protocol. Respondents were asked the following questions: Figure 3.

	Questions for interview	Respondents
1	What technologies are available for integrating the supply chain from an internal perspective (departments)?	Purchase analyst
2	What technologies are available for integrating the supply chain from an external perspective (suppliers)?	Purchase analyst
3	Which advanced technology would be most feasible for implementation?	Supply Intelligence Analyst; Warehouse Supervisor; e Project analyst

Figure 3: Interview questions

4. Results

Our findings suggest that the adoption of industry 4.0 technologies in the context of smart supply chain comprises three stages as can be seen in Figure 4 below. The three stages will be explained in detail below based on the present case study.

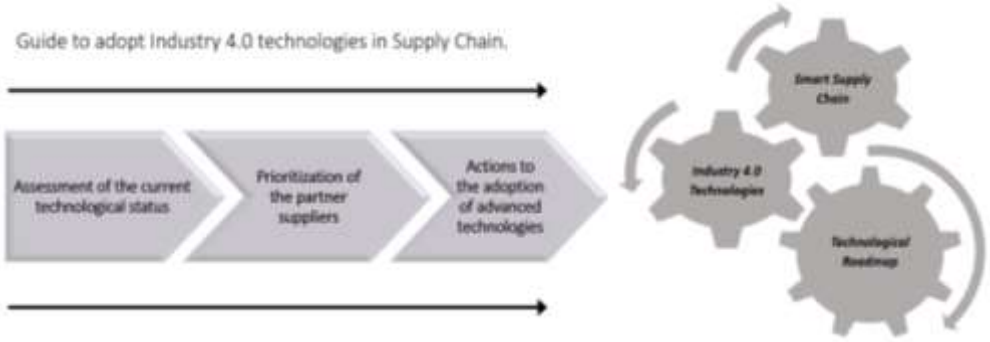

Figure 4: Stages for Industry 4.0 technologies adoption towards SSC

In the first stage - assessment of the current technological status - we obtained the following results according to Table 1, below:

Table 1: Technologies used in the research context

Categories	Spend	N° of Suppliers	Technologies currently available for Supply Chain Integration	
			Internal Integration (intra organizational)	External Integration (supplier)
Energy	35,10%	186	Microsoft 365; ERP.	Outlook 365; ERP
Raw Material	28,89%	25	Microsoft 365; ERP.	Outlook 365; ERP
Others	19,63%	48	Microsoft 365; ERP.	Outlook 365; ERP; SRM.
Spare Parts	16,35%	730	Microsoft 365; ERP; Power BI; Mobile; QR Code.	Microsoft 365; ERP; SRM (Digital Platform).

Another additional information in this first table was the categorization of suppliers by the material group. This categorization helped in the analysis and decision-making for the next stages.

In the second stage - evaluation and prioritization of partners - we take into account the group of spare parts suppliers. This is because, in this category, the processes are more inclined to the use of technologies to carry out quotations and place orders, for example, the use of a digital platform for receiving quotes. In addition, the complexity of this category in terms of interactions is greater than in the other ones. Please note the number of purchase orders that are considerably higher. In this sense, a higher level of adoption of advanced technologies is expected.

Table 2 shows the relevant information that we considered in the context of this research to proceed with the prioritization of partners and advance to the next stage. This information was extracted from the company's ERP system and takes the year 2020 as a reference.

Table 2: Overview of supplier category

Material Category	Interactions with suppliers		Complexity		Gains with industry 4.0 technologies adoption
	N° of suppliers	N° of P.O's yearly	Information flow	Variability	
Energy suppliers	186	6316	Standardized	Standardized	Operational control
Raw material suppliers	25	280	Stardardized	Standardized	Operational control
Suppliers of other materials	48	5422	Stardardized	Standardized	Operational control
Spare parts suppliers	730	61704	Ad-hoc	High	Traceability; memory; cost control; standardization; predictability

In the third stage - the actions to the adoption of the industry 4.0 technologies - we evaluated which technologies were the most viable for adoption. Therefore, the product group evaluated comprised (Analytics, Cloud, IoT, RFID, Blockchain). The evaluation criteria for the industry 4.0 technologies explored in this research were: (benefits, challenges, risks, impacts, feasibility, and costs). Table 3 is shown below, and the data explained below.

Table 3: Prioritization of technology based on the context of the research

	Industry 4.0 technologies					
	Analytics	Cloud	RFID	IoT	Blockchain	
Benefits	3	4	2	5	1	< better
Challenges	2	1	3	4	5	< better
Risks	2	1	3	4	5	< better
Impacts	2	1	3	4	5	< better
Feasibility	2	1	3	4	5	< better
Costs	2	1	5	4	3	< better
Total	2,17	1,50	3,17	4,17	4,00	

*Benefits has the inverted scale.

For the development of this table, we considered grades from 1 to 5 comparatively for each criterion presented versus technology. And the lower the grade, the better. To facilitate the rationale of the calculation, the first criterion: “benefits” had its scale reversed, that is, the lower the score, the greater the benefit. For the other criteria, the lower the score, the better. Thus, the total average of the grades followed the same scale. The lower the final average grade, the more viable the adoption of the advanced technology of industry 4.0 becomes.

Finally, a technology roadmap was developed for the adoption of industry 4.0 technologies in the supply chain of the company. This was the main result and contribution of this study. The proposed implementation of industry 4.0 technologies in supply chain through the proposed TRM is expressed in Figure 5 below:

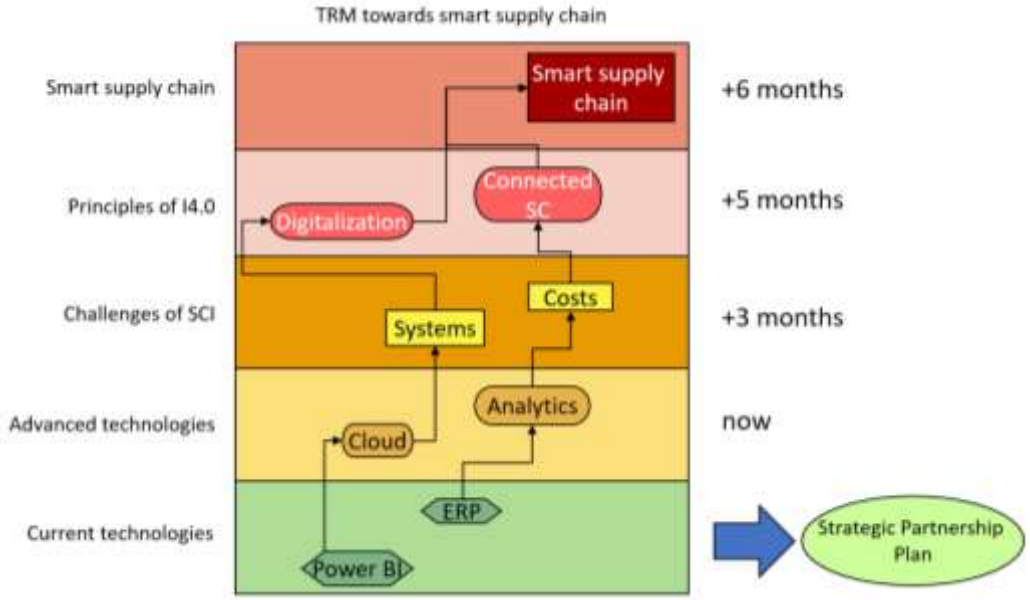

Figure 5: Proposed TRM towards SSC

The TRM for the adoption of industry 4.0 technologies was structured as follows:

- The upper layer is related to the future state to be reached. In the case of this study, achieving the degree of smart supply chain;
- The third layer presents the main challenges to be faced to the adoption of the industry 4.0 technologies;
- The second layer corresponds to the products and services to be developed where there are the technologies "cloud" and "analytics";
- Finally, the bottom layer is made up of internal and external resources and technologies currently available to the company.

The technology roadmap helps in structuring, unfolding and establishing the company's future vision in relation to the adoption of new technologies and our results indicate that the implementation of “cloud computing” and “analytics” technologies should be prioritized due to its proximity to current technologies available. In addition,

it was observed that some industry 4.0 technologies are more viable than others due to the criteria of "costs" x "complexity".

An important aspect that was taken into account for the smart supply chain adoption model was the prioritization of the “spare parts” category since in this category the number of suppliers and purchase orders is considerably higher compared to the other categories. And in this specific category, purchase transactions, as well as quotations, are carried out via the digital platform (SRM - Supplier Relationship Management – ERP module), which facilitates the adoption of new technologies and performance practices. Interestingly, this is the category that consumes the least financial resources in the relation of the company with the supply chain.

5. Data analysis

The results indicate two technological solutions, namely: “cloud” and “analytics” that are more viable and faster to implement given the proximity to the technologies already available in most companies. Cloud computing has great interface with the technologies planned for implementation in the short term in the studied company. The analytics is being implemented to deal with virtual inventories between different business units and, for the medium term, it should cover several suppliers.

The relationship between the evolution of current technologies, for example: "Power BI" and "ERP" for technological alignment to enable smart supply chain has already been addressed in some studies and mainly by companies that develop such technologies. Microsoft Power BI, for example, is a BI tool described by Microsoft as "a business analytics solution that allows you to view your data and share insights across your organization or embed them in your application or website" (Microsoft Corporation, 2018). In this sense, the BI application is no longer just a visual tool as it has started to analyze data that support companies' decision-making.

Regarding the path and evolution of ERP, Mohammad, et al., (2014) suggested standardization of ERP core functionalities as a cloud service. This standardization can provide basic standardized and personalized functionality. Other authors have also suggested this alignment of ERP for cloud and the main cloud servers currently already provide this service in the market.

IoT and RFID have already been mapped and should be implemented in the medium term due to the higher cost compared to cloud computing and analytics. There is a great expectation around the adoption of these technologies to enable the traceability of items, especially those of large size and considered more expensive, for instance, motors and bearings of large size and added value.

The blockchain, in turn, presents a great opportunity in terms of cost transparency in supply chain, smart contracts, and digital approval of suppliers. However, it is necessary to find a specific platform that can contribute to the business performance. It is worth highlighting that information security is an important concern related to this technology.

6. Conclusion

This exploratory study was developed in order to propose a three-stage structure (process) for adopting industry 4.0 technologies across the entire supply chain. These stages, while identifying the current technological status of the supply chain, also highlight the model of prioritizing the group of partners to continue with the adoption of advanced technologies in the supply chain.

The objective of this study was to contribute methodologically and theoretically to the adoption of industry 4.0 advanced technologies in the supply chain. From a methodological point of view, this study proposes a detailed technology roadmap. Therefore, the study contributes to research on the digital supply chain (Scuotto et al., 2017; Büyüközkan and Göçer, 2018), in addition to increasing the understanding of industry 4.0 technologies in supply chains. The empirical evidence from the study showed that TRM offers many opportunities for organizations to support advanced technologies in supply chain.

The proposed structure can provide insights for companies seeking advantage of the industry 4.0 concept across supply chain partners. The proposed TRM also highlights the importance of internal and external integration criteria, in the successful adoption of smart initiatives across SC. This study also highlights the importance of

expanding the team's scope, including data and systems experts who can leverage organizations' external knowledge. Finally, this study also provides a basic model for researchers and companies, to test and expand TRM in different industry segments and geographic regions.

As in other exploratory studies, there are some limitations in this study that create opportunities for future research. First, the data were collected only at the purchasing department level. Second, exploring a single company based on the perceptions of procurement professionals can introduce bias and lack of generalization in the results. Future studies can explore companies and multiple respondents from different departments, in addition to incorporating the perspective of suppliers. Finally, this study explores the adoption of industry 4.0 technologies in the supply chain internally, which opens opportunities to expand the theoretical model of this study to partner suppliers aiming to improve their external integration.

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References

Abbasi, M., Vassilopoulou, P. and Stergioulas, L., 2017. Technology roadmap for the Creative Industries. *Creative Industries Journal*, *10*(1), pp.40-58.

Amadi-Echendu, J., Lephauphau, O., Maswanganyi, M. and Mkhize, M., 2011. Case studies of technology roadmapping in mining. *Journal of Engineering and Technology Management*, *28*(1-2), pp.23-32.

Baihaqi, I. and Sohal, A.S., 2013. The impact of information sharing in supply chains on organisational performance: an empirical study. *Production Planning & Control*, *24*(8-9), pp.743-758.

Bharadwaj, A.S., 2000. A resource-based perspective on information technology capability and firm performance: an empirical investigation. *MIS quarterly*, pp.169-196.

Büyüközkan, G. and Göçer, F., 2018. Digital supply chain: literature review and a proposed framework for future research. *Computers in Industry*, *97*, pp.157-177.

Caritte, V., Acha, S. and Shah, N., 2015. Enhancing corporate environmental performance through reporting and roadmaps. *Business Strategy and the Environment*, *24*(5), pp.289-308.

Chae, B., Yen, H.R. and Sheu, C., 2005. Information technology and supply chain collaboration: Moderating effects of existing relationships between partners. *IEEE transactions on engineering management*, *52*(4), pp.440-448.

Chiarello, F., Trivelli, L., Bonaccorsi, A. and Fantoni, G., 2018. Extracting and mapping industry 4.0 technologies using wikipedia. *Computers in Industry*, *100*, pp.244-257.

Collins, E., Lawrence, S., Pavlovich, K. and Ryan, C., 2007. Business networks and the uptake of sustainability practices: the case of New Zealand. *Journal of cleaner production*, *15*(8-9), pp.729-740.

Daim, T.U. and Oliver, T., 2008. Implementing technology roadmap process in the energy services sector: A case study of a government agency. *Technological Forecasting and Social Change*, *75*(5), pp.687-720.

Ding, B., 2018. Pharma industry 4.0: Literature review and research opportunities in sustainable pharmaceutical supply chains. *Process Safety and Environmental Protection*, *119*, pp.115-130.

Dweib, M., Abuzir, Y. and Rabay'a, A., 2014. Standard for ERP as cloud computing. *ARPN Journal of Science and Technology*, *4*(7), pp.427-432.

Esslinger, H., 2011. Sustainable design: Beyond the innovation-driven business model. *Journal of product innovation management*, *28*(3), pp.401-404.

Flynn, B.B., Huo, B. and Zhao, X., 2010. The impact of supply chain integration on performance: A contingency and configuration approach. *Journal of operations management*, *28*(1), pp.58-71.

Ghobakhloo, M., 2018. The future of manufacturing industry: a strategic roadmap toward Industry 4.0. *Journal of Manufacturing Technology Management*.

Hsu, C.W., Tung, C.M. and Lin, C.Y., 2017. Industrialization roadmap model for fermentative hydrogen production from biomass in Taiwan. *International Journal of Hydrogen Energy*, *42*(45), pp.27460-27470.

Ivanov, D., Dolgui, A., Sokolov, B., Werner, F. and Ivanova, M., 2016. A dynamic model and an algorithm for short-term supply chain scheduling in the smart factory industry 4.0. *International Journal of Production Research*, *54*(2), pp.386-402.

Kappel, T.A., 2001. Perspectives on roadmaps: how organizations talk about the future. *Journal of Product Innovation Management: AN INTERNATIONAL PUBLICATION OF THE PRODUCT DEVELOPMENT & MANAGEMENT ASSOCIATION*, *18*(1), pp.39-50.

Lee, J., Bagheri, B. and Kao, H.A., 2015. A cyber-physical systems architecture for industry 4.0-based manufacturing systems. *Manufacturing letters*, *3*, pp.18-23.

Lee, S. and Park, Y., 2005. Customization of technology roadmaps according to roadmapping purposes: Overall process and detailed modules. *Technological forecasting and social change*, *72*(5), pp.567-583.

Li, X., 2020. Reducing channel costs by investing in smart supply chain technologies. *Transportation Research Part E: Logistics and Transportation Review*, *137*, p.101927.

Liao, Y., Deschamps, F., Loures, E.D.F.R. and Ramos, L.F.P., 2017. Past, present and future of Industry 4.0-a systematic literature review and research agenda proposal. *International journal of production research*, *55*(12), pp.3609-3629.

Lu, Y., 2017. Industry 4.0: A survey on technologies, applications and open research issues. *Journal of industrial information integration*, *6*, pp.1-10.

Machado, C.G., Winroth, M.P. and Ribeiro da Silva, E.H.D., 2020. Sustainable manufacturing in Industry 4.0: an emerging research agenda. *International Journal of Production Research*, *58*(5), pp.1462-1484.

Mesquita, L.F., Anand, J. and Brush, T.H., 2008. Comparing the resource-based and relational views: knowledge transfer and spillover in vertical alliances. *Strategic management journal*, *29*(9), pp.913-941.

Microsoft Corporation (2018). What is Power BI. Available at https://powerbi.microsoft.com/en-us/what-is-power-bi/. Accessed on 03 April 2021.

Müller, J.M., Buliga, O. and Voigt, K.I., 2018. Fortune favors the prepared: How SMEs approach business model innovations in Industry 4.0. *Technological Forecasting and Social Change*, *132*, pp.2-17.

Olesen, K. and Myers, M.D., 1999. Trying to improve communication and collaboration with information technology: an action research project which failed. *Information Technology & People*.

Parrott, A. and Warshaw, L., 2017. Industry 4.0 and the digital twin. In *Deloitte University Press* (pp. 1-17).

Pfohl, H.C., Yahsi, B. and Kurnaz, T., 2017. Concept and diffusion-factors of industry 4.0 in the supply chain. In *Dynamics in Logistics* (pp. 381-390). Springer, Cham.

Phaal, R., Farrukh, C.J. and Probert, D.R., 2004. Technology roadmapping—a planning framework for evolution and revolution. *Technological forecasting and social change*, *71*(1-2), pp.5-26.

Phaal, R., Farrukh, C.J. and Probert, D.R., 2010. *Roadmapping for strategy and innovation: aligning technology and markets in a dynamic world*. Institute for Manufacturing.

Phaal, R., Farrukh, C. and Probert, D., 2001. Technology Roadmapping: linking technology resources to business objectives. *Centre for Technology Management, University of Cambridge*, pp.1-18.

Porter, M.E. and Heppelmann, J.E., 2014. How smart, connected products are transforming competition. *Harvard business review*, *92*(11), pp.64-88.

Prajogo, D. and Olhager, J., 2012. Supply chain integration and performance: The effects of long-term relationships, information technology and sharing, and logistics integration. *International Journal of Production Economics*, *135*(1), pp.514-522.

Rinne, M., 2004. Technology roadmaps: Infrastructure for innovation. *Technological Forecasting and Social Change*, *71*(1-2), pp.67-80.

Saritas, O. and Aylen, J., 2010. Using scenarios for roadmapping: The case of clean production. *Technological forecasting and social change*, *77*(7), pp.1061-1075.

Siggelkow, N., 2001. Change in the presence of fit: The rise, the fall, and the renaissance of Liz Claiborne. *Academy of Management journal*, *44*(4), pp.838-857.

Suh, J.H. and Park, S.C., 2009. Service-oriented technology roadmap (SoTRM) using patent map for R&D strategy of service industry. *Expert Systems with applications*, *36*(3), pp.6754-6772.

Sundarakani, B., de Souza, R., Goh, M., Van Over, D., Manikandan, S. and Koh, S.L., 2010. A sustainable green supply chain for globally integrated networks. In *Enterprise networks and logistics for agile manufacturing* (pp. 191-206). Springer, London.

Tao, F., Cheng, J., Qi, Q., Zhang, M., Zhang, H. and Sui, F., 2018. Digital twin-driven product design, manufacturing and service with big data. *The International Journal of Advanced Manufacturing Technology*, *94*(9), pp.3563-3576.

Thoben, K.D., Wiesner, S. and Wuest, T., 2017. "Industrie 4.0" and smart manufacturing-a review of research issues and application examples. *International journal of automation technology*, *11*(1), pp.4-16.

Tien, J.M., 2011. Manufacturing and services: From mass production to mass customization. *Journal of Systems Science and Systems Engineering*, *20*(2), pp.129-154.

Vasconcelos Loureiro, A.M., Borschiver, S. and de Andrade Coutinho, P.L., 2010. The technology roadmapping method and its usage in chemistry. *Journal of technology management & innovation*, *5*(3), pp.181-191.

Vickery, S.K., Jayaram, J., Droge, C. and Calantone, R., 2003. The effects of an integrative supply chain strategy on customer service and financial performance: an analysis of direct versus indirect relationships. *Journal of operations management*, *21*(5), pp.523-539.

Vishnevskiy, K., Karasev, O. and Meissner, D., 2016. Integrated roadmaps for strategic management and planning. *Technological Forecasting and Social Change*, *110*, pp.153-166.

Wang, L., Törngren, M. and Onori, M., 2015. Current status and advancement of cyber-physical systems in manufacturing. *Journal of Manufacturing Systems*, *37*, pp.517-527.

Wang, S., Wan, J., Zhang, D., Li, D. and Zhang, C., 2016. Towards smart factory for industry 4.0: a self-organized multi-agent system with big data based feedback and coordination. *Computer Networks*, *101*, pp.158-168.

Wu, F., Yeniyurt, S., Kim, D. and Cavusgil, S.T., 2006. The impact of information technology on supply chain capabilities and firm performance: A resource-based view. *Industrial Marketing Management*, *35*(4), pp.493-504.

Wu, L., Yue, X., Jin, A. and Yen, D.C., 2016. Smart supply chain management: a review and implications for future research. *The International Journal of Logistics Management*.

Zhang, L.H., Li, T. and Fan, T.J., 2018. Radio-frequency identification (RFID) adoption with inventory misplacement under retail competition. *European Journal of Operational Research*, *270*(3), pp.1028-1043.

Yin, R.K., 1981. The case study as a serious research strategy. *Knowledge*, *3*(1), pp.97-114.

Zhong, R.Y., Newman, S.T., Huang, G.Q. and Lan, S., 2016. Big Data for supply chain management in the service and manufacturing sectors: Challenges, opportunities, and future perspectives. *Computers & Industrial Engineering*, *101*, pp.572-591.

Thanks, or No Thanks? Scale Development and Validation of Social Value Creation

Beverlley Madzikanda, Cai Li and Francis Tang Dabuo
School of Management, Jiangsu University, Zhenjiang, China
beverlley@icloud.com
gscaili@ujs.edu.cn
francis.dabuo@yahoo.com
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Abstract: Despite growing literature on social entrepreneurship (SE) and its impact on local communities, very little research has attempted to measure the extent of the value it creates. Much of the literature merely describes the initiatives of SE, and some scholars have noted that social enterprises may be working on short term solutionism and their positive impacts are temporary and short lived (Chalmers, 2020). In order to address this gap, we design and propose a qualitative measure of social value creation (SVC) of social enterprises. We build on earlier research on SE that contextualised the various outcomes it purports, has evaluated other aspects of SE and using the theory of effectuation which reflects the resource-scarce background of social entrepreneurs and the resultant dynamism of their goals. We ensure the nomological validity of the construct and gather sufficient support from earlier studies on social entrepreneurship. After this we employed a two-tier design to interview senior staff at 15 Zimbabwean-based social organizations in order to understand their missions and goals, then survey 609 key beneficiaries of these same organizations to understand their impact on the communities they serve. From these we proposition a five-dimensional construct of SVC: Solution Innovativeness, Community Involvement, Social Mission Orientation, Sustainable Continuity and Effectual Rewards. While good levels of internal consistency were found, we discuss the limitations and implications of our measure to future research in SE and the SVC of social enterprises. The main contribution of our research is that the opportunity to measure how successful social enterprises are dealing with real-world problems in ways that are sustainable can be useful to attract funding to the most crucial organizations and improve those that do not create an overall positive impact. This information is useful not only to entrepreneurs and managers of social enterprises but also governments and philanthropic foundations that largely rely on financial information to evaluate performance of organizations which unfairly give a poor impression of SE.

Keywords: measure of social entrepreneurship, social value creation, scale development

1. Introduction

Social entrepreneurship (SE) as a phenomenon and a subject of research has gained much attention in recent decades. This is mostly due selling point of social entrepreneurs that they are able to 'pursue commercial innovative opportunities to make solutions for various social injustices and problems' (Zahra et al., 2009). The research on SE sponsored social value creation (SVC) is still developing. The vast majority of the existing research on SE predominantly describes case studies of successful social entrepreneurs at the top of the field (Lepoutre et al., 2013). There is a dearth of empirical exploratory studies that could potentially define the boundaries of SE and SVC and even evaluate them in different contexts. In itself, SE is a complex subject, so it comes as no surprise that very little literature has attempted to create a measure for it. The definition given by Carraher et al. (2016) describes SE as a process that involves the securing and using of resources to pursue financial and innovation opportunities with the goal of catalysing social change and address social problem.

However, a recent essay by Chalmers (2020) stands out as a contrast to the positive outlook that most other academics have adopted. He states that SE is not appropriate or effective in dealing with deep rooted structural problems that manifest as some superficial social problems. He suggests that SE rather does more harm than good because the value or impact it has, has never been critically examined. In that essay he quotes Morozov (2013) whose study also took a similar standpoint on tech entrepreneurs. He discussed how the innovative and positive outcomes of technology must not overshadow the negative outcomes and the price that society has to pay. What this means is that with all the praise that SE has received in theory and practice, there is a need to determine whether it has an overall positive or negative result. Social entrepreneurs identify distinctly from conventional entrepreneurs as they are more concerned with social needs rather than commercial needs (Lurtz and Kreutzer, 2017).

Criticisms of SE argue that it is impossible to completely cure social problems such as unemployment and poor welfare. Therefore, the role of SE is simply to remedy these problems. The main question this study will answer is "to what extent is SE addressing the social problems it tackles?". The value created by SE must be visible and

able to be tested in order for societies to not only accept them, but integrate them accordingly. It is increasingly recognized that developing subjective measures of success of entrepreneurial activities is crucial in the advancement of theories and practices. In order to measure SVC, a framework must take into account the duality of output in SE and the resource constrained context that SE often operates in. In light of these two elements, we propose an SVC measurement construct to appraise how effective SE perform when compared to their goals. Attempts to quantify and assess social entrepreneurs have been carried out resulting in some highly insightful measurement scale models (Carraher et al., 2021, Lepoutre et al., 2013). These works even suggested areas for further study must attempt to include empirical measurement of the impact of SE. However, none that we came across have attempted to propose a measure of the impact of SE in the communities they work.

2. Literature review

2.1 Attempts to measure SE

The main studies that have attempted to define measures for SE have managed capture the concept and explain the boundaries of SE as well as measure the motivation and behaviour of social entrepreneurs. Dwivedi and Weerawardena (2018) conducted a study to define the conceptualization and operation of SE among American-based social entrepreneurs. Though they mention the need for a measure of social value creation, their results mainly focus on an instrument that can ascertain the boundaries of SE and give a way to determine the level of social entrepreneurship orientation. This was in support of Lurtz and Kreutzer (2017) who previously made a concept measure for SE orientation in the context of organizations. Other related literature considers SE orientation's effect on SVC. These come to the conclusion that any investments put into SVC give an outright positive outcome always for the communities they serve and the companies that provide them without any negative or neutral responses.

Another strand of literature argues that social entrepreneurship is simply a remedy but not a cure for society's problems. Through this Carraher et al. (2016) developed, a general measure SE which incorporates the motivation of social entrepreneurs (Sullivan et al., 2009). They conclude that the scale of success of SE should be their self-stated mission and goals against how far they have come along in achieving them. This is closely related to success theories for entrepreneurship that state that entrepreneurs do not only measure their success by financial performance but also by social contribution and the value of the impact of their innovations on the community. For social entrepreneurs, financial renumeration is already not a priority so cannot be used as an effective measure. Measuring the social contribution of the enterprises on society therefore is the only other way to contest whether SE is successful or not.

2.2 Measure of the impact of SE

Kuratko et al. (2017) conducted a pilot test of a measurement model of SE that they based on their measure of conventional entrepreneurship which was altered to capture the value of corporate social value created through social projects. Because this study was in the context of organizations, the SVC is not from a purely social mission so therefore cannot adequately capture the sole social cause of SE.

Another measure for SE developed by Kodzi Jr (2015) sits on the premise that the level of community engagement can indicate the success of failure of SE. However more community engagement can lead to greater SVC but it still does not tell to what extent the condition of the said community has been ameliorated.

Other researchers have created a multi-dimensional measure of SE that can capture both the commercial value of SE as well as the social value (Sullivan Mort et al., 2003). This framework measures the social contribution of social enterprises by evaluating the social mission and long-term viability. This particular measure is a good base for this current study but is yet to be tested empirically or be applied to new data sets or regions. The existing measures of SE have yet to capture the valuation of SVC and test it empirically.

2.3 Theory of effectuation

We consider the theory of effectuation described by Sarasvathy (2001) which maps the behaviour of entrepreneurs who find themselves in resource-scarce environments. This approach says that when resources are infrequent and the environment is plagued with uncertainty, entrepreneurs do not always work with pre-planned goal but rather work to attain evolving goals that are determined based on resources available and

needs to be met. This behavioural theory has been used to explain the innovation behaviour of MSMEs firms in volatile economic settings and even start-ups (Alsos et al., 2016). The resource- constrained environments and need for evolving goals is also characteristic of social entrepreneurs. SE, often categorized as non-profit organizations, do not have access to money markets or surplus generated from profits. Often, they have to rely on donors and well-wishers for finances and other resource inputs. This means that the challenges are many and barriers are very high, but SE demands for resourcefulness, creativity and boundless innovation.

3. Building the Social Value Creation (SVC) construct

Social enterprises are distinctly identifiable by the "socialness" of their mission. To measure how effective, they are in achieving their social goals, a construct to measure the impact of SE must measure the extent of SVC. While Santos (2012) argues that the creation of value of SE is less relevant than the motivations of the entrepreneurs we argue that their value to society is equally important. Being able to evaluate how well goals are met and lives impacted is an equally reliable measurement of SVC. Basing on social innovation theory (Kannampuzha and Hockerts, 2019) we propose that SVC is brought about by Innovativeness of the solutions brought by entrepreneurs, level of community involvement, how closely actions are oriented with social missions, whether the solutions are sustainable over time and effectual rewards. This makes a 5-dimensional construct. While the first three are well explained in literature (Dwivedi and Weerawardena, 2018), this study adds sustainable continuity of the programs to address the issue raised by Chalmers (2020) that SE initiatives should be considered successful if they can be sustained over time. Effectual rewards are also added to reflect that benefits of SE may not always be linear and steady and should be sufficient to help target communities considering the limited resources (Weerawardena et al., 2010).

3.1 Proposed SVC dimensions

We adopt a working definition of SVC to be "the measure of the value created by social enterprises that is expressed in terms of Innovativeness, Involvement, Social Mission Orientation, Sustainable Continuity and Effectual Rewards all aimed at assessing how well SE is at remedying social injustices and creating effective social value for its beneficiaries."

The Innovativeness of social enterprise offerings shows how creative a solution really is and how it is superior to other conventional methods (Portales, 2019) p.165. Community involvement describes to what extent the communities are considered stakeholders rather than just beneficiaries (Cherrier et al., 2018).

Social mission Orientation is a reflection of how closely social enterprises fulfil their "raison d'etre", their prioritization of social causes. The transformative nature of SE relies on their abilities to forgo financial rewards for social missions. Sustainable continuity of SEs, according to Ratten (2011) is how they create self-sustaining enterprises that can operate for a long time. The effectual rewards encompass reduction of unemployment, social inclusion and provision of other resources and services. Only if beneficiaries feel they have received some positive outcome from the activities of SE can there be said to be value creation.

3.2 Conceptual boundaries

SVC does not necessarily evaluate entrepreneurial motivations, intentions or even behaviours but rather seeks to assess the impact of the outcomes of these is. While subjective measures of success for commercial entrepreneurs are more common, we have found none on the success of SE to date. Social value created will be considered in the context of the specific context of the organizations we will study. SVC will, therefore, be based on the stated social mission of social enterprises.

3.3 Nomological validity

While assessing the impact of SE is complex, basing SVC on just social innovation is not enough, there should be a way to determine whether social enterprises are effective or not. We therefore determine that SVC is the nomological outcome of social entrepreneurs' intentions, motivations (To et al., 2020) and behaviour. We will define some environmental factors and contextual covariates that play into the nomological framework of each of the research setting. These will include perception of SE in the local environment, the financial and other resources available to social enterprises (Shaw and Carter, 2007).

4. Method

To fulfil the 2-tier design of the study, the data collection was done in two parts, the social entrepreneurs to determine the mission and goals, then their beneficiaries to understand how the missions and goal have played out in practice. We conducted telephone semi-structured interviews with CEO's, founders or the next available in charge manager of 15 Zimbabwean based non-profit-organizations (NPOs) that identify as SEs with varying specializations. These people would have specialized know-how of the enterprises mission and motivations as well as the day-to-day workings (O'Shannassy and Leenders, 2016). We also collected data by the use of online surveys filled out by 609 key participants of these SEs. These could give a detailed description of how the actions of SEs have affected them.

The first tier (entrepreneurs) was comprised of mostly females (65%), with 51% being CEO's and/or Founder and 35% being other high-level executives. Their average self-assessed level or decision-making power was 4.3/5.0, which indicates that they are key members in the organizations. While 40% of them fell in the 40-50 years age range, 26% were 30-40 years and the rest were almost evenly spread over the other age brackets. 48% said they are involved in the "Healthcare and Welfare services", 16% in "Education, Arts & Culture, 7% chose "Activism and Civil Rights", 3% in "environmental and animal protection" and 26% chose "Other". This makes for an appropriate mix of SE sectors that are generalizable. On average the organizations employ 215 employees and/or volunteers (Confidence Interval 95% [129-300]) and have been operating for 7 years (CI 95% 1-12 years) which suggests this a sample of average size and fairly new established social enterprises.

4.1 SVC scale development

To develop a suggested scale for the SVC construct, we used the established guidelines as illustrated by Netemeyer et al. (2003). Our methodology is detailed below:

4.1.1 Item generation and refinement

Considering that theory on SE remains in its infancy, we employed both inductive and deductive methods to generate preliminary scale items. Using priori research, we drew up 5 dimensions of SVC based on SE literature (Kannampuzha and Hockerts, 2019). These were used as a template for item generation. For the inductive approach we devised items for each dimension based on previous qualitative research about SE (Weerawardena and Mort, 2006). We compiled a preliminary set 30 item basing on the responses we received from the senior executives we interviewed. We made use of the 5-point Likert Scale to measure the responses, with strongly agree being a five and strongly disagree being a one. After reviewing some theoretical classifications, the validity of some items was reconsidered. Furthermore, in order to minimize bias and prevent empirical modelling difficulties, we had to balance out the items per dimension (Kline, 2015).

4.1.2 Review by experts

We asked 4 experts who are top academics in the business administration and economics departments (majoring in entrepreneurship, social innovation and CSR studies) at Jiangsu University to offer us some feedback on the face validity of our dimension-item ensemble. The comments they gave prompted the deletion of 2 items and merging of repetitive ones, leaving a total of 25 items, 5 for each dimension shown in Table 1.

Table 1: Validity and reliability measures

Dimensions & Items	Factor Loadings	Cronbach's α	Composite Reliability
Solution Innovativeness (SI)			
New ways of sourcing funding	0.62		
New ways of involving other parties (schools, clinics)	0.59	0.76	0.75
New ways of sharing resources	0.53		
New ways of tackling problems	0.51		
New ways of reaching people	0.48		
Community Involvement (CI)			
People have hands-on involvement in planning	0.69		
Leaders are consulted	0.63	0.81	0.82
Local culture is observed appropriately	0.61		
Programs reach people indiscriminately	0.60		
People involved in decision-making	0.57		

Dimensions & Items	Factor Loadings	Cronbach's α	Composite Reliability
Social Mission Orientation (SMO)			
Purpose of organization is fulfilled	0.63	0.88	0.88
Main aim is to create social value	0.57		
Organization philosophy guided activities	0.55		
Programs are closely related to the mission	0.49		
All assets and funds are used to fulfil mission	0.44		
Sustainable Continuity (SC)			
Long-term plans exist	0.72	0.76	0.75
Careful tracking of income and expenditures	0.57		
Established long-term sources of income	0.55		
Careful control of costs	0.59		
Balanced between finances and long-term plans	0.56		
Effectual Rewards (ER)			
Benefits are acceptable, looking at the inputs	0.52	0.63	0.72
Resource constraints do not negate positive impact	0.50		
Benefits received in the last 5 years	0.45		
Organizations make the best of what they have	0.38		
Rewards are very satisfactory, overall	0.33		
Value Creation (SVC)			
Value created in the last 5 years	0.76	0.72	0.73
Recipients are better off	0.71		
Activities of SE are helpful	0.71		
Solutions of SE are sustainable	0.65		
Actions have a positive impact overall	0.63		

4.1.3 Pre-Test

We conducted a pre-test with 136 key beneficiaries in order to check the psychometric properties prior to conducting the main study. They had the opportunity to give feedback on the content of the survey regarding the relevance, appropriateness and clarity. Using their feedback, 6 items were restructured to make them clearer and unambiguous.

Using Principal Component Analysis (PCA), we examined the unidimensionality of the construct by observing the items that constitute each dimension. A each of the factors emerged for all the dimensions except the items (SC3) and (SC5) which loaded on a different dimension. If we remove either one, the dimension sustainable continuity would become unidimensional but we maintained both because of the affirmation of the experts.

The convergent validity, as item-to-total correlations, were found to be in a satisfactory range (0.33-0.72). These ranges are above the recommended threshold of 0.40, except for effectual rewards which was less but was still maintained because it had achieved face validity. The inter-item correlations fall in the range 0.28-0.52 which is acceptable. To check scale reliability, we used Cronbach's Alpha and found that for the 5 dimensions it was within an acceptable range of 0.63-0.88. Although effectual rewards (α=0.63) was below 0.70, it remains acceptable as justified by the novelty of the research. To confirm construct validity, we used the single factor congeneric models for each of the dimensions. For this Involvement (Chi-Square (3) = 7.89, $p<0.05$; CFI 0.98) and SMO (Ch0-square (4) = 3.20, $p<0.51$) indicate the fit is acceptable. All the standardised factor loadings are above 0.50. To examine the discriminant validity, we examined the covariance between pairs of dimensions and found that Continuity and Innovativeness are statistically distinct (Chi-square (1) = 95.23, $p < 0.01$). This was found to be the case for effectual rewards and SMO (Chi-square (1) = 171.89, $p < 0.01$) (Dwivedi 2018). In the next section we present the main findings of the study.

5. Results and discussions

5.1 Common Method Bias (CMB) and non-response

There is no evidence of non-response bias as questionnaires were designed to give clarity and simplicity. We employed a clear Likert Scale and structured the questions carefully to avoid ambiguity and confusion. We checked for the indication of CMB using Harman's single factor test. It was that the second factor for the unrotated PCA explained 27% of the total 65% of variance, thereby showing little incidence of CMB.

5.2 Descriptive statistics

The descriptive statistics are detailed in Table 2. The organizations chosen showed above average means for SI: 3.8/5, CI:3.6/5, SMO:4.0/5, SC:3.5/5 and ER:3.9/5. These scores indicate high levels of activity by these social entrepreneurs. The correlations are all positive and mostly significant. They are all moderate which is consistent with our initial conceptualization.

5.3 Analysis of the measurement model

The goodness-of-fit was observed to be acceptable at χ^2 (601) = 1648.47 (p<0.01), CFI= 0.85, RMSEA =0.045, SRMR=0.048. Convergent validity was found to be present with factor loadings (p<0.01) ranging from 0.33-0.72. All these measures assure that the data used for the study is valid, reliable and correlated consistently. The constructs show acceptable internal consistency according to Cronbach's α, composite reliability estimates are all above 0.70. Discriminant validity is observed through the square root of average variance extracted (AVE) in Table 2.

Table 2: Descriptive statistics

	Mean	Std Dev	SI	CI	SMO	SC	ER	VC
SI	3.8	0.87	**0.68**					
CI	3.6	0.94	0.42**	**0.82**				
SMO	4.0	0.71	0.41**	0.21**	**0.73**			
SC	3.5	0.85	0.55**	0.51**	0.47**	**0.89**		
ER	3.9	1.49	0.58**	0.35**	0.36**	0.39**	**0.67**	
VC	3.9	1.05	0.46**	0.10**	0.28**	0.21**	0.29**	**0.79**

Note **p<0.01, (**AVE)**

5.4 SVC measurement model

We estimated the SVC model and observed an acceptably significant χ^2 (295) = 1072.98 (p<0.01). The standardized second-order loadings were significant (p<0.01); SI (β=0.73), CI (β=0.67), SMO (β=0.77), SC (β=0.69), ER (0.75). Going further to draw up a better fitting model, we compared the five-dimensional construct with a four-dimensional model that would remove one of the dimensions in each test case. The comparisons were done through AIC, BIC, CAIC and ECVI, for which the model with the smallest index numbers was to be selected as the better model. The results shown in Table 3 show that no exemptive model was significantly lower than the hypothesized model. This was then taken to represent the final measure of SVC.

Table 3: Alternative model comparison

Model	Description	χ^2 (df)	CFI	RMSEA	AIC	BIC	CAIC	ECVI
M0	Hypothesized	1072.98 (295)	0.88	0.074	11.87.59	1435.41	1491.82	2.33
M1	SVC w/o SI	998.29 (253)	0.87	0.061	818.62	956.05	985.31	1.62
M2	SVC w/o CI	1068.42 (264)	0.88	0.075	865.17	1036.80	1011.98	2.21
M3	SVC w/o SMO	1004.60 (208)	0.86	0.073	848.66	1001.40	1084.90	1.78
M4	SVC w/o CS	1070.82 (269)	0.89	0.072	947.92	1246.20	1183.12	1.85
M5	SVC w/o ER	983.53 (240)	0.90	0.069	898.29	937.15	994.08	1.60

5.5 Nomological validity

From this construct, we estimated a structural model with value creation as the specific outcome. This dimension' items are outlined in Table 1 where the scale was very little (1) to very much (5). The "perceived degree to which social entrepreneurship has been helpful" to recipients was outlined similarly. Lastly the "perceived durability of the benefits" was inquired on by deciding if it was very short-lived (1) to very long-term (5). Other covariates included the number of years it has operated. The structural model, illustrated in Figure 1, showed adequate results to justify nomological validity for SVC and supports that it can explain 42% of its variance.

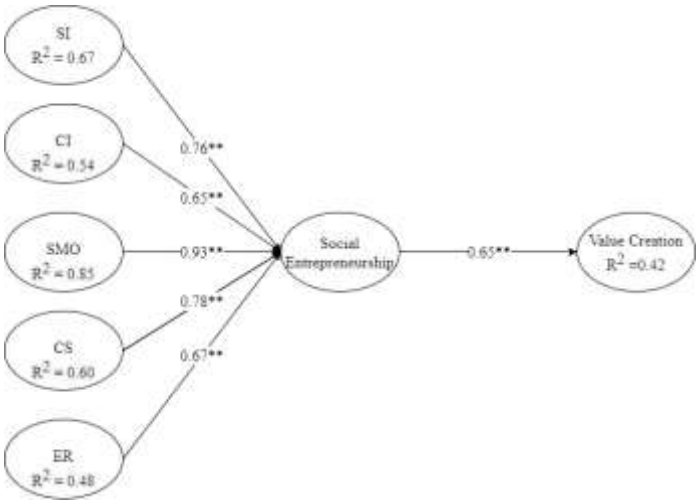

Figure 1: Social value created structural model

6. Discussion of results

6.1 Results

In order to address the lack of an evaluative model for social value created by social entrepreneurs, we develop a measure of SVC basing on the behavioural model of social entrepreneurs. By taking into account the special circumstances of SEs, we quantify this construct in a way that can allow for further explanatory and qualitative studies of social value creation (Dwivedi and Weerawardena, 2018).

The results of these analyses show that SMO (R^2=0.85) is the strongest indicator of SVC. This supports that the hallmark of SE is their willingness to forego other rewards in support of their social mission. Entrepreneurs that are more committed to their missions, therefore create the greatest value in the community. The second strongest indicator is SI (R^2=0.67). This result is in-line with the other studies that showed that the extent of innovativeness of the solutions of SEs are a fundamental in the delivering of social value. The third and fourth strongest indicators are CS (R^2=0.60) and CI (R^2=0.54). The importance of SE to continue in a way which is sustainable as opposed to short term solutionism was has been stressed and is key to ensuing the rewards of social enterprises are safeguarded (Saebi et al., 2019). Community engagement for social enterprises ensures that the people receive the best possible services from the SE and this style of inclusive governance can improve the acceptance of the entrepreneurs in society (Dahles et al., 2020). The least strong indicator is ER (R^2=0.48), which is unsurprising as effectual rewards are very relative and depend on a myriad of other circumstances (Dwivedi and Weerawardena, 2018). This makes them the least reliable measure with which to assess the extent of value creation.

The results are considered valid and generalizable because the sample size relatively large, diverse and shows that is can explains 45% of 65% of the variance of the model.

6.2 Implications of results

Considering the complexity of measuring social value, these findings are validated as appropriate (Mulgan, 2010). Furthermore, our items measuring value creation show that only when positive changes are realised in a timely manner (within 5 years) and can be continued over time (sustainable) can there be said to be social value created. While may models for social entrepreneurship uphold pervasive innovation (Portales, 2019), this construct shows that the essence of value creation lies in the practical implications of innovativeness. Good but practical and sustainable innovations lead to the most enhanced social value creation (Carraher et al., 2016).

This measure will be most useful to social entrepreneurs and other related practitioners as an instrument of evaluating value creation. It can single out the best performing SEs in societies and inform on hoe resources can be shared. It can also point out the weaknesses in under-performing SEs, allowing room to improve activities and achieve the very best value for societies and SEs alike.

7. Conclusion

7.1 Conclusions

Social entrepreneurs must innovate to seek out ways to create value in the communities the serve. BY focussing on the mission, they declare and using available resources as extensively as possible (that is effectual behaviour) they can attain high levels of social value creation. This study contributes to field of social entrepreneurship through an expansive measurement instrument of SVC. This will address the need to evaluate the value of activities of SEs. This will advance the research on social entrepreneurship and aid the work of practitioner on the ground. It is a stepping stone to the fertile field of research on the activities of SEs. While this study focused only on Zimbabwe, with a sample-based study, further study can explore larger datasets with more explanatory model in other parts of the world.

7.2 Limitations and recommendations for further study

The study faced some limitations. Firstly, we omitted one dimension, *proactiveness*, which encompassed the preparedness of SEs to deal with unexpected occurrences. Having found no empirical evidence for it and it being rejected by the experts, it was removed as dimension in this construct It is possible that different items could be used to measure it. These may include risk mitigation, and financial prudence. Secondly, the study makes use of self-reported information by key organization leaders. While this method can offer first-hand, valuable insights, it can lead to exaggerated or embellished details thereby distorting the results (Kumar et al., 1993). Lastly the location of the study is in a developing country going through a tough economic crisis. While this is addressing a lack of literature on SVC in low-income countries, this construct would need to be tested in developed and transition economies and see how the results differ. This line of work will bring up a myriad of further study directions including resource-based assessment and opportunity-based assessment of social entrepreneurial behaviour and value creation. Also, using larger datasets is encouraged and replication of this model across other fields of SE can serve as valuable contributions in the field.

References

Alsos, G. A., Clausen, T. H., Hytti, U. & Solvoll, S. (2016). Entrepreneurs' social identity and the preference of causal and effectual behaviours in start-up processes. *Entrepreneurship & Regional Development,* 28**,** 234-258.

Carraher, S. C., Carraher, S. M. & Welsh, D. H. (2021). Social entrepreneurship. *World Encyclopedia of Entrepreneurship.* Edward Elgar Publishing.

Carraher, S. M., Welsh, D. H. & Svilokos, A. (2016). Validation of a measure of social entrepreneurship. *European Journal of International Management,* 10**,** 386-402.

Chalmers, D. (2020). Social Entrepreneurship's Solutionism Problem. *Journal of Management Studies*.

Cherrier, H., Goswami, P. & Ray, S. (2018). Social entrepreneurship: Creating value in the context of institutional complexity. *Journal of Business Research,* 86**,** 245-258.

Dahles, H., Khieng, S., Verver, M. & Manders, I. (2020). Social entrepreneurship and tourism in Cambodia: advancing community engagement. *Journal of Sustainable Tourism,* 28**,** 816-833.

Dwivedi, A. & Weerawardena, J. (2018). Conceptualizing and operationalizing the social entrepreneurship construct. *Journal of Business research,* 86**,** 32-40.

Kannampuzha, M. & Hockerts, K. (2019). Organizational social entrepreneurship: Scale development and validation. *Social Enterprise Journal*.

Kline, R. B. (2015). *Principles and practice of structural equation modeling*, Guilford publications.

Kodzi Jr, E. T. (2015). The clash of missions: Juxtaposing competing pressures in South Africa's social enterprises. *Journal of Social Entrepreneurship,* 6**,** 278-298.

Kumar, N., Stern, L. W. & Anderson, J. C. (1993). Conducting interorganizational research using key informants. *Academy of management journal,* 36**,** 1633-1651.

Kuratko, D. F., Mcmullen, J. S., Hornsby, J. S. & Jackson, C. (2017). Is your organization conducive to the continuous creation of social value? Toward a social corporate entrepreneurship scale. *Business Horizons,* 60**,** 271-283.

Lepoutre, J., Justo, R., Terjesen, S. & Bosma, N. (2013). Designing a global standardized methodology for measuring social entrepreneurship activity: the Global Entrepreneurship Monitor social entrepreneurship study. *Small Business Economics,* 40**,** 693-714.

Lurtz, K. & Kreutzer, K. (2017). Entrepreneurial orientation and social venture creation in nonprofit organizations: The pivotal role of social risk taking and collaboration. *Nonprofit and Voluntary Sector Quarterly,* 46**,** 92-115.

Morozov, E. (2013). *To save everything, click here: The folly of technological solutionism*, Public Affairs.

Mulgan, G. (2010). Measuring social value. *Stanford Social Innovation Review,* 8**,** 38-43.

Netemeyer, R. G., Bearden, W. O. & Sharma, S. (2003). *Scaling procedures: Issues and applications*, Sage Publications.

O'shannassy, T. & Leenders, M. a. a. M. (2016). Avoiding the "too comfortable in the saddle" syndrome: Obtaining high performance from the chairperson, CEO and inside directors. *Journal of Business Research,* 69**,** 5972-5982.

Portales, L. (2019). Social innovation and social entrepreneurship. *Fundamentals, Concepts, and Tools. Cham, Switzerland: Palgrave Macmillan*.

Ratten, V. (2011). Social entrepreneurship and innovation in sports. *International journal of social entrepreneurship and innovation,* 1**,** 42-54.

Saebi, T., Foss, N. J. & Linder, S. (2019). Social entrepreneurship research: Past achievements and future promises. *Journal of Management,* 45**,** 70-95.

Santos, F. M. (2012). A positive theory of social entrepreneurship. *Journal of business ethics,* 111**,** 335-351.

Sarasvathy, S. D. Effectual reasoning in entrepreneurial decision making: existence and bounds. Academy of management proceedings, 2001. Academy of Management Briarcliff Manor, NY 10510, D1-D6.

Shaw, E. & Carter, S. (2007). Social entrepreneurship: Theoretical antecedents and empirical analysis of entrepreneurial processes and outcomes. *Journal of small business and enterprise development*.

Sullivan Mort, G., Weerawardena, J. & Carnegie, K. (2003). Social entrepreneurship: Towards conceptualisation. *International journal of nonprofit and voluntary sector marketing,* 8**,** 76-88.

Sullivan, S. E., Carraher, S. M., Baker, L., Cochrane, D. & Robinson, F. (2009). The entrepreneurial dilemma: Grow or status quo? A real case. *Journal of Applied Management and Entrepreneurship,* 14**,** 37.

To, C. K., Martínez, J. M. G., Orero-Blat, M. & Chau, K. (2020). Predicting motivational outcomes in social entrepreneurship: Roles of entrepreneurial self-efficacy and situational fit. *Journal of Business Research,* 121**,** 209-222.

Weerawardena, J., Mcdonald, R. E. & Mort, G. S. (2010). Sustainability of nonprofit organizations: An empirical investigation. *Journal of World Business,* 45**,** 346-356.

Weerawardena, J. & Mort, G. S. (2006). Investigating social entrepreneurship: A multidimensional model. *Journal of World Business,* 41**,** 21-35.

Zahra, S. A., Gedajlovic, E., Neubaum, D. O. & Shulman, J. M. (2009). A typology of social entrepreneurs: Motives, search processes and ethical challenges. *Journal of business venturing,* 24**,** 519-532.

Study of Student Acceptance of the Cryptocurrency Diem Based on the TAM

Kira Willems, Ines Holstein, Larissa Finzel, Angelina Fritsch and Daniel Michelis
Anhalt University of Applied Sciences, Bernburg, Germany
kira.willems@student.hs-anhalt.de
ines.holstein@student.hs-anhalt.de
larissa.finzel@student.hs-anhalt.de
angelina.fritsch@student.hs-anhalt.de
daniel.michelis@hs-anhalt.de
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Abstract: The constant development of innovative technologies is an increasing challenge. Understanding complex digital processes is often time-consuming and requires specific expertise, which makes it difficult to accept innovations. This is also true for the development of novel digital currencies such as cryptocurrencies. In 2019 the Libra Association had announced the launch of their own cryptocurrency named Libra. They changed the names to Diem and Diem Association in 2020. The US company Novi, which was founded by Facebook is one of the members of the association. This article examines how certain factors influence the acceptance of the cryptocurrency Diem. It is based on an online survey with students at the Anhalt University of Applied Sciences in Germany. The study was conducted as part of a student research project in 2019, when the cryptocurrency was still named Libra. The theoretical basis is the Technology Acceptance Model (TAM), which is an established model for the evaluation of technology acceptance. Based on existing studies, the original TAM by Davis was extended by additional factors of the acceptance of the cryptocurrency Diem. Through an online survey conducted from 08.01.2020 to 23.01.2020 with 162 students as participants the hypotheses derived from the TAM model were tested by determining the correlations and influence of the variables "perceived privacy", "perceived security", "innovation readiness", "knowledge", "perceived risk" and "perceived usefulness" on the intention to use the cryptocurrency. The result of the survey indicates that the students' knowledge about Diem and their personal willingness to innovate have no influence on the perceived usefulness. However, the perceived usefulness in the student sample is positively related to the intention to use Diem. The perceived privacy and security are positively linked to the confidence in using Diem. Moreover, the lack of trust in the social media platform Facebook and in Diem strongly influences the perceived risk, which has a negative influence on the intention to use Diem. It can be concluded therefore that the students perceived security has a higher influence on the trust in the cryptocurrency Diem than the perceived privacy.

Keywords: Libra, Diem, technology acceptance model, survey, Facebook

1. Introduction

The number of different digital currencies has surged since the 1990s. The reason for this is the development of the Internet and the resulting digitalization (Kurz et al. 2014). In March 2021, there were 4,677 different digital currencies, compared to 66 currencies in 2013. (Investing.com 2021; GP Bullhound 2018). A digital currency is defined as a digital means of payment that is not regulated by any authority and finds use and acceptance within or outside a community (Kurz et al. 2014).

Probably the best-known cryptocurrency is Bitcoin, which also laid an important foundation in the field at that time. Under the pseudonym of Satoshi Nakamoto, the official white paper and digital currency was launched in 2009. Today Bitcoin is used by a wide number of organizations and companies (BTCDirect n.d.).

The *Libra Association* announced their own cryptocurrency *Libra* in 2019. In late 2020, the Association was renamed *Diem Association* and the digital currency was renamed *Diem*. The Diem Association consists of 26 different members which include the US-based company Novi, which was founded by Facebook. The goal of the Diem Association is to "enable a simple global payment system and financial infrastructure that empowers billions of people" (Diem Association 2020). Due to the spread of smartphones, people around the world will be able to access the payment system easily. Diem is based on a blockchain-system, which is an open-source software. (Diem Association 2020).

The Diem Association is an independent membership organization, based in Geneva, consisting of various companies and non-profit organizations from different regions. The digital currency was developed by Facebook in 2010. Therefore, the company has a central role in the development of this payment system. However, it is

emphasized that Facebook does not have any other rights compared to the other members (Diem Association 2020). To separate social and financial data, Facebook created a subsidiary called Calibra, which is a wallet application. In 2020, the wallet was renamed Novi because the previous name was too close to Libra or Facebook (Kannenberg 2020). How the newly developed cryptocurrency is accepted by the population is the subject of initial studies. The survey of Forsa Marplan on behalf of the Deutsche Bundesbank from 2020 showed that 59% of respondents had not heard of the currency Diem. 34% of respondents know about the digital currency but would not use it and only 7% would be willing to use it (Deutsche Bundesbank 2020).

Facebook still has influence in the development of the cryptocurrency Diem. Therefore, the question arises to what extent society trusts Diem, when currently only 26% express their trust in the social media platform Facebook (ExpressVPN 2021).

Skepticism towards cryptocurrencies is high in general in Germany. 80% of respondents surveyed in 2020 said that they could not imagine buying or using crypto-tokens such as Bitcoin. Only 3% have already made payments with cryptocurrencies and 3% of the respondents plan to use digital currencies in the near future (Deutsche Bundesbank 2020). The YouGov survey from 2020 confirms the lack of trust. Although the general knowledge about cryptocurrencies is increasing and every fourth person has knowledge about the functionality of digital means of payment, the use and trust in the price stability of cryptocurrencies is decreasing (Bock 2020).

Therefore, the question arises to what extent the potential users of the cryptocurrency Diem would accept or even use it and which factors influence the acceptance. To investigate the user acceptance in more detail, based on the *Technology Acceptance Model (TAM)*, various studies have already been conducted to analyse the acceptance of digital means of payment in general as well as of the cryptocurrency Bitcoin (Aldás-Manzano et al. 2009; Folkinshteyn & Lennon 2016; Ginner 2018). Accordingly, the TAM forms the basic module for the study of the acceptance of the cryptocurrency Diem in this paper. The research project was conducted as a semester project of the master's degree program in online communication at Anhalt University of Applied Sciences. At the time the research took place, the cryptocurrency was still called Libra. Due to their name change in 2020, it will be titled Diem in the following. The study focuses on the target group of students, more specifically on students of Anhalt University of Applied Sciences. In the context of the study, hypotheses are developed for the acceptance of the cryptocurrency Diem based on the TAM. These will be tested by using an online survey. The different variables of the TAM and their correlations are thereby determined by a correlation analysis.

Therefore, the main goal of the paper is to find out what factors influence the acceptance of the cryptocurrency Diem among the surveyed students.

2. Literature review

The TAM will be used to answer the central question of the study. According to Hayes, acceptance occurs when something is accepted willingly or with consent, considered sufficient or adequate, adopted on one's own responsibility, and approved with liking (Hayes 2001).

The acceptance research is intended to explain the interrelationships between the introduction of innovations and their effects on the one hand, and on the other hand to provide indications for the further design of innovations with regard to their usability. The acceptance of an innovation is seen as a prerequisite for action. In the context of acceptance research, various models exist, especially in the area of technology acceptance. These are suitable for investigating acceptance among different user groups (Ginner 2018).

The goal of the TAM is to provide a general explanation of the factors that influence the usage behaviour of a wide variety of end-user computer technologies on a theoretical basis. One of the best-known acceptance models is Davis' TAM, which is also the basis for this study. The central components of the model are shown in Figure 1 (Davis 1986).

In the literature review, various studies are considered whose research findings are based on the TAM as a foundation to better classify the TAM and its use. Furthermore, by comparing different studies, the research team would like to gain additional knowledge about the current state of cryptocurrency developments and establishments, acceptance research and the models used. Depending on the thematic focus of the studies, additional factors were added or modified to the TAM. Accordingly, in the present study, the model is extended

by further aspects and adapted to the present research context. Therefore, three studies and literary works are presented in detail below, because they were used to adapt Davis' model to the present study.

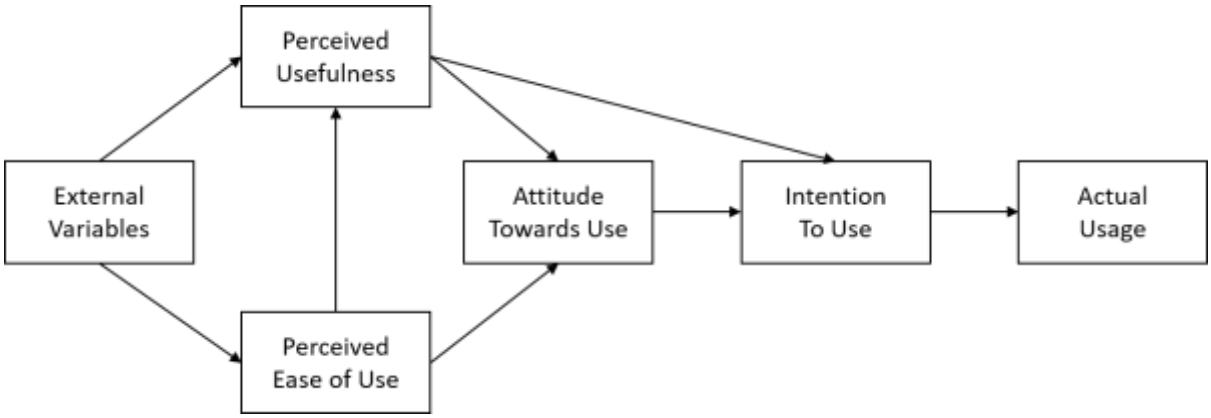

Figure 1: Original TAM after Davis 1985

The first study by Folkinshteyn and Lennon focuses on the digital currency Bitcoin and its payment method, the blockchain system. In this context, the acceptance of the digital currency Bitcoin is examined qualitatively from two perspectives. Both the view of the end users and of the developers, who use blockchain-based systems to offer products and services are investigated. In their paper, the researchers first look at various empirical studies that also use the TAM as a concept for analysing technological acceptance. In addition, different secondary sources on the topic of TAM and Bitcoin are consulted in order to analyse the acceptance of Bitcoin as a digital currency and blockchains as a financial payment system among end users in more detail. Furthermore, the two researchers conduct an in-depth interview with the founder of an auction house that also uses blockchain-based payment systems. As a result of the study, the various findings from the secondary sources on end-user acceptance are summarized in the context of condensed case studies. These are then validated by the interview statements and compared to the acceptance of digital currencies by its developer. Through their research, Folkinshteyn and Lennon identify commonalities and differences in adoption among various stakeholder groups. They highlight perceived risk as well as perceived security and privacy as the most important variables for acceptance (Folkinshteyn & Lennon 2016).

Ginner's literary work deals with the general acceptance of digital payment services. The aim of his study is to identify and define the central factors that influence the acceptance of mobile payment among potential users. According to Ginner, he research is prompted by mobile payment experts because they misjudge the current situation with regard to the use of digital payment methods. The TAM is used as a framework for the empirical study, which focuses on the acceptance of mobile payments in stationary retail. The model is modified accordingly for this purpose after various versions of the model have been considered, focusing on the aspects of innovation readiness and knowledge. The central component of the research design is a digital field survey conducted with a total of 511 online banking users. (Ginner 2018).

As a third extension of Davis' original TAM, the study "Key drivers of internet banking services use" from 2008 is included. The intention of Aldás-Manzano et al. was to determine the key factors influencing the acceptance and use of online banking. To this end, the TAM is supplemented by the components of project participation, perceived risk and trust, which are also made up of other sub-aspects. Within the framework of an online survey with 511 participants, all of whom are of Hispanic origin and regularly use online banking, their acceptance is evaluated. Trust is seen as an important, multidimensional construct for developing and maintaining successful relationships in the financial services sector. In this context, conducting online banking is seen as a complex process in which users rely on the secure functioning of the system. The results of the study show that various perceived risks have a direct influence on the acceptance of digital payment systems. In addition, trust is a key variable that reduces the perceived risk and thus positively influences the intention to use the system. Therefore, the trust factor will also be included in Davis' TAM when investigating the present research topic.

After the literature review has been completed and the information gathered, the central research question and individual hypotheses are derived based on the current state of knowledge. Likewise, individual aspects of the hypotheses are broken down further in order to address them in all their complexity within the framework of the research method used.

The definitions of the hypotheses are based on the contents of the presented literature. The seven hypotheses that are used in the TAM for this study and their individual components (see Figure 2) are explained in more detail below.

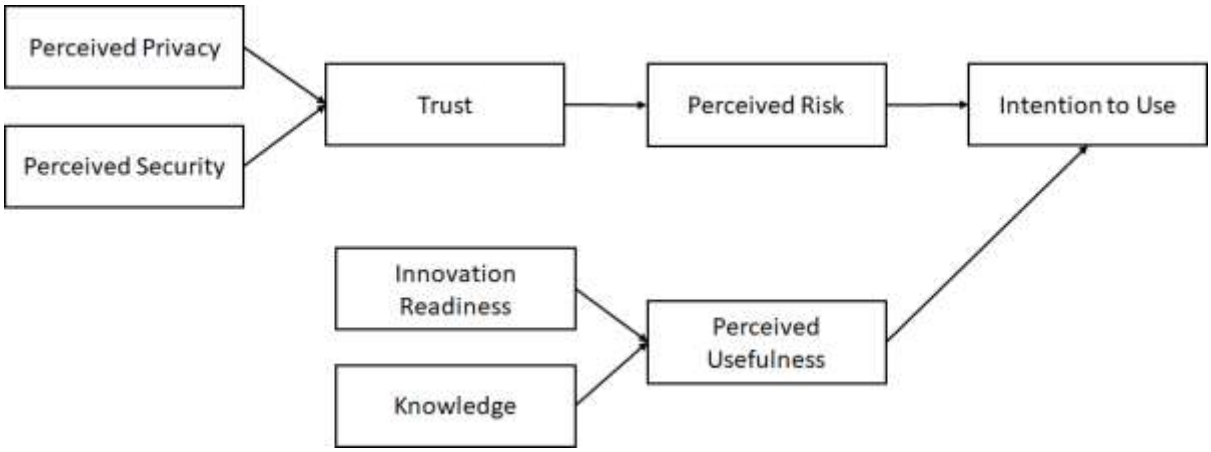

Figure 2: Own modification of the TAM (based on Folkinshteyn & Lennon 2016 p. 222).

In the modified TAM, knowledge and innovation readiness have a direct effect on perceived usefulness (perceived use) and thus an indirect effect on the intention to use. At the same time, perceived usefulness influences intention to use (intention to transact or to use). The willingness to innovate describes the openness to and interest in new systems or products. It influences acceptance in general and has an impact on the perceived individual value too. The variable knowledge, which describes the knowledge about the existence and basic functionality of the innovation, also affects the perceived usefulness and the willingness to adapt the product in everyday life. The perceived usefulness describes the extent to which the end user believes that using a particular system or innovation will improve their own performance and create added value. The intention to use represents the extent to which end users intend to actually use the innovation in their own lives.

> *H1: The higher the knowledge of cryptocurrency Diem, the higher the likelihood of positive perceived usefulness among the surveyed students.*
>
> *H2: The higher the personal innovation readiness of the university's students, the higher the probability of a positive perceived usefulness in Diem.*
>
> *H3: Perceived usefulness is positively related to intention to use Diem among the university's students.*

The other variables include perceived privacy and security, which have a direct impact on the trust of users or potential users regarding digital currencies. Trust is considered a particularly important construct and component with regards to the present research subject. In this context, trust has an impact on perceived risk, which centrally influences the intention to use.

The perceived privacy is understood as the end user's assessment of the extent to which their privacy is lost and personal data is disclosed. This factor can have a negative impact on trust in innovations.

Furthermore, the perceived security represents the evaluation of the end user based on previous experience or opinions of others with regards to the system securities. Especially in the case of cryptocurrencies, this factor plays a major role, as it involves digital cash that is deposited digitally, which is why cryptocurrency systems assume a major responsibility towards their users.

In addition, the trust factor is highly important in this context due to the uncertainties that the cryptocurrency Diem entails. Trust can further be divided into the components of honesty, security and good faith. Trust is seen as particularly important both in new technologies and the Internet of Things sector, as many products in this industry are structured in a very complex way, thus creating a sizable gap between the service provider and customer. Trust is a critical factor in the promotion of online banking or other new technologies. The uncertainties that an individual may have are often only accepted through trust, which is why it is seen as an essential component. Stable relationships, loyalty and customer retention play an important role to build trust (Aldás-Manzano et al. 2009).

The trust in the technological domain is composed of the belief that the provider has nothing to gain from fraud, the belief that there are security mechanisms in the system, and the belief and experience that it is easy to use. Trust can significantly minimize the perceived risk (Ginner 2018).

The perceived risk is composed of different sub-risks such as social risks and risks related to security and privacy. These sub-aspects can be assessed to different degrees and prevent end users from using the innovation or negatively influence trust.

H4: The perceived privacy is positively related to trust in the use of Diem among university students.

H5: The perceived security is positively related to trust in Diem use among students at the university.

H6: Trust in Facebook and Diem negatively influences perceived risk among the surveyed students.

H7: Perceived risk among the surveyed students has a negative influence on the intention to use Diem.

3. Research design

3.1 Research method

An online survey has been conducted as part of the research design of this study. It is a national survey, which will be addressed specifically to students of the selected university in Germany. By selecting students from different departments (design, economics, agriculture, ecotrophology and landscape development, computer science and languages), and regardless of their prior knowledge of the topic of innovative payment methods, the research team attempts to obtain a realistic and general viewpoint of Diem's acceptance by the university students. Accordingly, students overall have a higher level of education and can be classified as belonging to Generations Y and Z. These age groups are largely familiar with new technologies and digitalization (PwC 2020). The purpose of the survey is to investigate whether the acceptance of the cryptocurrency Diem among university students is influenced by the following factors: perceived privacy, perceived security, innovation readiness, knowledge, perceived usefulness, perceived risk and trust, and which of these factors are specifically inhibiting or promoting acceptance. To this end, the criteria of the hypotheses established in advance from the modified theoretical TAMs are tested empirically (see figure 2). How high the willingness is to use the currency will not be analysed in the context of this study. Likewise, the study takes a closer look at the actual behavioural component. This means that it is initially a matter of purely recording attitudes and needs without checking whether these would be reflected in the actual use of the cryptocurrency Diem.

3.2 Development of instruments

The eight different factors from the modified TAM serve as the basis for creating the items in the questionnaire. Two to four items are developed for each criterion, which serve to test it. The structure of the digital questionnaire is according to the central studies of technology acceptance research by Ginner (2018), Gefen (2003), and Folkinshteyn and Lennon (2016). Moreover, the online survey uses a five-point Likert scale for each of the 23 questions, starting with high agreement (one) and ending with no agreement (five). The online survey only consists of closed questions. This procedure allows a better comparability in the context of the evaluation and easier answering of the survey for the participants (Homburg 2017; Magerhans 2016). Furthermore, some questions are also related to demographic data to classify the criteria and to filter the results and make them more comparable with each other. As an incentive to participate in the online survey, an Amazon voucher worth 20€ will be raffled among all participants.

The research team assumes that many of the participants in the online survey are hardly or not at all familiar with the topic of cryptocurrency, as it is barely used in Germany. Nevertheless, in order to give users a feel for the currency, the online survey is introduced with a short explanatory text and a video in which the benefits and use of Diem are presented in more detail. This declaration is intended to ensure that the participants understand the questions as well as estimate and answer them to the best of their ability. Although the online survey assessments cover a wide range of correlations between the various factors of the TAM, depending on the perspective and specific question, there may also be deeper relationships which could equally be explored in future research.

3.3 Implementation of the online survey

The online survey was conducted from 8 January to 23 January 2020. To ensure that the focus of the various items do not influence the results and findings during the survey, the questions are played out to the participants in different orders. Afterwards the collected data will be cleaned, as questionnaires that were not complete will not be included in the evaluation. Of the basic population of 4,043 students from the selected departments, a total of 354 students took part in the survey. After cleaning up the results, 162 valid digital questionnaires remain. In the final step their data will be clearly presented, analysed and evaluated. Of the 162 participants, 66 are female and 96 are male. 53 % of the questioned students belong to the department of agriculture, ecotrophology and landscape development, 25 % to the department of economics, 14 % to the department of computer science and languages and 8 % to the department of design.

4. Evaluation and key findings

The interdependencies between the various variables are examined as part of a correlation analysis. This is followed by a regression analysis to measure the respective influence of the dependent variable on the independent one. The results of the dependencies are presented below.

Considering all subject areas, the first hypothesis cannot be verified. The variable knowledge does not have a statistically significant effect on the variable perceived usefulness as $F(1,160)3.583$, $p > 0.05$. Similarly, the variable innovation readiness does not have an effect on the variable perceived usefulness with $F(1,160)0.85 = p>0.05$, which means hypothesis two can also be rejected. Perceived usefulness, however, positively influences the intention to use, according to the findings in the correlation analysis $F(1,160)114.31$ $p<0.001$. Moreover, the perceived privacy and security among the surveyed students has a positive impact on their trust in cryptocurrency with a correlation of $F(1,160)15.865$, $p<.001$ and $F(1,160)74.008$, $p<.001$. Thereby, hypothesis five and six can be verified. In turn, the factor trust has a negative impact on the variable perceived risk with $F(1,160)16.12$, $p<.001$. Furthermore, perceived risk has a negative impact on the intention to use shown by $F(1,160)41.145$, $p<.001$. The results of the survey are additionally summarized in Figure 3.

In summary, the results of the research indicate that for the surveyed students, their knowledge of the cryptocurrency Diem and their personal innovation readiness has no influence on their perceived usefulness of Diem. However, perceived usefulness is positively related to their general intention to use Diem. For the respondents perceived privacy and security also appear to be positively related to trust in Diem. Furthermore, the results suggest that the lack of trust in the social media platform Facebook and the cryptocurrency Diem strongly influences the perceived risk of the surveyed students. Further, the perceived risk has a negative effect on their intention to use Diem. The results of the online survey are broken down by the individual departments of the surveyed students. Findings of the analysed data are shown in Table 1 below. By comparing the results, it becomes clear that there are significant differences between the response and acceptance of students from different departments. While none of the hypotheses can be verified by the separate evaluation of the data from the design department, several of the hypotheses can be confirmed by the surveys of students from the agriculture, ecotrophology and landscape development department.

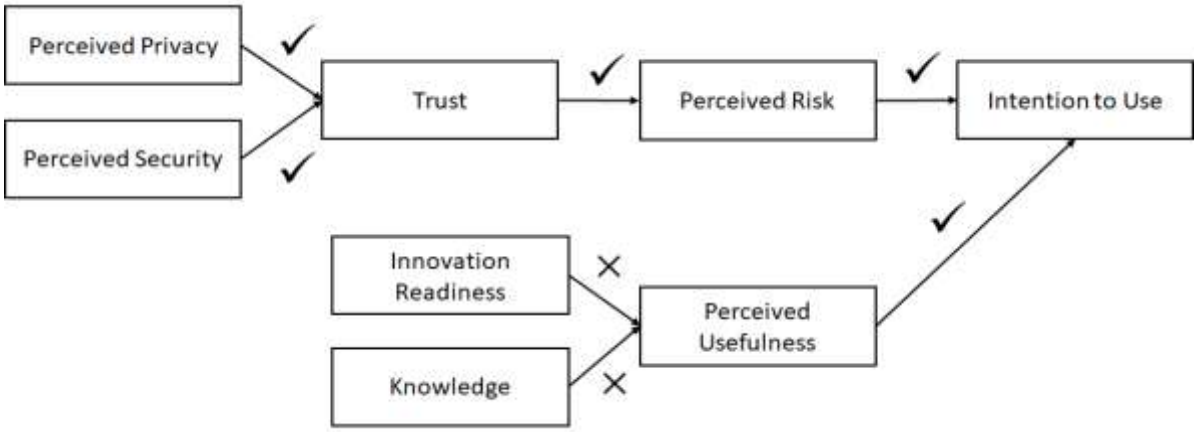

Figure 3: Results of research integrated in modified TAM (Representation based on Folkinshteyn & Lennon 2016, p.222)

Table 1: Overview of the answers of the hypothesis by different departments 2020

Hypothesis	Interdependent variables	Department: Agriculture, Ecotrophology and Landscape Development	Department: Economics	Department: Design	Department: Computer Science and Languages
H1	Knowledge, Perceived Usefulness	verified	not verified	not verified	not verified
H2	Innovation Readiness, Perceived Usefulness	not verified	not verified	not verified	not verified
H3	Perceived Usefulness, Intention of Use	verified	not verified	not verified	verified
H4	Perceived Privacy, Trust	verified	not verified	not verified	verified
H5	Perceived Security, Trust	verified	not verified	not verified	not verified
H6	Trust, Perceived Risk	verified	verified	not verified	verified
H7	Perceived Risk, Intention of Use	verified	verified	not verified	not verified

5. Discussion

The key findings from the research indicate that there are significant differences between students from separate departments, in terms of which factors influence the acceptance of the cryptocurrency Diem. The key finding from the evaluation indicates that perceived security influences the trust in the cryptocurrency Diem more than the perceived privacy.

By focusing on selected acceptance factors, complex relationships related to the acceptance of the cryptocurrency Diem can only be illustrated to a limited extent in this study (Bagozzi 2007).

One limitation of using the TAM is that alternatives are not considered. One technology is considered alone and not compared to the acceptance of other alternatives. Therefore, it would be possible that the evaluation of acceptance would be biased toward the technology. When using the TAM, the impact of related technologies are not considered (Muthitcharoen et al. 2011). Hence, in a future consideration, it would be important to take a closer look at other alternative payment methods and the user experiences that already exist. Due to the study of a digital currency that cannot be used yet, no conclusions can be made from the impact of the intention to use to the actual use. For this reason, it would be useful to conduct the survey again after the launch of the Diem currency in order to validate the existing results. Since there is a time lag between intention to use and actual use, there may be other influences that can further affect the impact of the factors on each other.

Following on from this, the evaluation of a cryptocurrency which the respondents have not yet been able to use, is considered to be difficult. This could have created barriers to answering the online survey. In addition, manipulated answers cannot be ruled out in an online survey in general.

In the context of further research, it would make sense to look at other universities in order to draw conclusions about the population of students in Germany. In addition, it would also be useful to analyse other influencing factors such as cultural, emotional and social aspects, as these may have a central impact on the acceptance of innovations (Bagozzi 2007). Furthermore, based on the central findings of the study, it can be deduced that the safety factor should be considered in more depth, as it was identified as a decisive factor for the acceptance of Diem among the surveyed students.

6. Conclusion

The aim of the paper was to find out which factors influence the acceptance of the cryptocurrency Diem among the surveyed students. For this purpose, selected studies were considered as part of the research. Based on this,

hypotheses were developed with regard to the acceptance of the cryptocurrency Diem. Through an online survey, these were verified and the interrelationships of the variables of the TAM were examined.

From the analysis, the key finding can be indicated that the perception of security influences the trust in the cryptocurrency Diem of the surveyed students more than the perception of privacy. With regard to other influencing factors examined here, no clear conclusions can be drawn across students. Their influence could only be demonstrated among students in individual departments. Future research should be extended to other universities to obtain a more diversified view. It should be expanded to include other influencing factors, such as cultural, emotional, and social aspects.

References

Aldás-Manzano, J., Lassala-Navarré, C., Ruiz-Mafé, C. and Sanz-Blas, S. (2009) "Key drivers of internet banking services use"*, Online Information Review*, Vol. 33, No. 4, pp 672-695

Bagozzi, R.P. (2007) "The Legacy of the Technology Acceptance Model and a Proposal for a Paradigm Shift", *Journal of the Association for Information Systems*, Vol 8, No 4, pp 244-254.

Bock, A. (2020) "Umfrage: Immer weniger Deutsche nutzen Kryptowährungen*",* [online], https://www.bearingpoint.com/de-de/ueber-uns/pressemitteilungen-und-medienberichte/pressemitteilungen/umfrage-immer-weniger-deutsche-nutzen-kryptowaehrungen/.

BTCDirect (n. d.) "Die Ursprünge und die Geschichte von Bitcoin", [online], https://btcdirect.eu/de-at/geschichte-von-bitcoin.

Deutsche Bundesbank (2020) "Zahlungsverhalten in Deutschland 2020 – Bezahlen im Jahr der Corona-Pandemie. Erhebung über die Verwendung von Zahlungsmitteln", [online], https://www.bundesbank.de/resource/blob/855642/cabf0971e0f0697d688dcc57c0cb65d3/mL/zahlungsverhalten-in-deutschland-2020-data.pdf, pp 37-38.

Davis, F.D. (1986) *A Technology Acceptance Model for Empirically Testing New End-user Information Systems: Theory and Results,* Ph. D. Thesis*,* Massachusetts Institute of Technology, Cambridge.

Diem Association (2020) "White Paper v.2.0. Cover Letter", [online], https://wp.diem.com/en-US/wp-content/uploads/sites/23/2020/04/Libra_WhitePaperV2_April2020.pdf.

ExpressVPN (2021) "Study: Germans willing to pay a monthly fee for Facebook services in exchange for not having any of their data collected", [online], https://www.expressvpn.com/blog/study-germans-willing-to-pay-a-monthly-fee-for-facebook-services/.

Folkinshteyn, D. and Lennon, M. (2016) "Braving Bitcoin: A technology acceptance model (TAM) analysis"*, Journal of Information Technology Case and Application Research*, Vol 18, No. 4, pp 220-249.

Gefen, D., Karahanna, E. and Straub, D.W. (2003) "Trust and TAM in Online Shopping: An Integrated Model", *MIS Quarterly*, Vol 27, No. 1, pp 51-90.

Ginner, M. (2018) *Akzeptanz von digitalen Zahlungsdienstleistungen. Eine empirische Untersuchung am Beispiel von Mobile Payments mittels Smartphones im stationären Handel,* Springer Fachmedien Wiesbaden, Wiesbaden, pp 139-200.

GP Bullhound (2018) "TOKEN FRENZY. The fuel of the blockchain", [online], https://cdn2.hubspot.net/hubfs/4119751/GPB%20Research%20Reports/GP%20Bullhound%20Research%20-%20Cryptocurrencies%20-%202018.pdf, p. 30.

Hayes, S.C. (2001) Acceptance and Change, Psychology of. In Smelser, N.J. and Baltes, P.B. (Eds.), *International Encyclopedia of the Social and Behavioral Science*, Vol 1, pp 27-30, Oxford, UK: Elsevier.

Homburg, C. (2017) *Grundlagen des Marketingmanagements: Einführung in Strategie, Instrumente, Umsetzung und Unternehmensführung*, Springer Gabler, Wiesbaden, pp 70-85.

Investing.com (2021) "All Cryptocurrencies", [online], https://www.investing.com/crypto/currencies.

Kannenberg, A. (2020) "Novi statt Calibra: Facebook benennt seine Libra-Geldbörse um", [online], Heise, https://www.heise.de/news/Novi-statt-Calibra-Facebook-benennt-seine-Libra-Geldboerse-um-4765573.html.

Kurz, H., Richert, J., Hurr, E. and Hartwig, J. (2014) "Vertrauen - Kompetenz - Innovation: SYRACOM Trendstudie. Virtuelle Währung", [online], SYRACOM AG, https://www.syracom.de/fileadmin/user_upload/Downloads/Studien/syracom-Trendstudie-Virtuelle-Waehrungen-2013.pdf.

Magerhans, A. (2016) *Marktforschung: Eine praxisorientierte Einführung*, Springer Fachmedien Wiesbaden, Wiesbaden. pp 212-300.

Muthitcharoen, A.M., Palvia, P.C. and Grover, V. (2011) "Building a Model of Technology Preference: The Case of Channel Choices", *Decision Sciences*, Vol 42, No. 1, pp 205–237.

PwC (2020) "Gen Z is Talking. Are you Listening? #3 of PwC europe Consumer Insight series", [online], PwC, https://www.pwc.de/de/handel-und-konsumguter/gen-z-is-talking-are-you-listening.pdf, pp 3-15.

Work in Progress Paper

Corporate Pre-Incubator: New Platform for University-Business Collaboration

Marcin Bielicki and Adam Weinert
Poznan University of Economics and Business, Poland
marcin.bielicki@ue.poznan.pl
adam.weinert@ue.poznan.pl
DOI: 10.34190/EIE.21.104

Abstract: We introduce the new concept of corporate pre-incubator. In this model, the corporation becomes the entity responsible for running the pre-incubation process. This change is primarily driven by the desire to meet the goals of a specific corporation using the pre-incubation method. Our research used the case study of a leading Polish multinational company, which decided to implement the pre-incubation within its structures. The most important goals realised by utilising the pre-incubation include outsourcing R&D, searching and training individual talented students and whole project teams, promoting intrapreneurship in the organisation, and employer branding. In the article, we also indicate why the corporation decided to organise the pre-incubation process for students. The key reasons are the desire to build interdisciplinary teams, addressing critical competencies for the corporation in the program, which is not fully developed in the existing study programs, or promoting the organisation as a good place for development for talented students. Our work contributes to the growing literature on pre-incubation, entrepreneurship, and intrapreneurship. It shows how well-known tools can be used in a new environment to overcome existing barriers.

Keywords: intrapreneurship, entrepreneurship, corporate pre-incubator, pre-incubation

1. Introduction

Pre-incubation is analysed almost exclusively from supporting the creation of new companies (Deutschmann, 2007; Wirsing et al., 2002). Pre-incubators are considered a place where learning takes place in, about, and for the enterprise (Kirby, 2004) that is why they are even called "entrepreneurial schools of tomorrow" (Albert & Gaynor, 2003).

The first program, called "pre-incubator", has been established in 1997 at the University of Bielefeld within the USINE European Union project (Wirsing et al., 2002). Since then, the pre-incubators has developed significantly (Bielicki & Stevenson, 2020). Their role also changes with the evolution of the whole process of supporting entrepreneurship. Today, pre-incubators are no longer regarded merely as preparation for incubation. For example, they can be an integral part of studies, where students can obtain academic credits. Their aim is no longer to create entrepreneurs but entrepreneurial people - the professionals of the future (Heikkinen & Stevenson, 2016).

The effectiveness of these team-based, problem-based and interdisciplinary learning programmes can be also beneficial for corporations. However, the role of pre-incubation in developing intrapreneurship within an existing organisation has not received sufficient attention from researchers. To shed more light on this, we explore a corporate pre-incubation program established within one of the biggest Polish international corporations – Amica. We aim to increase our understanding of how pre-incubation can be used in this new context. Therefore our research questions is: *What corporate goals can be achieved through a pre-incubation programme?*

Amica is an ideal setting for our research for two reasons. First, to our knowledge, it is the first corporate pre-incubation programme in the world, and certainly the first in Poland. Its assumptions function similarly to LAB studio - a pre-incubation model developed in Finland and currently used, among others, in Belgium, Nepal, or Slovakia. Second, we have been involved in establishing this programme from the idea of developing and implementing such a tool. It gives us direct access to data on both student teams and corporate employees.

Currently, the program is in its pilot phase, and the entire process is documented in a case study. It involves five interdisciplinary student teams from Poznan University of Technology, Poznan University of Life Science, Poznan University of Economics and Business. These teams cooperate to solve corporations' real problems and develop their competence in entre- intrapreneurship. The need for such a program stemmed from the three phenomena

described later in the text: competencies mismatch, seeking a fresh perspective on corporate problems (development project outsourcing), and building a relationship with the university.

We offer three key contributions. First, we extend the literature examining the role of pre-incubation in developing entrepreneurial competencies (Rajaniemi et al., 2005; Zeps et al., 2009). Specifically, we show how it can be used to foster intrapreneurship. Second, we contribute to growing literature on competencies mismatch (Holtzman & Kraft, 2010; Tomlinson, 2007), showing how a corporation can supplement the formal education system with its programmes. Finally, our paper is helpful for practitioners. We show how particular corporate goals can be achieved through the pre-incubation program. As a result, it can lead to better company performance.

2. Literature review

2.1 Competences mismatch

One of the key reasons why a corporation decides to implement its programme to complement formal education is the phenomenon that occurs – competencies (skills) mismatch (Bielicki, 2018). One of the critical shortcomings of the Polish higher education system is the small number of programmes offering interdisciplinary learning, team-based or project-based learning. Research shows that most students and employers in the Polish education system rate the entrepreneurship and project management competencies acquired during studies low. One reason for this may be that most degree programmes prepare students to work in complex corporate structures rather than small, agile teams or startups (Rzempala, 2019). Therefore, it was necessary to complement this system with the competencies of so-called 21st-century skills. These include disciplinary knowledge, self-awareness, innovation/creativity, critical thinking/civil literacy, responsibility and global awareness, communication and collaboration (Karjalainen et al., 2016).

2.2 Project outsourcing

Outsourcing projects and strategic outsourcing considered as an option for enterprise development generally brings some opportunities and threats. The possible benefits of outsourcing enterprise projects to students, young project managers and student teams include getting out-of-the-box ideas, the chance to get a different perspective from the younger generation. It can be considered a form of crowdsourcing (Huberman, 2008) or open innovation (Teirlinck & Spithoven, 2013).

However, most companies have considerable difficulties accessing student projects verified in terms of an idea, team, and adopted project management methodology. It is also perceived that there is a lack of time and resources to engage in substantive issues of such cooperation, to which one has to delegate one's employees who have to act as a student mentor anyway. Many of the employer branding activities carried out are oriented towards mass actions, bringing corporate benefits. There is less behaviour among companies to reach out with targeted efforts to selected groups of students, which would increase such cooperation. Certainly, the benefits also include the acquisition of product-specific knowledge, e.g., social and environmental, which can be used to create new products or complementary products within the company. However, the most significant advantage of such a solution is building the image of a socially responsible company at the junction of CSR activities and Employer Branding (Kashive et al., 2020).

2.3 Collaboration with the university

The project, which involves students finding solutions to company problems, is also an opportunity to generate collaboration and networking within the company's existing organisational structure. Besides, it contributes to the natural support of the academic environment. It creates an environment in which awareness of real market issues and challenges within the company is built. What is more, it is a chance to foster regular cooperation with the scientific circles and their subsequent recruits and extend the project within the framework of mutual learning and organising subsequent editions of the corporate student pre-incubation program. It is worth mentioning that the model of such a program assumes that students work in interdisciplinary teams, developing solutions to real problems submitted by organisations. Involved mentors and coaches support the groups in their work and positively influence company employees' changes. Students, in turn, increase their competencies, being much better prepared to work in a company, as they have already learned its specificity and particular needs and problems.

3. Data and methodology

The data collected for the project case study includes three periods. The first covers the time from January to April 2021. During this time, the team responsible for creating and implementing this programme within the company's structure met regularly. During these meetings, representatives of the management board, HR, R&D, production and marketing departments determined what goals should be pursued within the programme. The second period from May to September 2021 covers the recruitment of students to the programme. The third, from October 2021 to March 2022, is the pilot edition of the programme. Students will solve challenges submitted by the company's various departments during this time while gaining entrepreneurial competencies.

4. Discussion

Corporate pre-incubation program is aimed primarily at strengthening cooperation between talented students and entrepreneurs. Due to prolonged changes in the Polish education system, the corporation took the initiative, wanting to solve several problems simultaneously, such as competencies mismatch, improving the image of the academy employer, strengthening innovation inside the company. The results of the pilot edition will determine whether and to what extent these goals will be achieved.

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References

Albert, P., & Gaynor, L. (2003). National Contexts, Incubator Families and Trends in Incubation - Views From Four Countries.

Bielicki, M. (2018). Labour market mismatch among graduates. Similarities and differences between nations using HEGESCO database. Przegląd Naukowo -Metodyczny. Edukacja Dla Bezpieczeństwa, 38(1), 305–320.

Bielicki, M., & Stevenson, B. (2020). Business Pre-Incubators as Structures for Change Toward the Entrepreneurial and Third Generation University. ECIE 2020 16th European Conference on Innovation and Entrepreneurship, 120.

Deutschmann, M. (2007). What difference a “pre” makes: University business preincubators in Germany. A national survey. Lüneburger Beiträge Zur Gründungsforschung, 5, 1–12. www.gmlg.de/32.0.html

Heikkinen, K.-P., & Stevenson, B. (2016). The LAB studio model: Enhancing entrepreneurship skills in higher education. International Journal of Innovation and Learning, 20(2), 154–168. https://doi.org/10.1504/IJIL.2016.077846

Holtzman, D., & Kraft, E. (2010). Skills Required of Business Graduates: Evidence from Undergraduate Alumni and Employers. 2.

Huberman, B. A. (2008). Crowdsourcing and attention. Computer, 41(11), 103–105. https://doi.org/10.1109/MC.2008.450

Karjalainen, J., Törmälä, U.-M., & Heikkinen, K.-P. (2016). Oamk LABs practices for bridging work life 21th century skills and higher education. UAS Journal, Special Issue: EAPRIL 2016.

Kashive, N., Khanna, V. T., & Bharthi, M. N. (2020). Employer branding through crowdsourcing: understanding the sentiments of employees. Journal of Indian Business Research.

Kirby, D. (2004). Entrepreneurship education and incubators: pre-incubators, incubators and science parks as enterprise laboratories.

Rajaniemi, L., Niinikoski, E. R., & Kokko, E. (2005). Pre-incubation in Higher Education. Examples of pre-incubatuion and some critical conditions to be taken into account in order to establish pre-incubation activities.

Rzempala, J. (2019). Developing students' competences in project management in Poland--a case study of IPMA-Student Certification. 5th IPMA SENET Project Management Conference (SENET 2019), 121–125.

Teirlinck, P., & Spithoven, A. (2013). Research collaboration and R&D outsourcing: Different R&D personnel requirements in SMEs. Technovation, 33(4), 142–153. https://doi.org/https://doi.org/10.1016/j.technovation.2012.11.005

Tomlinson, M. (2007). Graduate employability and student attitudes and orientations to the labour market. Journal of Education and Work, 20, 285–304. https://doi.org/10.1080/13639080701650164

Wirsing, B., Traude, A., Steffens, J., Sheen, M., Löffler, B., de Lapparent, D., Broadfoot, C., & Alonso-Gonzalez, J.-L. (2002). Becoming an Entrepreneur for a Trial Period: The Pre-Incubation Experience. The International Journal of Entrepreneurship and Innovation, 3(4), 265–277. https://doi.org/10.5367/000000002101299312

Zeps, V., Avotins, V., Grineviča, A., Lukaša, N., Brakovska, V., & Zariņš, K. (2009). Pre-Incubation and Incubation in Latvia: Assessment of Some Critical Conditions' To Establish Efficient Incubation Cycle. 4th International Conference Information Society and Modern Business "The Role of Regional Centers in Business Development," May.

Embedding Innovation and Entrepreneurship in Engineering Education Through Curriculum Development and Educator Training: A Case From Denmark

Casper Friberg and Mette Lindahl Thomassen
VIA University College, Denmark
cafr@via.dk
melt@via.dk
DOI: 10.34190/EIE.21.265

Abstract: Challenges faced by society today, from climate change, social inequality, and health issues, calls for graduates who can contribute to create future proof solutions, graduates who are entrepreneurial and innovative in thoughts and actions. With their technical background, engineers hold key roles in developing solutions for future challenges and needs. This raises the question: How can education ensure that students graduate with entrepreneurial skills and competences, which enable them to create new value for others through action? To answer the call for innovative and entrepreneurial engineers VIA Engineering are undergoing a transformation of structure and content of all 7 engineering programs. Cornerstones in the transformation are a keen focus on Sustainability, Digitization, Entrepreneurship & Innovation and Problem Based Learning. VIA Engineering is based in Denmark with approx. 1.150 students and 80 teachers split on 7 programs. The programs are Machine, Material, Civil, Manufacturing, Global Business, Supply and Software. The planning of the restructuring started in 2019 and is effective from Summer 2021. This contribution will present the work done in relation to Entrepreneurship & Innovation. Inspired by Handscombe et al. (2009), who found that the most effective way of fostering Enterprising graduates in Engineering is by embedding entrepreneurial learning activities throughout the education in existing curricular, this contribution focuses on how this embedment can be operationalized and achieved. The contribution suggest a framework for progression in learning objectives at Engineering programs and an outline for developing competencies for educators to embed the new learning objectives. In extension, a shortlist of potential challenges/barriers is presented. **Why is this interesting**? There is an abundant number of arguments for including innovation & entrepreneurship in higher education. Yet challenges remain in relation to embedding innovation & entrepreneurship into entire educations in practice. The contribution present a contextualized attempt of doing so and condense general takeaways from the process.

Keywords: embedding entrepreneurship and innovation, curriculum development, educator training

1. Introduction

Entrepreneurship education has in the past decades gained traction and positive attention from policy-makers because it is believed instrumental for economic growth and technological development (Reynolds et al., 1994, Sheshinski et al., 2007). With the proliferation of entrepreneurship education from business to STEM, arts and humanities other attributes have been identified i.e effects on employability (Berglund, 2013) and positive social impact (Brock & Steiner 2009). However, due to the context dependency of entrepreneurship education (Thomassen et al, 2020), there is no one size fits all. Still there is a number of unanswered questions relating to how entrepreneurial graduates are fostered during education.

This contribution present the preliminary work done to embed innovation & entrepreneurship as a stream into the curriculum of the engineering educations at VIA UC.

The terms innovation and entrepreneurship are capacious and numerous definitions coexist. Therefore, initially definitions were agreed upon before further development was done. The definitions chosen are as follows:

- 1: Innovation is to develop new solutions
- 2: Entrepreneurship is to act on opportunities and ideas to create value for others

The next step was to identify relevant knowledge, skills and competences to formulate learning goals and suggest a progression. To identify them inspiration was found in the EntreComp framework (2021). EntreComp is a reference framework identifying knowledge, skills and attitudes of an entrepreneurial mind-set. Inspired by this framework relevant knowledge, skills and competences were identified and categorised into 3 major categories: Idea & Opportunities, Ressources and Take Action.

The final categorisation is illustrated in figure 1 below.

Figure 1: Overview categories and skills/competences

At VIA University College Engineering department all programs have a duration of 7 or 9 semesters, including internship in 5th or 6th semester.

Thus, the progression within each final learnings goal of becoming Innovative and Entrepreneurial engineers needs to be split across all semesters, see section 2.

Next step is to educate and train all educators in this approach. See section 3.

2. Innovation and entrepreneurship progression in learning objectives

In this section, examples of the progression in learning goals are presented to give an insight to how the final categorised learning goals will be presented.

Each table is showing the suggested semester of the specific learning goal, the learning goals and finally the SOLO taxonomy level of the learning goal shown.

2.1 Area: Idea and opportunities

This section focuses on the initiation of the innovative and entrepreneurial process. The students are to be able to take an idea or see an opportunity and run with it. To do that they need to have Creativity. The ideas or opportunities need to have base in needs of the customers/users. Too often, it is seen that student's ideas or opportunities is based on their own ideas and believe instead of the needs of the future customers/users. This is the second subject within this area. The third subject in this area is the need to be able to validate the ideas or opportunities concerning creating value for the customer/user in question. If it only creates value for the manufacturing company, it is not valuable for the customer/user to buy, invest in, etc. Finally, the last subject is first of all Sustainability, which is the number one topic in this decade. Others will follow and thus this can change in the future. Second, it is ethics. Students need to think of ethics in developing ideas or opportunities. Especially since technology makes it possible to do things that was thought impossible just 10 years ago.

In table 1 the progression of creativity learning goals is shown and there suggested placement during the student's education.

Table 1: Learning goals for creativity, categorised based on semester placement and solo level

Suggested semester	LEARNING GOALS	SOLO Level
2.	Identify creative and purposeful ideas/solutions	2
4.	Describe creative and purposeful ideas/solutions	3
6.	Develop creative and purposeful ideas/solutions	4

2.2 Area: Resources

This area focuses on the resources available and used for succeeding in developing the idea or opportunity. Resources are not only the machines, equipment, finances, knowledges, etc. needed to do it, but also the students own capabilities. It is vital that students understand and know them self in relation to their capabilities, strengths and weaknesses. This way they also know where they need help and perhaps who they need in their network to help them in their project.

Even though students know them self, does not mean that they also act. They need Self-efficacy and courage to do it despite the unknown factors present.

Then they need to think critically about their decisions, results, methods, solutions, etc.

Finally, persistency is key subject in this area. Despite setbacks, errors, unexpected outcome, risk occurring, etc. entrepreneurs need to push on and believe in the project of theirs till the end.

In table 2 the progression of subject Self-Awareness learning goals are shown and their placement in the student's education.

Table 2: Learning goals for self awareness, categorised based on semester placement and solo level

Suggested semester	LEARNING GOALS	SOLO Level
1.	Identify your own means Describe and apply your own means	2 3
6.	Analyze and argue the use of your own means in value creating processes	4

2.3 Area: Take action

This area focuses on what needs to be done to succeed. It is important to act on opportunities or when an idea is spotted, which include knowing what to do when it happens.

This requires that all students have the competences to plan, facilitate and manage for instance the innovation process incl. prototyping. Prototyping is seen as a separate subject in this area because it is relevant to have clear knowledge, skills and competences on this process. Whenever tasks are done it is important to do it with a reflective approach. It is important to understand or know why something became a success or why the outcome did not turn out as planned. Which leads to the ability to cope with uncertainties or risks, because they will be there.

All of above is needed to be done in a certain context that student's need to be able to navigate in, for instance an organisation of a company.

In table 3 the progression of subject Act on Opportunities learning goals are shown and there suggested placement during the student's education.

Table 3: Learning goals for Act on opportunities, categorised based on semester placement and solo level

Suggested semester	LEARNING GOALS	SOLO Level
3.	Can identify methods to plan and succeed with planned actions Can identity possible opportunities	2
4.	Can execute on planned tasks to achieve goal Can execute on possible opportunities	3
Internship	can execute and work independently to achieve goals	3
6.	Can take responsibility of an innovative process working with interdisciplinary challenges	4
7.	Design and implement products, solutions or services that create value	4

3. Educator training

One thing is to plan an embedment of innovation and entrepreneurship, another thing is to implement it. Studies have showed that the most effective method for embedding enterprise in science and engineering is through toning existing curriculum taught by current faculty (Handscombe et al, 2008). To best prepare educators for this task a competence development course is developed[1] for relevant faculty members. The course is practical oriented and consist of three workshops. The workshops help educators to create learning designs that incorporate learning goals in sustainable innovation and entrepreneurship.

Table 4 provides an overview of the course. Currently the first pilot workshop has been conducted and the rest will follow in the fall semester 2021. It is planned to use the social learning platform LoopMe (LoopME, 2021) to monitor student developments in the learning experiments during the course.

Table 4: Sustainable innovation and entrepreneurship in engineering education

Preparation	**Watch introductory tutorial, read articles and watch videos about sustainability, entrepreneurship, entrepreneurship education and working with sustainability in engineering education.**
Workshop1	Presentations and plenary discussions focusing on: - Introduction and purpose of the course - Definitions - Learning objectives and competencies in sustainability and entrepreneurship - The role of the teacher and to support entrepreneurial competencies - Entrepreneurship in a VIA and engineering context - The entrepreneurial learning process - Planning form for teaching experiment - Evaluation of workshop 1 and preparatory material.
Planning experiment	Select relevant learning objectives for sustainable entrepreneurship and plan learning experiments to help students achieve them.
Workshop 2	Participants present their planned experiments and receive feedback.
Experimenting	During the semester, the educators conduct the learning experiments and asses the effects.
Workshop 3	Evaluation of the learning experiment and identification of next best steps.

After completing educator training, the educator should be able to:

- define the concepts entrepreneurship, innovation and sustainability
- identify opportunities in own practice to incorporate entrepreneurship, innovation and sustainability, possibly in collaboration with semester team
- argue for and justify the inclusion of entrepreneurship, innovation and sustainability in teaching

[1] The development of this course was partially funded by Young enterprise Denmark- Fonden for entreprenørskab.

- support students' development of entrepreneurial competencies in teaching and reflect on their own role in the course
- bring relevant disciplines into play and involve the relevant context in entrepreneurial processes
- use the PACE model in whole or in part in the work of designing learning courses
- design, carry out and evaluate learning experiments that include elements from workshops

4. Conclusion

This contribution suggests embedding entrepreneurial learning goals and train current faculty to support the development of entrepreneurial graduates.

Currently the suggested progression and method of educator training is work in progress. However, challenges are already now emerging. Available hours for educators to train and implement entrepreneurship education is limited due to financial constraints. The educators are already pushed on priority of their hours due to budget constraints. On the plus side several educators are already applying to the learning goals despite not being explicit present in the course descriptions. In this case a greater focus on formulating relevant learning goals and developing methods for evaluating learning outcome is a minor adjustment relative to current practice.

The advocated approach to developing student's entrepreneurial competences is not a re-invention of current curriculum. It should rather be viewed as toning of current educational content and achieving additional learning objectives through change in teaching method.

References

Berglund, K. (2013) Fighting against all odds: Entrepreneurship education as employability training. *Ephemera: Theory and politics in organization.* Pp 717-735.

Brock, Debbi D. and Steiner, Susan, Social Entrepreneurship Education: Is it Achieving the Desired Aims? (February 16, 2009). Available at SSRN: https://ssrn.com/abstract=1344419

LoopME. (2021). Retrieved from https://www.loopme.io/

EntreComp (2021), https://ec.europa.eu/social/main.jsp?catId=1317&langId=en

Handscombe RD, Rodriguez-Falcon E, Patterson EA(2009). Embedding Enterprise in Engineering. International Journal of Mechanical Engineering Education. 37(4):263-274.

PACE (2021). https://mgmt.au.dk/research/innovation-entrepreneurship-and-information-systems/research/icare/pace/pace-work-book-in-english/

Reynolds, P. Storey,D. Westhead, P. (1994). Cross-national comparisons of the variation in new firm formation rates. *Regional Studies*, 28, pp. 443-456

Sheshinski,E. Strom, R. Baumol, W. (2007) Entrepreneurship, Innovation, and the Growth Mechanism of the Free-enterprise Economies. Princeton University Press, Princeton Thomassen, M.L., Williams Middleton, K., Ramsgaard, M.B., Neergaard, H. and Warren, L. (2020), "Conceptualizing context in entrepreneurship education: a literature review", International Journal of Entrepreneurial Behavior & Research, Vol. 26 No. 5, pp. 863-886. https://doi.org/10.1108/IJEBR-04-2018-0258

Towards Enhancing Social Entrepreneurial Intention in Secondary School Contexts

Ronan McArt[1], Veronica McCauley[2] and Paul Flynn[2]
[1]St. Angela's College, Sligo, Ireland
[2]National University of Ireland, Galway, Ireland
rmcart@stangelas.nuigalway.ie
veronica.mccauley@nuigalway.ie
paul.flynn@nuigalway.ie
DOI: 10.34190/EIE.21.044

Abstract: Social Entrepreneurs have the potential to address the unmet needs of disadvantaged communities providing both economic and social benefits. Existing models of Social Entrepreneurial Intention demonstrate a pathway to future intent and early educational intervention has proven beneficial to increasing the intention of young people to think and act entrepreneurially. However, a dearth of adoptable evidence exists within the field of entrepreneurship education exemplifying the social interactions that enhance or sustain social entrepreneurial intention in second level educational settings. This paper argues for the adoption of a social constructionist approach to entrepreneurship education with the express aim of increasing social entrepreneurial intention in participating second level students. The authors present a multi-ontological framework, building on existing models, that aims to enhance social entrepreneurial intention amongst Irish secondary school students ages 15-17 years. It is intended that this framework will inform the development, and assess the effectiveness, of a designed academic unit that requires the formation of teams and the production of an artefact to solve an environmental problem in their local community. This paper and the future findings from this research will be of interest to those involved in the delivery of entrepreneurship education, both in formal and non-formal settings.

Keywords: education, entrepreneurship education, entrepreneurial intention, social entrepreneurship, social constructionism

1. Introduction

Social entrepreneurship, a blend of social mission and business strategies, seeks to address the needs of marginalised communities through the actions of social entrepreneurs, addressing market disequilibria to the benefit of marginalised communities (Blundel et al. 2018). Entrepreneurial Intention (EI) is considered a reliable predictor of entrepreneurial behaviour (Obschonka et al, 2010). Accordingly, Social Entrepreneurial Intention (SEI) refers to the intent of an individual to pursue the creation of a social venture and to acquire resources necessary to become a social entrepreneur (Mair & Naboa, 2006). Entrepreneurship education has a significant role to play in explicitly increasing student intention towards such venture creation (Sánchez, 2013) but there is little empirical evidence regarding the impact of social entrepreneurship education (Hockerts, 2018). Early exposure to entrepreneurship education matters. Children that develop entrepreneurial competencies at 14-15 have higher entrepreneurial intentions later in life, yet there is a lack of research in entrepreneurship education below third level education (Floris & Dettori, 2019; Obschonka et al., 2010), and this is compounded by a dearth of research on the impact of course content and methods of instruction on SEI (Tan et al., 2020).

Hockerts (2018) found success designing and implementing social entrepreneurship education utilising social learning theory in university settings. Social constructionism, relatively new to entrepreneurship, challenges the dominant cognitive approach (Down, 2010). In social constructionist learning, students engage in the conscious construction of an artefact in workshop style collaborative environments where individuals learn as part of a larger group (Reynolds, 2016). A social constructionist perspective of entrepreneurship education offers an alternative view of entrepreneurship, avoiding the traditional view with its focus on the individual (Kalden et al., 2017). More interventions are required to validate the impact of social learning on SEI formation (Hockerts, 2018). This work responds to this call and presents the merits of adopting a social constructionist, multi-ontological framework in entrepreneurship education with the express aim of increasing Social Entrepreneurial Intention (SEI) in participating second level students.

2. Conceptual framework

The first model designed specifically for SEI formation was developed by Mair & Naboa (2006). Hockerts (2015) later found two sub-constructs of the original model empirically unfit (Perceived Desirability and Perceived

Feasibility) and a four factor model a better fit (Hockerts, 2015). A revised model by Hockerts (2017) added the construct of Social Entrepreneurial Experience and found good fit.

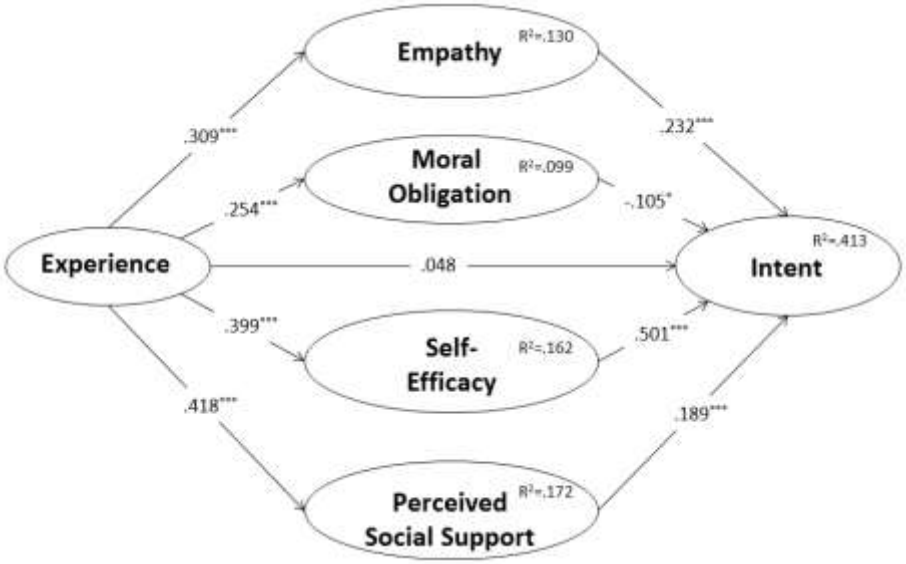

Figure 1: Hockerts revised model of SEI (2017, p46)

This empirical research proposes adapting and testing constructs utilised by Hockerts' (2017) revision of the Mair and Naboa (2006) framework, removing the construct of Social Entrepreneurial Experience (students will have no prior experience) and adding the construct of engagement to a multi-ontological framework of collaboration, empathy and engagement which will inform the design of a social entrepreneurship education intervention aimed at enhancing SEI in second level students. The broader construct of empathy shall also account for moral obligation through behavioural empathy, and the broad construct of collaboration will account for efficacy and social support. The changes proposed make the model more suitable to implementation and study across secondary school contexts.

3. Empathy in student social entrepreneurship

Empathy refers to the ability to share emotions, understand emotional states and respond empathically to another person or group (Silke et al., 2018; Davis, 1983). Empathy has long been considered an antecedent of SEI (Mair & Naboa, 2006). Traditional teaching methods such as didactic approaches are insufficient and contextually constrained regarding the development of social entrepreneurial empathy (Hockerts, 2018). In contrast, a designed programme employing a social constructionist approach to educational design has the capacity to increase empathy by providing opportunities to develop prosocial behaviours (Le et al., 2020), inspire students to consider needs from user perspectives and underpin behaviours that create social value (Rambe & Ndofirepi, 2019).

4. Collaboration in student social entrepreneurship

Despite a focus on teamwork in innovation, entrepreneurship is often seen as a solo endeavour. Better understanding of how the individual develops as part of a collective is required. Forster and Grichnik (2013) understood Perceived Collective-Efficacy (PCE), the group's belief in its collective capabilities to facilitate the provision of resources, had a significant impact on social entrepreneurial activities. PCE may be developed through collaborative learning, the process of combining the academic effort of a community of learners (Smith & MacGregor, 1992). Designed collaborative engagement, as part of a social constructionist context, is student driven, where freedom to work collaboratively in planning and designing an artefact is an important learning experience (Reynolds, 2016).

5. Engagement with student social entrepreneurship

Student engagement, traditionally a measure of attendance, must include active participation and cognitive, affective, and behavioural involvement to be successful (Taylor & Parsons, 2011). Engagement, in the context of entrepreneurship education, may be realised by focusing on learning outcomes, student motivation, task freedom and collaboration between students and teacher/students (Balan & Metcalfe, 2011). Recent

technological developments and increased prevalence of social media technology facilitate student learning enhancing opportunities for collaboration (Chu et al. 2017), stretching the idea of traditional learning environments, negating barriers such as traditional classrooms and approaches that impact student collaboration and engagement (Kariippanon et al., 2019).

6. Designing to enhance social entrepreneurial intention

This research will employ a Design-Based Research (DBR) approach, enabling research to be conducted in an educational setting with cyclical analysis and improvement after each iteration (Barab & Squire, 2004). As part of this process a project-based learning approach will be implemented with the aim of creating the conditions to enhance SEI (Kim, 2020) informed by the multi-ontological framework detailed in the previous section. Design Thinking principles (Armstrong, 2016) will frame student engagement with the learning experience. Student participation will be contextualised by a challenge to solve a community based social problem. Students will work within teams and learn varying skills. Their final artefact will be a collaborative creation reflecting the collective knowledge and experience of the team (Reynolds, 2016). Of interest to this study, is how students collaborate and how the students and educators perceive collaboration to successfully contribute to the production of an artefact solving a community problem. DBR approaches can often be unclear, Conjecture Mapping (Sandoval, 2014) serves to conceptualise the process. Figure 2 below illustrates the Conjecture Map for this research.

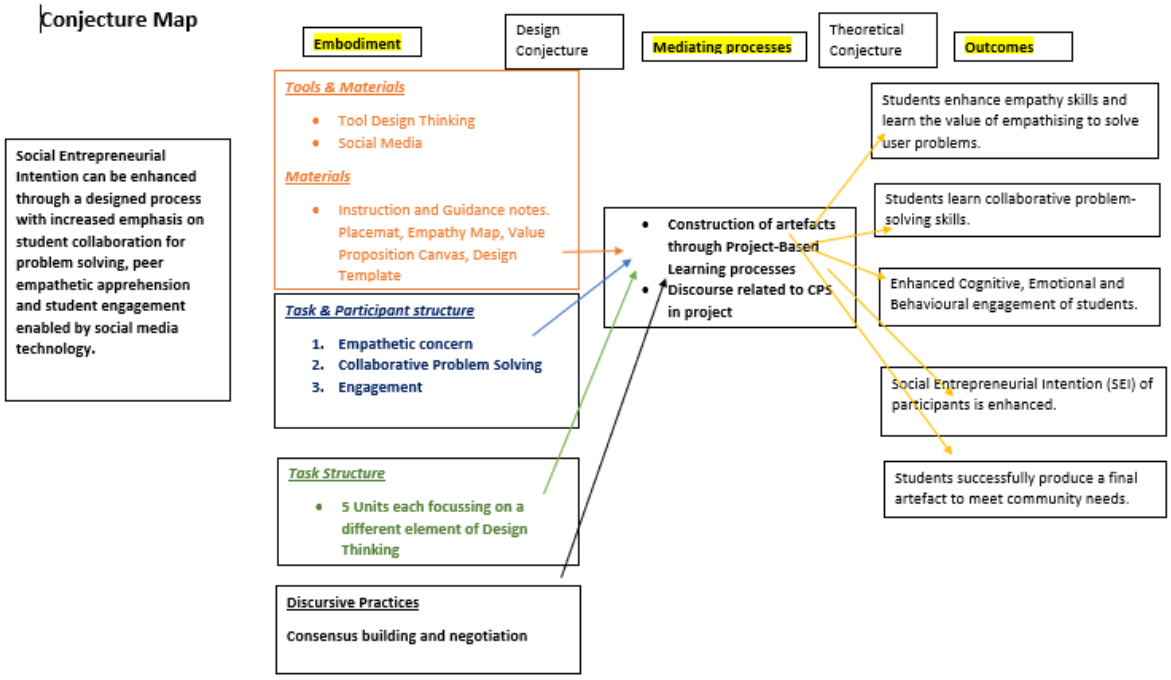

Figure 2: Conjecture map for proposed research process

This research seeks to test adapted constructs of a proven model in a novel context and uncover the mediating effect of the designed programme of entrepreneurship education on SEI in a second level education setting. It is expected the results will reveal that entrepreneurship education with a focus on social interaction, mediated through a problem-solving process, can lead to increased Social Entrepreneurial Intention. Findings from this research will be of interest to those involved in the delivery of entrepreneurship education.

References

Armstrong, C. E. (2016) "Teaching Innovation Through Empathy", *Management Teaching Review*, 1(3), 164–169. https://doi.org/10.1177/2379298116636641

Balan, P., & Metcalfe, M. (2012) "Identifying teaching methods that engage entrepreneurship students", *Education and Training*, 54(5), 368–384. https://doi.org/10.1108/00400911211244678

Barab, S., & Squire, K. (2004) "Design-Based Research: Putting a Stake in the Ground", *The Journal of Learning Sciences*, 13(1), 1–14.

Blundel, Richard, Lockett, Nigel and Wang, Catherine (2018) *Exploring Entrepreneurship: Second Edition*, Sage Publications Limited, London.

Chu, S. K. W., Capio, C. M., van Aalst, J. C. W., & Cheng, E. W. L. (2017) "Evaluating the use of a social media tool for collaborative group writing of secondary school students in Hong Kong", *Computers and Education*, 110, 170–180. https://doi.org/10.1016/j.compedu.2017.03.006.

Davis, M. H. (1983) "Measuring Individual Differences in Empathy: Evidence for a Multidimensional Approach", *Journal of Personality and Social Psychology*, 44(1), 113–126.

Down, Simon (2010) *Enterprise, Entrepreneurship and Small Business*, Sage Publications Ltd, London.

Floris, M., & Dettori, A. (2020) "Fostering Early Entrepreneurial Competencies: An Action Research Approach", In Arslan-Cansever, B., & Önder-Erol, P. (Ed.), *Sociological Perspectives on Educating Children in Contemporary Society* (pp. 259-281). IGI Global. http://doi:10.4018/978-1-7998-1847-2.ch011

Forster, F., & Grichnik, D. (2013) "Social Entrepreneurial Intention Formation of Corporate Volunteers", *Journal of Social Entrepreneurship*, 4(2), 153–181. https://doi.org/10.1080/19420676.2013.777358

Hockerts, K. (2015) "The Social Entrepreneurial Antecedents Scale (SEAS): a validation study". *Social Enterprise Journal*, 11(3), 260–280. https://doi.org/10.1108/sej-05-2014-0026

Hockerts, K. (2017) "Determinants of Social Entrepreneurial Intentions". *Entrepreneurship: Theory and Practice*, 41(1), 105–130. https://doi.org/10.1111/etap.12171

Hockerts, K. (2018) "The Effect of Experiential Social Entrepreneurship Education on Intention Formation in Students", *Journal of Social Entrepreneurship*, 9(3), 234–256. https://doi.org/10.1080/19420676.2018.1498377

Kalden, J. N., Cunningham, J., & Anderson, A. R. (2017) "The social status of entrepreneurs: Contrasting German perspectives", *International Journal of Entrepreneurship and Innovation*, 18(2), 91–104. https://doi.org/10.1177/1465750317706439

Kariippanon, K. E., Cliff, D. P., Lancaster, S. J., Okely, A. D., & Parrish, A. M. (2019) "Flexible learning spaces facilitate interaction, collaboration and behavioural engagement in secondary school", *PLoS ONE*, 14(10). https://doi.org/10.1371/journal.pone.0223607

Kim, K. J. (2020) "Project-based learning approach to increase medical student empathy", *Medical Education Online*, 25(1). https://doi.org/10.1080/10872981.2020.1742965

Le, T. T., Nguyen, T. N. Q., & Tran, Q. H. M. (2020) "When giving is good for encouraging social entrepreneurship", *Australasian Marketing Journal*, 28(4), 253–262. https://doi.org/10.1016/j.ausmj.2020.05.005

Mair, J., and E. Noboa. 2006. Social Entrepreneurship: How Intentions to Create a Social Venture Get Formed. In J. Mair, J. Robinson, and K. Hockerts (Eds.), Social Entrepreneurship, 121–136. New York: Palgrave MacMillan.

Obschonka, M., Silbereisen, R. K., & Schmitt-Rodermund, E. (2010) "Entrepreneurial intention as developmental outcome", *Journal of Vocational Behaviour*, 77(1), 63–72. https://doi.org/10.1016/j.jvb.2010.02.008

Rambe, P., & Ndofirepi, T. M. (2019) "Explaining Social Entrepreneurial Intentions among College Students in Zimbabwe", *Journal of Social Entrepreneurship*, https://doi.org/10.1080/19420676.2019.1683878

Reynolds, R. B. (2016) "Relationships among tasks, collaborative inquiry processes, inquiry resolutions, and knowledge outcomes in adolescents during guided discovery-based game design in school", *Journal of Information Science*, 42(1), 35–58. https://doi.org/10.1177/0165551515614537

Sánchez, J. C. (2013) "The impact of an entrepreneurship education program on entrepreneurial competencies and intention", *Journal of Small Business Management*, 51(3), 447–465. https://doi.org/10.1111/jsbm.12025

Sandoval, W. (2014) "Conjecture Mapping: An Approach to Systematic Educational Design Research". *Journal of the Learning Sciences*, 23(1), 18–36. https://doi.org/10.1080/10508406.2013.778204

Silke, C., Brady, B., Boylan, C., & Dolan, P. (2018) "Factors influencing the development of empathy and pro-social behaviour among adolescents: A systematic review", *Children and Youth Services Review*, 94, 421–436. https://doi.org/10.1016/j.childyouth.2018.07.027

Smith, B. L., & MacGregor, J. T. (1992) "What is Collaborative Learning?" *In Goodsell, A.S., Maher, M.R., Tinto, V., Smith, B.L. and MacGregor, J.T. (1992) Collaborative Learning: A Sourcebook for Higher Education*, National Center on Postsecondary Teaching, Learning, and Assessment (NCTLA), Pennsylvania. https://www.researchgate.net/publication/242282475

Tan, L. P., Le, A. N. H., & Xuan, L. P. (2020) "A Systematic Literature Review on Social Entrepreneurial Intention", *Journal of Social Entrepreneurship*, Vol. 11, Issue 3, pp. 241–256, Routledge. https://doi.org/10.1080/19420676.2019.1640770

Taylor, L., & Parsons, J. (2011) "Improving Student Engagement", *Current Issues in Education*, 14(1). http://cie.asu.edu/

How Design Thinking Training Impacts Innovation Capabilities in an Irish Retail Organisation

Aidene O'Mahony
Munster Technological University, Ireland
aidene.omahony@mycit.ie
DOI: 10.34190/EIE.21.035

Abstract: The increasing use of design thinking can be observed through large organisations such as Google and IBM adopting the discipline. Recognized as a driver for innovation, organisations are turning to design thinking education as an approach for increasing organisation innovation capabilities. There has been little research that evaluates the impact of internal design thinking training on internal innovation capability. This research focuses on the internal training activities at Musgrave's Retail Partners Ireland (MRPI), Ireland's largest retail organisation. MRPI have implemented an internal training programme in the form of a *Design Academy* to educate employees about design thinking. The *Design Academy* has been operating over the last 3 years with the goal of educating employees about design thinking techniques and mindsets to encourage change towards innovation culture across the organisation. This work-in-progress paper presents an investigation of the potential impact of internal design thinking training programmes on firm innovation capabilities using existing literature and a case-study analysis. This paper presents an initial literature review and proposed research methodology. The literature review leverages theories from multiple related fields including *business strategy, innovation, organisational behaviour, information systems, design,* and *intrapreneurship.* The proposed research methodology includes a single case-study analysis of MRPI. The primary method of data gathering is semi-structured interviews. Secondary data consists of observations gathered during training sessions and other interactions. The data collection is conducted over a course of 6-8 months. This research is likely to generate significant contributions to academic research in internal innovation training and will have consequent benefits for design thinking education practitioners. The research will contribute to the growing body of design thinking training research and includes an evaluation of the impact of training through the lens of organisation innovation capabilities, providing a unique lens for understanding. Practitioners will also benefit from a formalisation of how specific design training approaches impact the organisation.

Keywords: design thinking, firm innovation capabilities, training, innovation, intrapreneurship

1. Introduction

The increasing use of design thinking can be demonstrated through top global organisations such as Google, SAP, and P&G adopting the discipline (Rauth, Carlgren and Elmquist, 2014; Elsbach and Stigliani, 2018). Design thinking is known as a flexible iterative thinking process that emphasises user involvement and ideation to solve complex problems (Kurtmollaiev *et al.*, 2018). As a result, design thinking is progressively being recognized as a novel approach to implement creative problem-solving and innovative practices (Morehen, Wrigley and Wright, 2014). This paper explores and establishes a research agenda to investigate the use of internal design thinking training through the lens of developing innovation capabilities. The participating case-study have implemented an internal training programme in the form of a *Design Academy* to educate employees about design thinking. The proposed methodology will employ a single case-study approach of the ongoing internal design thinking training programme within an organisation in the food retail industry.

2. Theoretical background

The necessity to continuously innovate and improve products, services, and processes to sustain competitive advantage is one of the driving forces of design thinking growth (Dunne, 2018). The theory of using design thinking to generate innovation first originated in the late 20th century (Buchanan, 1992), and the momentum has only increased with multiple researchers crediting the success of implementing new products and services to this approach (Brown, 2008; Seidel and Fixson, 2013; Liedtka, 2015). There is a growing interest amongst organisational management to understand the tools and techniques used by design thinkers to solve complex problems (Elsbach and Stigliani, 2018). Organisations are often dependent on analytical solutions to solve such problems, which leads to organisations having trouble implementing innovative tools and techniques (Christensen and Overdorf, 2000). Research has emerged that highlights the potential for design thinking as a mediatory between analytical problem solving and exploration of new knowledge to trigger innovation (Martin, 2010). This may be a factor leading to a growing interest in research exploring the opportunity of innovation training. Research from Bassanini and Brunello (2001) reveals that organisations that provide and support employee training programmes have a greater likelihood of fostering innovation. Following this, organisational

innovation capability models could provide a unique lens to help understand the impact of internal design thinking training.

Innovation capability is a relatively new research topic, having originated from work in organisational capability theory. Dismukes (2005) has credited the increasing interest of innovation capability to factors such as the new higher standard of innovation, increasing multi-disciplinary interactions, and escalating wicked problems. Research has shown there is a strong relationship between the success of innovation capabilities and the organisational culture towards innovation (Part, 2008). Early research into firm innovation capability demonstrated that firm innovation was the result of organisational culture moving towards embracing new ideas (Hurley and Hult, 1998). A culture that supports creativity, risk-taking and teamwork are likely to experience an increasing innovative work environment (Part, 2008). Organisations that demonstrate an emphasis on learning are also likely to generate greater innovation capability (Damanpour, 1991). Further research has shown that the presence of in-house R&D significantly increasing a firm's innovation capability (Fan, 2006), which encourages the potential of an internal training programme focused on insight and developing greater understanding of stakeholders, markets, and resources. Such commonalties between design thinking and innovation capability theory are encouraging reasons to explore the capacity of internal design thinking training to boost innovation capabilities.

While there is little research on internal design thinking training in private organisations, there is a rapidly growing body of literature demonstrating the positive impact of design thinking in education. The increasing popularity has led to universities and institutions across the UK, Asia, and Europe to integrate design thinking practice into student curriculum to facilitate the future of innovators (Morehen, Wrigley and Wright, 2014). A study completed by Mary Foster investigated the approach to teaching design thinking to students (Foster, 2019). This study mirrors research conducted by Seidel and Fixson (2013) who credit the success of implementing design thinking within organisations to guidance and support provided to non-designers. There is little research investigating design thinking training in private organisations but research in design thinking education could provide indications as to what direction an organisation can take to implement such a programme. This leads to the growing question of this research paper.

3. Research question and objectives

Following the theoretical findings of this paper, the research question that emerges is:

> *'What is the impact of internal design thinking training on developing organisational innovation capabilities?'*

The following objectives are being explored:

- 1. Investigate how internal design thinking training programmes influences firm innovation capabilities with individuals.
- 2. Investigate what techniques or tools are most successful in implementing innovation capabilities.
- 3. Investigate if these training sessions encourage innovative thinking or actions in projects outside the *Design Academy*?
- 4. Investigate how internal training can encourage acceptance of new design thinking or innovative practices at various levels of the organisation?

4. Methodology

The methodological approach taken for this research consists of a case-study analysis of a single organisation, focusing on the design academy initiative in Musgrave Retail Partners Ireland (MRPI). The case study will include stakeholders from multiple levels and departments of the organisation, primarily those participating in the *Design Academy* training programme. The *Design Academy* is hosted by the Customer Experience team who all have formal design thinking education and are experienced practitioners. The primary source of data will derive from interviews with various stakeholders, through 1-1 interviews or focus-groups. The questions will be semi-structured to ensure consistent questions are asked throughout each interview, but also allowing for interpretations and flexibility to express opinions. Questions will include the participants definition of design thinking and motives for using such tools and techniques. For now, interviews will be conducted through online meetings to comply with COVID-19 guidelines.

Secondary research will include ethnographic data collected from training sessions and perceptions from the work environment. Ethnography will provide research into cultural interpretation of the case-study and the organisations perspective of design thinking and organisational behaviour towards innovation. This research will take an *observer-to-participant* role to observation. Interviews and observation are to begin in May 2021 and will be completed in February 2022. This extensive timeline will allow for iterative analysis and insight into the organisation's development of behaviour, knowledge, and awareness of design thinking and innovation.

5. Conclusion

This paper has identified the growing interest and requirement for an internal design thinking training program as an approach to enhance private organisations. Design thinking is becoming increasingly appreciated, leading to organisations becoming eager to learn about the discipline and implement the practice to sustain competitive advantage long into the future. This has yielded an opportunity of research, which this paper will to contribute to. The long-term aim of this research is to investigate the framework in which internal design thinking training takes form to successfully promote internal innovation. The research aims to identify popular and successful techniques used by new designers in their own projects and innovative creations. It will also contribute to the growing body of design thinking training research and includes an evaluation of the impact of training through the lens of innovation capabilities, providing a unique lens for understanding. New practitioners within industry will also benefit from this research, as it will encourage a formal program for design thinking to be implemented within industry.

References

Bassanini, A. and Brunello, G. (2011) 'Barriers to entry, deregulation and workplace training: A theoretical model with evidence from Europe', *European Economic Review*, 55(8), pp. 1152–1176. doi: https://doi.org/10.1016/j.euroecorev.2011.05.004.

Brown, T. (2008) 'Deisign thinking', *Harvard Business Review*, 86(6), pp. 84–92. doi: 10.1002/med.

Buchanan, R. (1992) 'Wicked Problems in Design Thinking', *Design Issues*, 8(2), p. 5. doi: 10.2307/1511637.

Christensen, C. M. and Overdorf, M. (2000) 'Meeting the challenge of disruptive change', *Harvard Business Review*, 78(2).

Damanpour, F. (1991) 'Organizational Innovation: A Meta-Analysis of Effects of Determinants and Moderators', *The Academy of Management Journal*, 34(3), pp. 555–590. doi: 10.2307/256406.

Dismukes, J. (2005) 'Information accelerated radical innovation from principles to an operational methodology', *The Industrial Geographer*, 3(1), p. 19.

Dunne, D. (2018) 'Implementing design thinking in organizations: an exploratory study', *Journal of Organization Design*, 7(1). doi: 10.1186/s41469-018-0040-7.

Elsbach, K. D. and Stigliani, I. (2018) 'Design Thinking and Organizational Culture: A Review and Framework for Future Research', *Journal of Management*, 44(6), pp. 2274–2306. doi: 10.1177/0149206317744252.

Fan, P. (2006) 'Catching up through developing innovation capability: Evidence from China's telecom-equipment industry', *Technovation*, 26, pp. 359–368. doi: 10.1016/j.technovation.2004.10.004.

Foster, M. K. (2019) 'Design Thinking: A Creative Approach to Problem Solving', *Management Teaching Review*, p. 237929811987146. doi: 10.1177/2379298119871468.

Hurley, R. F. and Hult, G. T. M. (1998) 'Innovation, Market Orientation, and Organizational Learning: An Integration and Empirical Examination', *Journal of Marketing*, 62(3), pp. 42–54. doi: 10.1177/002224299806200303.

Kurtmollaiev, S. *et al.* (2018) 'Developing managerial dynamic capabilities: A quasi-experimental field study of the effects of design thinking training', *Academy of Management Learning and Education*, 17(2), pp. 184–202. doi: 10.5465/amle.2016.0187.

Liedtka, J. (2015) 'Perspective: Linking Design Thinking with Innovation Outcomes through Cognitive Bias Reduction', *Journal of Product Innovation Management*, 32(6), pp. 925–938. doi: 10.1111/jpim.12163.

Martin, R. (2010) 'Design thinking: Achieving insights via the "knowledge funnel"', *Strategy and Leadership*, 38(2), pp. 37–41. doi: 10.1108/10878571011029046.

Morehen, J., Wrigley, C. and Wright, N. (2014) 'Teaching design thinking and design led innovation to non-designers: A tertiary facilitator multidisciplinary study', *2013 IEEE-Tsinghua International Design Management Symposium: Design-Driven Business Innovation, TIDMS 2013 - Proceedings*, pp. 55–63. doi: 10.1109/TIDMS.2013.6981215.

Part, R. C. (2008) 'Measuring innovation culture in organizations: The development of a generalized innovation culture construct using exploratory factor analysis', *European Journal of Innovation Management*, 11(4), pp. 539–559.

Rauth, I., Carlgren, L. and Elmquist, M. (2014) 'Design Thinking: Exploring Values and Effects from an Innovation Capability Perspective', *The Design Journal*, 37(2), pp. 21–24.

Seidel, V. P. and Fixson, S. K. (2013) 'Adopting design thinking in novice multidisciplinary teams: The application and limits of design methods and reflexive practices', *Journal of Product Innovation Management*, 30(SUPPL 1), pp. 19–33. doi: 10.1111/jpim.12061.

Late Submissions

The Design for Business Initiative: A Systematic Approach to Embedding Entrepreneurship in Design Education

Sharifa Latter, Fraser Bruce and Brian McNicoll
University of Dundee, UK
s.latter@dundee.ac.uk
f.s.bruce@dundee.ac.uk
b.mcnicoll@dundee.ac.uk
DOI: 10.34190/EIE.21.800

Abstract: The paradigms of entrepreneurship education are manifold, however, it is doubtful that successful entrepreneurs attribute their skills to academic programmes. Yet, within HEI's there is a need to support and encourage entrepreneurial behaviours and create immersive learning opportunities that allow students to develop and grow their skills in real-world scenarios. Design education plays an important role in driving innovation through the creation of new products and services. However, due to an increasingly overcrowded curriculum, it has become more and more difficult for design schools to create an interconnected learning environment that recognises the role and value of embedding entrepreneurial skills, qualities and attributes. This study explores the strategic initiative, "Design for Business", a partnership between Duncan of Jordanstone College of Art & Design (DJCAD) and the Centre for Entrepreneurship (CfE) at the University of Dundee (UoD), which strives to embed entrepreneurship content in design curricula across all levels. Through an in-depth review and analysis of published materials, including testimonials, competition results and venture creation activities, the study sets out to discuss the infrastructure, challenges, success rates and how the initiative was received by participants. Results show that the initiative reaches far beyond a theoretical approach and equips students with entrepreneurial skills while assisting with start-up and spinout advice. In addition, evidence suggests that the initiative builds on the innovator-entrepreneur relationship, synergistically creating holistic learning experiences that seamlessly interconnect curricular and extra-curricular opportunities to cultivate entrepreneurial activity tailored to different levels of ambition and motivation. The paper concludes with a set of recommendations for further developing the initiative, paying particular attention to the further integration of entrepreneurial opportunities, top management support and increasing awareness and understanding among staff.

Keywords: Entrepreneurship Education; Design; Curriculum Design; Systems of Learning, Integration.

1. Introduction

Covid-19 has ushered in a new era for businesses and entrepreneurs, significantly impacting growth in some sectors and creating previously unimaginable opportunities in others. Quick adaptation and pivoting considering changed market conditions have separated the wheat from the chaff across global economies. Within the education sector this means that "it is therefore key for institutions not just to cater to the need to keep existent businesses alive. They must also continue to nurture a fertile ground for entrepreneurship and stay connected with other economies, to remain alert to new opportunities, and safeguard the jobs of the future" (Bosma et al. 2020, p.1).

Lack of education is still one of the major barriers to entrepreneurship. In Higher Educational Institutions (HEIs), if students do not attend a purposefully designed business or entrepreneurship course, they will generally be guided and prepared to be suitable future employees for existing organisations in their field rather than self-determined entrepreneurs (Rideout and Gray 2013). Furthermore, it is common for HEIs to separate the disciplines by creating schools or departments which tend to operate independently from one another thus contributing to silo mentality, which can hinder progress for individual disciplines when "the importance of interdisciplinary entrepreneurship education as an inherent feature of itself" is not acknowledged (Winkler et al. 2021). In recent decades, however, interdisciplinary activity amongst academic scholars has created a subtle shift towards the convergence of subjects that is slowly highlighting the need for more interconnectivity in the curriculum in order to enable students to deal with the increasingly complex issues of our time (Newell 2007).

The discipline of design, with problem-solving at its core, has always been inherently interdisciplinary in nature and is usually taught in the context of other subjects to enable pertinent design solutions (Davis 1999) relevant to all industries and all aspects of life. Likewise, entrepreneurship education is not very effective when restricted to the umbrella of business studies only, as it "spans disciplinary boundaries and levels (…) [and] should [therefore] be explored as a part of every educational system, locally and globally, at the micro and macro levels, in every field" (Liguori et al. 2018, p. 6). It is this fluidity of scholarly boundaries within both disciplines that

presents an opportunity for interconnectedness in the curriculum fostering innovation-driven entrepreneurial behaviours.

The "Design for Business" (DfB) initiative was created to harness this very potential by systematically interweaving teaching activities of both fields to create an integrated learning experience for students of all levels at Duncan of Jordanstone College of Art & Design (DJCAD) at the University of Dundee (UoD). Its purpose is to encourage entrepreneurial behaviour, enable students to develop market-ready solutions and make venturing a viable alternative career path for graduates. DJCAD always seeks to support experiential learning opportunities for students through internal and external collaborations and partnerships. Dundee is a creative and cultural city and in 2015 it became the first and only UK City to be awarded with the UNESCO City of Design status. In partnership with the V&A Museum at Dundee, an international centre of design for Scotland, DJCAD has a particularly important role to play in unlocking innovation potential. The University of Dundee (UoD) has a long-term strategy of being one of the most entrepreneurial universities in the UK both in terms of developing an entrepreneurial mindset and culture across the institution. The university has therefore created the Centre for Entrepreneurship (CfE) to "…firstly improve the self-reliance and employability of the University's students, staff and recent graduates by developing their enterprise skills. And secondly, to support those who wish to embark on the journey of starting their own business" (Centre for Entrepreneurship 2021). The embedding of entrepreneurship content at DJCAD has therefore recently been strengthened through the creation of the CfE. Within DJCAD, there were already established areas of best practice in the delivery of entrepreneurial education across the spectrum of design subjects, like product, interaction, illustration, graphic, animation, jewellery, interior and textile design. However, due to an increasingly overcrowded curriculum, it had become apparent that an interconnected learning environment that recognises the role and value of embedding entrepreneurial skills, qualities and attributes needed to be cultivated.

This study was undertaken to explore the levels of collaboration and integration of entrepreneurial content in design curricula at DJCAD, as well as the challenges and outcomes for students and staff resulting from the implementation of the DfB initiative.

2. Data Gathering

Data gathering and analysis for this case study is based on the following:

- Review of module descriptors and delivery schedules (module content) of key modules and programmes at DJCAD.
- Review of entrepreneurship offerings by the CfE, including, for example, competitions, master classes, training and support programmes.
- Review of historic and current competition results and data from 2017 until 2021 on student engagement with those offerings as an indicator for success of the initiative.
- Evaluation of key staff and student experiences on the integration of CfE offerings at DJCAD. Data was gathered through interviews and surveys.

The infrastructure is explained below and visually condensed in Figure 1 (Section 3.3) showcasing the interconnectivity of entrepreneurship and design education offerings within the initiative.

3. The "Design for Business" Infrastructure

3.1 Centre for Entrepreneurship (CfE)

Sitting within the Student Services Directorate, the Centre's initiatives, such as masterclass lectures, enterprising skills programmes, an annual entrepreneurship week and a university wide business idea pitching competition, provide a clear pathway for those who are wishing to learn highly transferrable enterprising skills to those who are wishing to embark on the entrepreneurial journey of venture creation. Entrepreneurship is increasingly being promoted as a viable career pathway for students (Nabi et al. 2018), and in order to further encourage and support early-stage entrepreneurs within the Dundee City region, the UoD entered a partnership in 2017 with Elevator (a Scottish-wide social enterprise business support service) to open a £250,000 public access facility on campus. The joint partnership delivered the first on-campus business Accelerator programme at any Scottish University, running three times a year with a specific annual summer intake reserved for staff and students across the region. The partnership aims to support Dundee City's entrepreneurial culture to have further positive impact on the area's economy.

3.2 Duncan of Jordanstone College of Art & Design (DJCAD)

At DJCAD, students are encouraged to take risks, pitch ideas and value the fundamental aspect of business skills that bring their ideas to life in the marketplace. The prevailing studio culture also places an emphasis on peer learning and provides a professional learning environment to nurture students' creative practice. There has been a history of embedding entrepreneurial teaching in the curriculum through live projects and competitions, specific taught content and the delivery of interdisciplinary modules. Indeed, within the majority of design subjects there have been repeated efforts to implement specific Intended Learning Outcomes (ILOs) associated to professional and transferable skills. However, there was an opportunity to embrace the generic offers provided by the CfE to enhance the delivery of entrepreneurship teaching and learning within the school in a more coordinated and interconnected way to help both staff and students to excel in their practice whilst also providing new career progression pathways beyond the traditional disciplines. Yet, a major difficulty was in connecting and integrating the entrepreneurial offerings delivered by the centre with the existing operational structures and practices of the school. Therefore, a successive, staged learning environment was created that enabled the school to be both flexible and rigid ("flexigid") (O'Malley 2010) in achieving its learning outcomes and at the same time supported design-driven entrepreneurial innovation.

3.3 Design for Business (DfB) Initiative

The DfB Initiative is an integrated system of learning that delivers entrepreneurial education across design subjects at DJCAD (Figure 1). The figure is further explained in the Findings (Section 4).

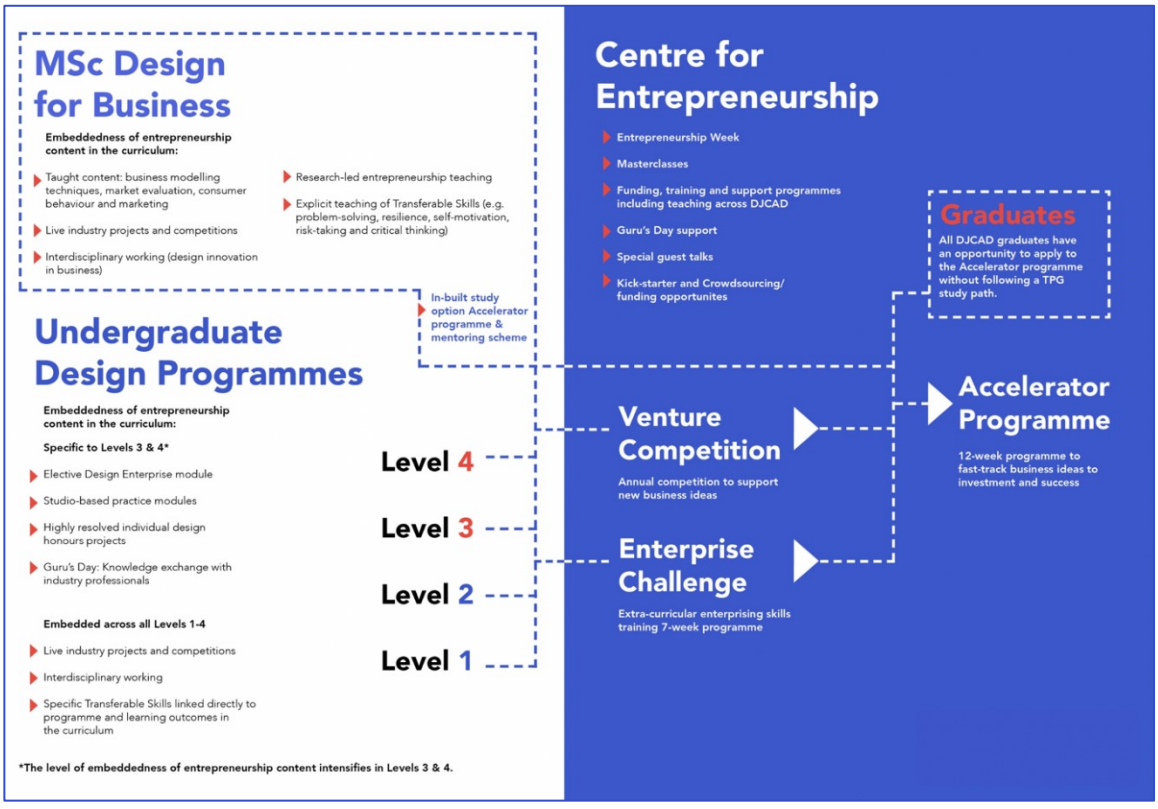

Figure 1: Overview of the DfB Initiative

Some of the more significant features of the initiative, i.e., the Design Enterprise module, the MSc Design for Business programme and the tailored offerings provided by the CfE are discussed below in more detail showcasing the interconnected nature of the initiative.

3.3.1 The Design Enterprise Module

The aim of the Design Enterprise module is to provide students with an opportunity to understand how businesses and markets operate and to allow them to develop an in-depth business plan based on an innovation in the context of their studio-based module or their discipline. Within the module students are required to submit a business plan that explores the marketplace, Unique Selling Points & value propositions, funding routes and successful marketing strategies. At the core of the DfB Initiative, this module presents an opportunity to

deliver a closely-knit, collaborative approach with the CfE. More specifically, the CfE delivers a number of entrepreneurship focused sessions as part of the indicative content of the module, for example, start-up do's and don'ts, case studies on entrepreneurial journeys and finance. Knowledge exchange is offered through guest talks and master classes with internal and external entrepreneurs. This module is a prime example of the interconnected approach of the DfB Initiative which acts as a direct feeder to the MSc Design for Business programme at DJCAD (discussed below).

3.3.2 About the Enterprise Challenge

The CfE delivers the bi-annual Enterprise Challenge as an extra-curricular enterprising skills training 7-week programme. The workshop content consists of ideation, business modelling, market research, competitor analysis, marketing, IP, finance and culminates with a submission of a business proposal and a live pitch at the final event. The delivery is undertaken by both university staff and external industry experts. The programme is open to all staff, students and recent graduates at UoD, as well as students from other HE/FE institutions in the region. There are two prize categories:

1. The Most Enterprising Team Award – for teams who do not wish to take their business idea forward at this stage but have delivered a compelling business case that deserves recognition. Winners receive advanced personality profiles by a dedicated sponsor.
2. The New Business Idea Award – for teams who wish to take their business idea forward and have demonstrated they have the most viable business opportunity. Winners receive prize funding for their business idea and a guaranteed place on the Accelerator programme.

3.3.3 About the Venture Competition

The CfE delivers an annual Venture Competition with significant prize funding to support new business ideas. The competition is open across the institution to staff, students and recent graduates. The rationale for the competition is to draw out potential business ideas at the university and help translate them into a validated business opportunity. Finalists pitch at the Venture Final during the university's Entrepreneurship Week to a panel of judges and a public audience including investors and members of the business community across Scotland. All applicants receive constructive feedback on their business ideas.

3.3.4 About the Academic Accelerator Programme

In a unique partnership with Elevator, a social enterprise focussed on supporting new entrepreneurs throughout Scotland, the CfE is one of the few academic institutions in Scotland with a bespoke business Accelerator programme hosted on campus. The Accelerator (2-3months long) is designed to fast-track business ideas to investment and success by providing a desk space alongside fellow entrepreneurs, a bespoke curriculum, and access to expert advice and contacts they will need to take their business to the next level—all free of charge. The Academic Accelerator programme delivers a tailored offering to students and staff during the summer months. This is where DJCAD students, who have developed their business ideas throughout their studies and offerings by the CfE, receive in-depth expert support to implement their business.

3.3.5 MSc Design for Business Programme

The TPG programme builds on the interdisciplinary nature of the design subjects, the studio-based modules and the Design Enterprise modules delivered in Levels 3 and 4 across the school. The MSc programme provides students with the theory and skills to be effective designers, managers and leaders of the future within an organisational context as well as the entrepreneurial skills to develop their own business. Students learn to capitalise on models of innovation, service design frameworks, Design Thinking in business, marketing, leadership, culture and entrepreneurship. The modules are supported through direct involvement of CfE staff and external partners who contribute to the delivery of taught content. As a result, this creates more student engagement with the extra-curricular offerings, such as Enterprise Challenge, Venture Competition and master classes. More significantly, the programme encourages participation with the Accelerator programme as an in-built study option along with a mentoring system tailored to students' specific venture creation. The objectives of the DfB Initiative underpin the rationale and the philosophy of the MSc Design for Business programme (hence the same name) and is also the main driver for student engagement with the CfE at TPG level.

4. Findings

The findings presented are a summary of the analysis from the data gathering and refer to Figure 1.

4.1 Review of module descriptors and delivery schedules (module content) of key modules and programmes at DJCAD

Level 1 and 2 curriculum content focuses primarily on the practice of design in the context of subject disciplines. Transferable skills are embedded in the module ILOs laying the foundation for entrepreneurship content at higher levels. The level of engagement and depth of entrepreneurship teaching intensifies across Levels 3 and 4 and then again at Level 5 within the MSc Design for Business programme in the form of specifically tailored modules covering indicative content on business and entrepreneurship. For instance, in Levels 3 and 4, "Design Enterprise" is a two-part elective module that is delivered across all design subjects that allows students to explore their creative outputs in an entrepreneurial context. The module sits alongside a studio-based module in which students are required to enhance their design practice by creating new products and services. In addition, the MSc Design for Business programme provides graduates with a further opportunity to grow and develop their innovation-driven entrepreneurial behaviours and launch successful new businesses. The CfE offers an array of entrepreneurship competitions, start-up support as well as curricular support within the design school.

4.2 Review of entrepreneurship offerings by the CfE, including, for example, competitions, master classes, training and support programmes

The CfE reaches far beyond a theoretical approach to equip staff, students and graduates with entrepreneurial skills and assisting with start-up and spin-out advice by offering live projects, competitions, interdisciplinary working, master classes, funding advice, training and support programmes delivered by internal and external entrepreneurial practitioners. This is achieved through competitions, masterclasses, funding advice, training and support programmes delivered by internal and external entrepreneurial practitioners. In addition, a tiered approach offering these opportunities alongside tailored support mechanisms has enabled synergies of success and yielded significant results. For instance, since 2017, DJCAD students have continuously exceeded expectations and outperformed other schools at the University by consistently demonstrating the highest engagement and success rates in competitions and have been prolific in the pursuit of entrepreneurial endeavours.

4.3 Review of historic and current competition results and data from 2017 until 2021 on student engagement with those offerings as an indicator for success of the initiative

Enterprise Challenge

DJCAD students have performed consistently well during this programme either in developing their own business idea, which is sometimes related to their own studio-based honours project or as part of a multi-disciplinary team. Although the level of engagement appears to be low (15% in 2020/2021), it should be acknowledged that participation numbers consist of students from across 10 schools and DJCAD students have a successful track record of winning (Table 1).

Table 1: Annual Breakdown of Enterprise Challenge

2020/2021	**9 out of 123 participants were DJCAD students (15%)** Most Enterprising Team Award – winning team included 1 DJCAD student Most Enterprising Team Award – winning team included 2 DJCAD students
2019/2020	**25 out of 104 participants were DJCAD students (24%)** New Idea Award – winning team included 1 DJCAD student New Idea Award Runner-up – winning team included 1 DJCAD student (who later received a place on Accelerator Programme)
2018/2019	**22 out of 121 participants were DJCAD students (18%)** New Idea Award – winning team included 1 DJCAD student Most Enterprising Team Award – winning team included 1 DJCAD student Most Enterprising Team Award – winning team included 2 DJCAD students

Venture Competition

The data below indicates that DJCAD has a higher engagement rate compared to other schools, with an average of 9 DJCAD entries compared to an average of 4 entries from 9 other schools. DJCAD entries (including staff as well as students and recent graduates) have a more than 5 times higher success rate than other schools, winning £55,500 out of a total prize fund of £144,500 (Table 2).

Table 2: Annual Breakdown of Venture Competition

2021	7 out of 43 applicants were DJCAD entries (16%); Won £5,000 from £38,000 prize fund
2020	17 out of 64 applications were DJCAD entries (27%); Won £13,500 out of £28,000 prize fund
2019	7 out of 48 applications were DJCAD entries (25%); Won £12,500 out of £27,500 prize fund
2018	7 out of 50 applications were DJCAD entries (26%); Won £10,000 out of £26,000 prize fund
2017	7 out of 39 applicants were DJCAD entries (28%); Won £14,500 out of the £25,000 fund

The winners and shortlisted candidates of the Venture Competition are offered a place on the highly esteemed Accelerator programme (as discussed in section 3.3.4). Using the prize funding, they continue to develop a detailed business plan to start trading after completion.

Accelerator Academic Summer Programme

Through the DfB Initiative, we have seen a year-on-year increase in participants commitment to the implementation of their new venture creation by joining the Academic Accelerator programme (Table 3).

Table 3: Annual Breakdown of New Venture Creation through the Accelerator Academic Summer Programme

2020	4 out of 14 business founders were DJCAD (29%); lower numbers due to the impact of Covid-19
2019	5 out of 10 business founders DJCAD (50%)
2018	3 out of 16 business founders DJCAD (19%)
2017	1 out of 15 business founders DJCAD (7%)

The results above show significant positive developments for DJCAD students over the last years since the initiative was launched. They have been engaged and successful across the board of most extra-curricular CfE offerings.

4.4 Evaluation of key staff and student experiences on the integration of CfE offerings at DJCAD, data was gathered through interviews and surveys

Through analysing student feedback, staff reflections and more importantly, the evaluation of students' success stories and their business creations, the initiative has been highly effective in delivering an experiential learning journey that leads to increased engagement with the CfE thus leading to higher entrepreneurial success rates. What now follows are several extracts from participants who commented on their learning experience.

Participant and Staff Reflections

Commenting on the Enterprise Challenge, one participant highlighted how the initiative has helped build confidence in order to make the transition to business implementation, saying:

> *"Having previously studied Product Design, I entered the competition with a strong understanding of visual communication techniques and developing products but had limited knowledge of how a business*

> *functions. Through the weekly sessions on different themes (incorporation, finances, insurance, legal), I gained a new awareness of entrepreneurial skills and how they can pair up seamlessly with design techniques. Alongside the Enterprise Challenge, I continued to complete the MSc Design for Business programme at the University of Dundee. I found that the extra-curricular activities provided by the CfE influenced my approach to my MSc projects as well."* (Alice Harper, 2021)

Another participant acknowledged the importance of the Venture Competition as a route to an entrepreneurial career after graduation, commenting:

> *"The Venture Competition allowed me to explore new business opportunities and further my design skills with an entrepreneurial mindset. Throughout the process, I used a Design Thinking methodology to design my own business. The CfE and lecturers were on hand to help with problems or queries as I encountered them. The business acumen I gained from the competition has increased my skills and given me quantifiable business development experience helping me transition from my studies to starting up my own business. (Aaron Donald, 2021)*

This participant was actively involved in all parts of the DfB Initiative, from undergraduate design studies to TPG. He was a winner of the Venture Competition and successfully launched his business after completing the MSc Design for Business and the Accelerator programme:

> *"The relationship between the MSc Design for Business programme and the CfE has given me a unique opportunity to explore entrepreneurship as a future career pathway. The MSc curriculum provided me with a theoretical and practical understanding of Entrepreneurship and the courses and competitions delivered by the CfE allowed me to put what I had learned into practice in a real world setting with my own business idea. The integration of these two areas of the University were invaluable to me." (Robbie Beautyman, 2019)*

Elevator staff acknowledged an increased level of engagement by DJCAD students with the Accelerator programme:

> *"Elevator has had a very strong engagement with DJCAD students and graduates since the Dundee Flagship Accelerator kicked off in September 2017. Because most - especially those who have participated in our summer Academic Accelerators – have had time to develop their ideas on their course and in many cases, have worked with the Centre for Entrepreneurship team, they have a clearer idea of the features and benefits that their concepts will offer. They are also more familiar with many of the techniques that we use on the programme, such as Design Thinking for business, the business model canvas and value proposition."* (Cat Ward, 2021)

Interestingly, staff have also emphasised the prevailing discrepancies between design creation and practice and market-readiness:

> *"It can be difficult when students / graduates have spent time during their studies working on a product to find out that the market doesn't want or need it. This can be a challenge, so we encourage founders in this situation to "fail fast" and pivot."* (Cat Ward, 2021)

By the very nature of the design disciplines, students undoubtedly excel in their practice, but it is the opportunity to apply and contextualise their design ideas in a business and marketing context that creates valuable synergies that enhance student motivation and entrepreneurial behaviours.

5. Discussion

This case study set out to examine the levels of integration of entrepreneurial content in the design curriculum at DJCAD and outcomes for students and staff resulting from the implementation of the DfB initiative. In addition to the findings and discussion above, the analysis of the data has identified further challenges that were overcome through the initiative.

It is clear that the working relationship between DJCAD and CfE has performed well and is intuitively complementary. It was found that the embedment of a "flexigid system of learning" provided holistic and engaging pathways in the delivery of entrepreneurial education at DJCAD. It supported existing best practice

and fostered a better understanding of innovation-driven entrepreneurial behaviours in students and staff alike. A more dynamic and interconnected curriculum was created, which offered impactful curricular and extra-curricular entrepreneurial learning opportunities. Students gained confidence and entrepreneurial skills as key elements of transferable skills development (i.e., problem-solving, resilience, self-motivation, risk-taking and critical thinking) and were able to create successful market-ready design solutions.

Before implementation of the initiative, students generally received interest towards the end of Level 4 studio-based modules from potential customers, or coverage from the national press, amplified by the annual degree show. This sparked their interest in an entrepreneurial pathway at a very late stage in their studies. During that time, the CfE aimed to engage with as many students as possible, while supporting 9 other schools, but having only a small team of 3-4 full-time staff made it a challenge for the centre to meet this "seasonal" demand. However, the DfB Initiative has now created a more interconnected curriculum across all study levels and therefore promoted an earlier appreciation of entrepreneurial pathways after graduation to students and staff. Another challenge identified in relation to an entrepreneurial career pathway was students' lack of confidence in their ability to become entrepreneurs or to proceed with a new venture creation. The DfB Initiative has helped to build confidence in the student journey by encouraging risk taking and breaking down barriers through the early introduction of entrepreneurial content and activities. The repeated, meaningful engagement with offerings from the CfE helps students embrace an entrepreneurial mindset throughout their design studies and opens their eyes to speakers and case studies that demonstrate teams and individuals who began at a similar embryonic stage.

The curricular and extra-curricular entrepreneurial activities have created fruitful synergies within the overall learning experience and have helped to overcome challenges associated with an over-crowded taught curriculum. Within DJCAD there was a legacy of excelling at the practice of designing and where the object prevails rather than seeing the value of a curriculum that also integrates theoretical and business-oriented teaching. Giving up space in an already crowded curriculum that focuses on the activity of "thinking through making" was a particular challenge. The DfB initiative has fostered student engagement with entrepreneurial activities at undergraduate level and therefore laid the foundation for an increased student interest in pursuing the MSc Design for Business programme, for example, thus deviating from traditional study pathways. The programme is an example of best practice with regard to the integration of traditional teaching objectives with Transferable Skills and market-oriented innovation, supporting students in becoming design-driven entrepreneurs. Interestingly, a deliberate consequence of this initiative was the natural convergence of like-minded students to later enrol onto the MSc Design for Business programme.

6. Recommendations

Future development plans to enhance the initiative should include:

- Providing dedicated CfE staff to support and amplify the results and outputs that have been observed to date. In other words, it is important for the school and university to recognise the impact that has been achieved through the DfB Initiative and support future developments.
- Embedding more entrepreneurial content in the ILOs across Levels 1 & 2 at DJCAD in order to build the scaffolding for later years.
- Ensuring that entrepreneurial content is delivered on a much wider scale beyond dedicated stand-alone modules and programmes, thereby creating a more meaningful impact across the school.
- Increasing DJCAD staff's understanding of the value and relevance of entrepreneurship education within a design context by continuously promoting awareness and improving levels of engagement with the CfE.

Although more work is clearly needed, particularly around educating all staff on the importance of entrepreneurial mindsets and behaviours, the value of the initiative is supported by school management who encourage staff buy-in, ensure operational resources are in place and continually develop strategies in order to provide a better foundation for further implementation.

References

Bosma, N., Hill, S., Ionescu-Somers, A., Kelley, D., Guerrero, M., Schøtt, T. (2021) "Global Entrepreneurship Monitor-2020/2021 Global Report", *Global Entrepreneurship Research Association*, London Business School, London, UK.

Centre for Entrepreneurship (2021) "Our Mission", [online], https://www.dundee.ac.uk/entrepreneurship/ourmission/

Liguori, E., Winkler, C., Winkel, D., Marvel, M. R., Keels, J. K., van Gelderen, M., & Noyes, E. (2018) "The Entrepreneurship Education Imperative: Introducing EE&P", *Entrepreneurship Education and Pedagogy*, Vol 1, Issue 1, pp 5-7.

Davis, M. (1999) "Design's Inherent Interdisciplinarity: The Arts in Integrated Curricula", *Arts Education Policy Review,* Vol 101, Issue 1, pp 8-13.

Nabi, G., Walmsley, A., Liñán, F., Akhtar, I., Neame, C. (2018) "Does Entrepreneurship Education in the First Year of Higher Education Develop Entrepreneurial Intentions? The Role of Learning and Inspiration", *Studies in Higher Education*, Vol 43, Issue 3, pp 452-467.

Newell, W. H. (2007) "Decision Making in Interdisciplinary Studies", In Morçöl, G. (Ed.), *Handbook of Decision Making.* CRC, New York, USA.

O'Malley, M. (2010) *The Wisdom of Bees: What the Hive can teach Business about Leadership, Efficiency and Growth.* Penguin Group, New York, USA.

Rideout, E.C. and Gray, D.O. (2013) "Does Entrepreneurship Education Really Work? A Review and Methodological Critique of the Empirical Literature on the Effects of University-Based Entrepreneurship Education", *Journal of Small Business Management*, Vol 51, pp 329-351.

Winkler, C., Winkel, D., Shields, J., Barber, D., Levin, D., Zane, L. (2021) "Editorial: Special Issue on Interdisciplinary and Experiential Entrepreneurship Education", *Entrepreneurship Education and Pedagogy,* Vol 4, Issue 2, pp 96–99.