

**Abstracts of the Papers  
Presented at the  
9<sup>th</sup> European Conference  
on  
IS Management  
and Evaluation  
ECIME 2015**

**The University of West England**

**UK**

**21-22 September 2015**

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## Preface

The 9th European Conference on Information Management and Evaluation (ECIME) is being hosted this year by the University of the West of England, Bristol, UK on the 21-22 September 2015. The Conference Chair is Dr Elias Pimenidis, and the Programme Chair is Dr Mohammed Odeh both from the host University.

ECIME provides an opportunity for individuals researching and working in the broad field of information systems management, including IT evaluation to come together to exchange ideas and discuss current research in the field. This has developed into a particularly important forum for the present era, where the modern challenges of managing information and evaluating the effectiveness of related technologies are constantly evolving in the world of Big Data and Cloud Computing. We hope that this year's conference will provide you with plenty of opportunities to share your expertise with colleagues from around the world.

The keynote speakers for the Conference are Professor Haris Mouratidis, from the School of Computing, Engineering and Mathematics, University of Brighton, UK who will address the topic "*Rethinking Information Systems Security*", Dr Mohammed Odeh, from the University of the West of England, Bristol, UK and Dr. Mario Kossmann from Airbus, UK who will talk about "*The Significance of Information Systems Management and Evaluation in the Aerospace Industry*'

ECIME 2015 received an initial submission of 55 abstracts. After the double-blind peer review process 28 academic Research papers, 5 PhD Research papers, 1 Masters Research paper and 3 Work in Progress papers have been accepted for these Conference Proceedings. These papers represent research from around the world, including Austria, Botswana, Cyprus, Czech Republic, Ireland, Japan, Kuwait, New Zealand, Norway, Poland, Portugal, Slovakia, Russia, South Africa, South Korea, Sweden, The Netherlands, UK and the USA.

We wish you a most interesting conference.

Dr Elias Pimenidis and Dr Mohammed Odeh  
September 2015

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# Biographies

## Conference Chair



**Dr Elias Pimenidis**, Elias started his working life as a projects engineer in heavy manufacturing and has been involved in the design and implementation of production planning, ERP and logistics control systems in manufacturing plants over a period of ten years. He joined the University of the West of England in 2014 where he is a senior lecturer and a member of the Software Engineering Research Group. Elias has been a member of the programme committee of ECIME and its predecessor ECITE since 2003. He has published widely with more than 90 papers in refereed journals and conference proceedings.

## Programme Chair



**Dr Mohammed Odeh** is a Reader in Software Engineering and Head of the Software Engineering Research Group in the Faculty of Environment and Technology of the University of West of England. He has more than 29 years of research and development experience in the engineering of software systems with an in-depth interest in Systems of Systems software engineering, Knowledge-driven Requirements Engineering and Bridging the Gap between Business Processes and Computer-based Systems. He has supervised over 11 PhD students to successful completion and is currently supervising further six PhD students in software engineering and other related disciplines. Mohammed has been acting as invited PhD examiner externally and internally, and as an invited keynote speaker in international conferences and as associate editor on international journals. He was co-organiser of the 5th IEEE CloudCom Conference in December 2013 and introduced the first Requirements Engineering for Cloud Computing (RECC) in the IEEE CloudCom Conference. He has been the UWE principal investigator on the OntoREM project and as a joint inventor of OntoREM with Dr. Kossmann from Airbus, and with two patent applications filed in the US. Among other research output include 40 refereed journal papers and books (including books and research work to appear) and 38 conference papers. He is an associate editor of the INCOSE/Wiley Systems Engineering and the IAjit journals. He sits on the steering committee of the ACIT conference series. He has been UWE Bristol co-investigator on EU FP5 and FP6 projects.

## Keynote Speakers



**Dr Haris Mouratidis** is Professor of Software Systems Engineering at the School of Computing, Engineering and Mathematics, at the University of Brighton, U.K. He holds a B.Eng. (Hons) from the University of Wales, Swansea (UK), and a M.Sc. and PhD from the University of Sheffield (UK). He is also fellow of the Higher Education Academy (HEA) and Professional Member of the British Computer Society (BCS). Haris has been a visiting researcher at the National Institute of Informatics (NII), Japan, and a visiting fellow at the British Telecom (BT), U.K and the University College London, U.K. He is visiting professor at the University of the Aegean, Greece. His research interests lie in the area of secure software systems engineering, requirements engineering, and information systems development. He is interested in developing methodologies, modelling languages, ontologies, tools and platforms to support the analysis, design, monitoring of security, privacy, risk and trust for large-scale complex software systems. He has published more than 130 papers (h-index 21) and he has secured funding as Principal Investigator from national (Engineering and Physical Sciences Research Council (EPSRC), Royal Academy of Engineering, Technology Strategy Board (TSB)) and international (EU, NII) funding bodies as well as industrial funding (British Telecom, ELC, Powerchex, FORD) towards his research. His "Powerchex KTP" project was finalist for the best 2012 UK National Knowledge Transfer Partnership TSB award. He has acted as evaluator for national and international funding bodies (e.g. EPSRC, HEA, and EU) and invited subject expert for organisations (e.g. TSB, NATO). He is member of the ERCIM Security and Trust Management Working Group and of the IFIP Working Group 8.1: Design and Evaluation of Information Systems. He is on the editorial boards of the Requirements Engineering Journal and the International Journal of Information System Modeling and Design and he has been involved in the organization of various events related to his research interests. He was the General co-Chair of CAiSE'14.



**Dr. Mario Kossmann** (ESEP) is an experienced Systems Engineer and Capability Integrator for Airbus, having previously worked for Blohm & Voss as Systems Engineer, Technical Manager, and Consultant in Services Marketing. He has served as a naval officer with the German and French navies, and was awarded an MEng in Aerospace Technology from the University of the Federal Armed Forces in Munich (Germany), an MBA from the University of Warwick (UK) and a Ph.D. in Requirements Engineering from the University of the West of England. He is the author of the books *Delivering Excellent Service Quality in Aviation* (Ashgate 2006) and *Re-*

quirements Management – How to ensure that you achieve what you need from your projects (Gower 2013), as well as numerous research publications in the fields of Systems Engineering, Software Engineering and Project Management. Mario is also a certified Project Manager and Expert Systems Engineering Professional

## **Mini Track Chairs**



**Dr. Elena Serova** works in International School of Economics and Politics, High Economics School of St. Petersburg State University of Economics in Russia. Her role combines teaching and research. Her research interests are related to Information Management, Marketing Information Management, Business Models, Economics of Innovation and Knowledge Management. She has co-authored a book and contributed chapters to several books and collections of essays, and she is a regular key presenter at national and international conferences and workshops. As a research active academic with a number of PhD Students under her supervision, Elena is focusing on Spatial Economics, Modelling of Complex Management Systems, Marketing Information Systems, Business Models in Global Environment and Architectural Design of Management Information Systems.



**Danilo Piaggese** is Managing Director of the Fondazione for the Renaissance of the Americas (FRAmericas) a non-for profit organization. FRAmericas focuses on Knowledge Society, Knowledge Economy, E-governance, ICT for development, and innovation for development. He founded and directs FRA’s International Knowledge Economy Program (IKEP), working with multilateral and bilateral cooperation to support development projects where ICT, innovation and the principles of the Knowledge Economy can be instrumental for achieving socio-economic growth. He is also the founder of the “ICT forDevelopment International School” or ICT4DEVIS a higher education summer program focusing on training on ICT for development, hosted by prestigious international Institutions and Universities. At FRAmericas, Mr. Piaggese brings into bearing his experience in the private sector (Telecom Italia) and with multi-lateral development organizations (Inter-American Development Bank as Chief of its ICT4DEV Division), and previously, the United Nations’ Food & Agriculture Organization).



**Dr Gunilla Myreteg** is Assistant Professor at Uppsala University, Sweden. Her research interest includes how information technologies, especially ERP systems, are designed and used in organizations for a variety of information purposes. Her research concerns foremost the problems and possibilities of the manufacturing industry, however her current research also deals with information needs and communication related to health care organizations.



**Dr Karen Neville**, Senior Lecturer, Director of the Centre for Security & Emergency Management Research (CSEM), BIS, University College Cork, Ireland



**Dr Ciara Heavin**, College Lecturer, Director of the Health Information Systems Research Centre (HISRC), BIS, University College Cork, Ireland

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## Biographies of Presenting Authors

**Olusegun Ademolu Ajigini** lectures in Computer Security at the School of Computing, University of South Africa, Florida Campus, South Africa. His areas of research interests include Information Security, Sensitive Data Protection, Business Intelligence Analytics, Big Data Analytics and Cyber security. His industrial experience includes working as a Business Intelligence (BI) Analyst, Data Analyst and Information Technology Senior Manager.

**Ahmed AlHarbi** is a PhD candidate in Business Information Systems (BIS), University College Cork (UCC). Research interests include understanding and investigation of the role of IT capabilities in supporting the customer-focused strategies and customer experience management (CEM).

**Alexis Amaye** is a Ph.D. student at University College Cork in Business Information Systems with particular interest in crisis management decision making and system development. Prior to UCC, she worked for 10 years as an emergency manager in the public and private sectors in the USA. Alexis holds a MPH from Tulane University in Disaster Management.

**Maria Bergenstjerna** is a program coordinator, PhD candidate and part of the IT management research group, Department of Applied IT, University of Gothenburg, Sweden. Her research interest is in the field of informatics; the management of coordinated development of business, information systems and knowledge. As lecturer, she has engaged in the IT management courses for several years.

**Terese Besker** has an extensive and long experience in systems development area, with a primary focus on real-time applications with base in automation and supply chain management. She studies in parallel with her profession an IT management master, with the aim of strengthening and broadens her IT management skills.

**Rebecca Casey** is a full-time doctoral researcher at Northumbria University. Her research interests include benefits realisation, IS evaluation, project management, critical research and socio-materiality. Rebecca has seven years of experience undertaking international qualitative and quantitative academic research.

**Chrysostomi Maria Diakou** is currently a Ph.D. student at the University of Nicosia. She holds an MA in Innovation & Brand Management and BA in 3D Design. She is actively involved in European research actions. Important research endeavours for her doctoral research arise from fields such as change management, decision science, risk management and information systems.

**Simon Dwane** has completed a BSc in Applied Psychology and recently finished an MSc in Engineering Psychology with Ergonomics. He is currently working as a Research Assistant at University College Cork's (UCC) ASSERT Centre under the project S-HELP, developing a training course for the purpose of improving decision making of response organisations in emergency situations.

**Ahmed Elmorshidy** is the head of the Accounting & MIS Department in the College of Business Administration at Gulf University in Kuwait. Dr. Elmorshidy received a Ph.D. in (MIS) Management of Information Systems from Claremont Graduate University, California, USA and an M.A. and an MBA from Webster University, U.S.A. He has over 25 publications in peer-reviewed journals and conference proceedings.

**Sunet Eybers** has been an industry practitioner focusing on large scale Business Intelligence Systems implementations across various industries in South Africa. She has fulfilled many roles, including developer, business analyst, project manager, and BI manager. She recently joined the University of Pretoria as Senior Lecturer in the Department of Informatics after obtaining a PhD degree in Information Systems.

**Oduronke Eytayo** is a Senior Lecturer in the Department of Computer Science, University of Botswana. She holds a Bachelor's degree in Computer Science and Master's degree in Information Science from the University of Ibadan, Doctor of Philosophy in Information Studies from the University of Botswana. Her research area is in user studies and evaluation.

**Dr Apostolos (Paul) Giannakopoulos** has been in education for more than 35 years, teaching Mathematics, Physical Science, Computer Literacy and Numerical Methods in high schools and universities. His research interests are problem solving and critical thinking applied in mathematics and other disciplines (knowledge management, intellectual capital, physics).

**Behrooz Golshan** is a PhD student at the informatics Department of Linnaeus University in Växjö Sweden. His current research project is on the impact of IT-capabilities on Business Model reconfigurations. Prior to his academic career, he worked as a software developer, where he found his passion for managerial aspect of Information Technologies.

**António Guerreiro** is Assistant Professor in the Department of Management, University of Évora, Portugal, and President of the Pedagogic Council of the School of Social Sciences, 2013-2015. He holds a MSc. in Organization & Information Systems and a PhD in Management by the University of Évora, and was research student at Queen's University at Belfast, UK (2003/2005).

**Aida Hadzic** is a PhD student and program coordinator in the Department of Applied IT, University of Gothenburg, Sweden. She has a system science background and a second level education in the field of IT Management. Aida is part of the IT management research group and is studying issues related to management and architectural design of both existing and future IT investments.

**Douglas Hawley** is an Assistant Professor of Computer Science at Northwest Missouri State University. From 2007 until 2014, he was an IT Supervisor for the Nucor Bar Mill Group. Hawley holds a Master's Degree in Computer Science from the

University of Missouri-Kansas City, and a Doctorate in Leadership from the University of Missouri.

**Jerry Horgan** has over 10 years of expertise in systems and network administration. He manages the TSSG's Data Centre as the Waterford Institute of Technology, Ireland. He holds a BSc in Computer Science, an MSc in Communications Software Develop, an MSc in IT Management and a number of industrial qualifications including Cisco's CCNA and CCNP.

**Jwan Khisro** has a master's degree in informatics and is part of the IT management research group, Department of Applied IT, Gothenburg University, Gothenburg, Sweden. Her research interest is in the field of informatics; the management of coordinated development of business, information system and knowledge in healthcare sector.

**Soudabeh Khodambashi** is a Ph.D. candidate and teacher assistant at the Norwegian University of Science and Technology (NTNU). Her research background is in the domain of clinical process analysis and re-engineering, Information system evaluation, clinical guideline development requirement engineering, clinical decision support systems and Lean management.

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**Sander van Splunter** is an assistant professor in the System Engineering group in Delft, researching adaptation within dynamic complex systems. For designing for change, knowledge needs to be made explicit to support local adaptations. Integration of such knowledge in both structures and processes, and knowledge representations are key issues of his research.

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# Exploring Security Strategies for Enterprise Data Protection in Organisations

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**Abstract:** Due to the rise of data breaches, organisations constantly need to develop new strategies and security architectures to protect their data assets. This must be done to prevent further breaches, financial losses and a tarnished reputation. In recent years, organisations have focused on perimeter security to protect their data assets; however, since about 50 per cent of most security breaches are perpetrated internally, perimeter defences are no longer adequate for securing organisational data. This further emphasises the importance of developing strategies that can provide adequate data protection measures for organisations. This paper presents an overview of security strategies that can be utilised by organisations to safeguard and protect their data assets. The paper explores various aspects of data protection measures such as classification of sensitive data, defining a security policy around identified data, determining a mode of data privacy implementation, and cyber security awareness. A security strategy model for the protection of organisational data assets in organisations is proposed from the literature review. The paper provides valuable information on how organisational data can be handled safely and protected against both internal and external threats. The paper aims to assist organisations to protect their data as part of the contributions toward community engagement.

**Keywords:** data protection, security strategy, information classification, sensitive data, security model, cyber security

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## Collaborative Disciplines, Collaborative Technologies: A Primer for Emergency Management Information Systems

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**Abstract:** Emergency management (EM) is a dynamic, interdisciplinary research domain evolving from a practitioner led discipline focused on managing disasters. The complexity of multi-agency coordination, interoperability of divergent systems and processes, and emphasis on required functional capabilities highlights unique issues and challenges within the discipline. Emergency Management Information Systems (EMIS) was coined to describe specialized information and

communication technologies, systems and tools used to support the unique needs of responders, decision makers and ultimately communities impacted by disasters since the late 1960s. Though the evolution of EM and EMIS have occurred in tandem, as research domains, both disciplines are impacted by developing standards and the lack of common terminology and a prevailing model or theory to inform theory, practice, and research. The goal of this primer is to examine the dimensions of the domain in existing literature, define concepts and functional capabilities that join the domain, categorize the systems and tools which support the domain, and propose a framework for a broader literature review of these unique disciplines. Application of a socio-technological view of EMIS hinges on a better understanding of the concepts and dimensions which frame EM research and practice. The key to EMIS success lies not only in the understanding of the dimensions, needs, and challenges of EM to ensure the information and communication solutions are fit for purpose, but also to meet the needs of intended end users. This paper has been developed to present a discussion of concepts that frame the focus on capabilities and structures necessary to support EM to better align system development and evaluation for this dynamic and constantly evolving domain in practice.

**Keywords:** emergency management information systems, interoperability, capability-based system development

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## **The Importance of Economic Evaluations of mHealth Pilots: A Proposed Malawian Case-Study**

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**Abstract:** Health care in Low and Middle Income Countries (LMICs) is facing a major challenge in terms of developing a sustainable financial model; leading to difficulties such as poor retention of professional staff, fragmented and uncoordinated patient information; further exacerbated by limited national funds. Mobile Health (mHealth) potentially offers a low-cost solution to overcome some of these challenges. To date, there is a dearth of research regarding the cost-effectiveness of mHealth solutions in LMICs. As an exemplar case study, this paper

introduces the World Health Organisation (WHO) Community Case Management (CCM) (a set of clinical paper based guidelines for treating childhood (> 2 months and < 5 years of age) illness in LMICs), and evaluates the potential of converting it into a mHealth solution. The Supporting Low-cost Intervention For disEase control (LIFE) electronic CCM application (SL eCCM app) is a mHealth decision support tool that digitises clinical guidelines. Its decision support system aims to reduce human error and improve the quality of care for children in rural Malawi. An economic evaluation and statistical tests are proposed to assess and evaluate the SL eCCM app based on results attained from a technical feasibility study. The procedure and key considerations for the economic evaluation are outlined. To date, many mHealth projects never expand beyond small scale pilot projects. The failure to achieve wide scale adoption may, in part, be attributed to the lack of quantitative data demonstrating the value of the technology to respective local governments and other relevant stakeholders.

**Keywords:** economic evaluation, cost effectiveness, mHealth; quantitative analysis, LMICs

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## **The Enterprise Architect Profession: An Empirical Study**

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**Abstract:** The field of Enterprise Architecture (EA) is rapidly evolving why there is a need for increased professionalization of the discipline. Therefore, understanding the profession of the Enterprise Architects in enterprise transformation and development becomes important. However, there are very few empirically based studies which have reflected these professionals within their work domain of an every-day business. The purpose of this paper is to increase our understanding of how the Enterprise Architect's practice their profession and in addition, to study how these professionals describe their occupation. Five different topics are of particular interest to portraying the occupation of the Enterprise Architect's profession; the role, competence, power, style of acting and main focus. The research is a descriptive study based on interviews with Enterprise Architects in ten large Swedish organizations. In conclusion, the architect is considered as a proud individualist with an entrepreneurial vein who endeavor consideration, reflection, and the guidance capability.

**Keywords:** enterprise architecture, enterprise architect profession, role, competence, power, style of acting, main focus

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# Benefits Realisation of Information Technology in the National Health Service: A Paradigmatic Review

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**Abstract:** The context for this research is the continued difficulties associated with realising benefits of IT in the NHS which, according to the National Audit Office (NAO), has failed to deliver two thirds of forecast benefits of a £10Bn national IT project. Benefits Realisation (BR) is an evaluation method used by NHS organisations to plan, deliver and measure benefits of IT. Developed as both a standalone enterprise and as a work package incorporated within Managing Successful Programmes (MSP) and Projects in Controlled Environments (PRINCE) BR is a recognised approach for informatics projects within the NHS. The concern is whether the existing approach to BR delivers meaningful benefits which adequately meet the needs of patients and staff. BR is identified in the academic literature as both a concept and a framework intended to ensure that an organisation realises the benefits it expects from an IT investment. The realisation of benefits matters to organisations and society because of the significant sums of money involved and because IT investments can often be central to an organisation's performance. It is therefore a relevant topic of study for both academics and practitioners. The focus and concerns of such studies range from positivist to more interpretive discussion with many prescribing practical methods for effective delivery of benefits from investment in IT. There is little evidence, however, that theory has translated into effective practice and insufficient attention given to the social and political aspects of the topic. In an effort to clarify alternative approaches this paper aims to stimulate reflection on how an inquiry of BR can be accomplished. Drawing attention to aspects of various paradigmatic approaches, the paper focuses on critical, interpretive and positivist and how these paradigms have contributed to research in the subject domain of BR. A plethora of studies exist within interpretive and positivist paradigms and the review emphasises the need for further development of the topic from a critical perspective. A critical orientation to the social and political aspects of benefits realisation and in particular the question of *cui bono* offers an alternative approach to provide more insight and ultimately progress theory and practice.

**Keywords:** benefits realisation, IS evaluation, critical IS research

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# Assessing Benefits of Enterprise Resource Planning (ERP) Systems in Local Government

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**Abstract:** Over the past decade Enterprise Resource Planning systems (ERPs) are increasingly being adopted by governments in their quest to improve service delivery. However, there isn't sufficient evidence which demonstrates how local communities and citizens' benefit from such a costly investment, aside from the improvements in internal organisational processes. The study reported in this paper, used a Case Study design, to collect data from amongst management and Information and Communication Technology (ICT) specialists of a local municipality. The study used hermeneutical principles of qualitative data analysis to interpret the evidence. The findings show that even though it is documented that ERPs are benefits rich, these benefits are not automatically extended to all stakeholders within and beyond the organisation and that there is a need to pay particular attention from a system planning and management perspective to the appropriation of benefits. The study further recommends that managers who oversee the ERPs should augment the self-management capability of these systems to ensure that the benefits are extended to targeted stakeholders, including the citizenry in a consistent and sustainable manner. This can be done through an effective ERPs benefits management process, enabling ERPs self-management and public awareness campaigns.

**Keywords:** citizen-benefits, enterprise resource planning, IT benefits, local government, Information and communication technology

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## Exploring the Impact of Cloud Computing on IT Departments

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**Abstract:** In this paper we study the impact of Cloud Computing on the information technology (IT) department using the case of an educational institute in the Higher Education sector. The findings reveal that while cloud computing may become the primary technology platform within the institute, the role of the IT

department has not been clearly defined, nor is there a plan to carefully manage the transition to the cloud. The interview data presents the role the institute wants the IT department to play in the future, whilst it also reveals how Cloud Computing can offer the IT department renewed focus and capacity to take on this new role. An Information Systems (IS) capability framework is proposed following the study. This framework offers a target set of capabilities, which will help the IT department to plot a course into developing the capabilities required to fulfil its changing role within the specific organisation and beyond.

**Keywords:** cloud computing, IT department, IT staff, challenges, higher education

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## **Assessment of Maturity Levels in Dealing With low Probability High Impact Events**

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**Abstract:** Low probability high impact events which may include crises, disaster and emergencies have the capacity to affect organizations' processes in delivering goods and services to markets, disrupt economies and result in life losses. Existing methods used for the anticipation and management of such events, suffer from common limitations such as judgment or decision making biases, process and content ambush, heavy dependence on out-of-date information, sensitivity to data quality, lack of empirical testing and frame blindness. Judgment or decision making biases is identified as the most common limitation among them, with a huge impact in the quantification of probability, uncertainty and risk. As the identification of direct causality between risks becomes progressively problematic, traditional risk management needs to be reinforced with new concepts designed to fit an environment with uncertain qualities. Recent studies that suggest the successful integration of Collective Intelligence (CI) in resilience, capacity building and mitigation, for the management of adverse events, present an opportunity for the development of a framework that fits the uncertain properties of our modern world. The paper examines the development of a maturity assessment model in regards to low probability high impact events and studies relevant literature. Progress on developing such a model is expected to strongly benefit the implementation of a decision support system that is based on CI. The paper studies literature on the design and development of a generic model for maturity assessment, covering the origin, nature and use of maturity models; and draws on relevant criticism. Furthermore, it provides literature on maturity models used for the management of adverse events, focusing on the Risk Management Maturity Model and the Capability Maturity Model (CMM). Emphasis is given on the organisations'

necessity to equally have the capacity and the maturity to manage risks and on the reasons why the Capability Maturity Model is considered to be suitable for the assessment of the emergency management performance and capability.

**Keywords:** maturity assessment model, collective intelligence, low probability, high impact, emergencies, disasters

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## **Factors Influencing Live Customer Support Chat Services: An Empirical Investigation in Kuwait**

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**Abstract:** This study investigates factors influencing live customer support chat services in Kuwait. Live Customer Support Chat represents a newly implemented type of customer service in E-commerce websites. Live Support Chat allows online agents through company's websites to answer customer questions, complaints, and concerns on the spot through a live chat session, which bypasses the traditional e-mail and web forms. The theoretical framework used in this study is based on the well-established Technology Acceptance Model and the Theory of Reasoned Action. The study tries to validate these theoretical frameworks in the context of Live Customer Support Chat to see if they can be equally applied to the E-commerce environment as in the other technology fields. Using a sample of 324 respondents, the hierarchical regression revealed that factors such as usefulness, ease of use and attitude have a significant influence on customers' intention to use Live Customer Support Chat services. Our model explains around 31% for the variance in customers' intention to use Live Customer Support Chat.

**Keywords:** live support chat (LSC), technology acceptance model (TAM), e-commerce, e-business, internet social impact

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# Identifying Critical Success Factors for Business Intelligence Systems

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**Abstract:** In a knowledge society, information or data, and structured or unstructured, form the 'backbone' of any organisation. Business Intelligence Systems (BIS) are systems that allow organisations to take advantage of the structured and unstructured data in support of decision making. Although many organisations embark on projects to implement such systems, these systems are not always implemented successfully or perform as intended. This might be attributed, among other factors, to the complex multidimensional nature of the concept of BI, namely that it is a product (of the construct stored namely data, information, knowledge and decisions); but it is also a process (gathering, storing, analysing, utilisation and acting); and uses technology (data warehouse, OLAP and decision support systems). These three attributes of BI are inter-related and inter-dependent. Each one has to be evaluated on an on-going basis to ensure maximum performance. Furthermore, successful implementation of systems and measurement thereof can be achieved using different methods such as: Return on Investment (ROI), Balanced Scorecard, Process Engineering, Key Performance Indicators (KPIs) and Critical Success Factors (CSFs) to name a few. The identification of CSFs is a popular method used by many authors to investigate a particular item vital for an organisation or project to achieve its mission. In the context of BI, CSFs is a collection of tasks and procedures that should be monitored in order to ensure the success and optimal performance of BI system. It can be argued therefore that this method could be used to: (1) identify CSFs in the context of BI; (2) test these items for applicability; and (3) finalize a list for future practical utilisation. This qualitative study was conducted using a multiple case study approach using different types of industry. CSFs identified from previous empirical studies were used as basis for conducting semi-structured interviews. The study indicated that a list of CSFs for BIS can be generalized across industries to a great extent as there are also industry specific CSFs. The main contribution of this study, namely a list of CSFs for BI, can be used as a starting point for identifying KPIs to track the performance of BIS to ensure that the optimal performance of such systems is met.

**Keywords:** business intelligence (BI), business intelligence systems (BIS), critical success factors (CSFs)

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# Improving ERP Implementation Through Knowledge Gained From end Users

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**Abstract:** This paper is based on the study of implementation of an ERP system in an academic environment and some of the challenges students faced with the implementation. The case study is based on the Academic Student Administration System (ASAS) implemented at the University of Botswana (UB). UB is the largest university in Botswana with regards to student numbers and programs of study. An interview was carried out with 34 people. The data was collected from students within the six programmes of the Computer Science Department in the University of Botswana (UB) on problems encountered during registration. End user satisfaction is critical in determining success. SA-FETMIS success model was used in the process of analysing data collected from interviews. The study was able to test the model used and verify its general applicability in measuring MIS success as well as proposing two constructs for service quality which did not have any construct. The study showed that ASAS is not a bad system or a poorly programmed system as portrayed by the media. The main problems that influenced the users view on satisfaction were data quality, training and support.

**Keywords:** enterprise resource planning, project management, post implementation review, critical success factor, SA-FETMIS success model

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# An Investigation into the Effects That Business Intelligence can Have on Organisational Performance

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**Abstract:** Despite financial challenging times, organisations continue their spending on Business Intelligence (BI) implementations. This includes the focus on solutions to cater for big data requirements. A study of literature showed that some companies implement BI solutions not because they are beneficial to the company but because it is more of a trend. However before they implement any BI solution they have to answer the question:-Do such implementations positively influence organisational performance? The objective of this study was to investi-

gate the extent to which Business Intelligence implementations contribute to organisational performance. The research question formulated was: What is the impact of BI implementations on organisational performance? Previously, similar quantitative studies have been conducted to investigate similar questions. In this case as the study is dealing with the attitudes and perceptions of various employees of organisations a qualitative study is appropriate. The study conducted was a multiple, explanatory case study as various sources were used (e.g. interviews and technical documentation). Four organisations from diverse industries participated in the study. This enabled a cross comparison of results. The study indicated that Business Intelligence can have a positive influence on organisational performance. However, the influence might vary depending on the industry type. For example, a substantial increase in product sales was experienced whilst compliance to regulatory requirements from a risk management perspective was applicable in non-sales industries (for example banking). The most common influence across all four industries was the contribution to organisational sustainability. However, this contribution also varied across the industries. The findings of this study are of importance to both existing as well as prospective BI implementers. Organisations with existing BI implementations can expand their existing BI solution to include coverage of the areas in which the contribution was the most. Also, prospective BI implementers can focus their new implementations on these areas. From an academic perspective, this study contributes to the current body of knowledge from a qualitative perspective due to the majority of the studies in this field focusing on quantitative studies.

**Keywords:** business intelligence, organisational performance, risk management, performance management

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## **Impact of IS/IT Investments on Firm Performance: Does Stakeholder Orientation Matter?**

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**Abstract:** This research project addresses a central question in the IS business value field: Does IS/IT investments impact positively on firm financial performance? IS/IT investments are seen as having an enormous potential impact on the competitive position of the firm, on its performance, and demand an active and motivated participation of several stakeholder groups. Actual research conducted in the Information Systems field, relating IS/IT investments with firm performance use transactions costs economics and resource-based view of the firm to try to explain and understand that relationship. However, it lacks to stress the

importance of stakeholder management, as a moderator variable in that relationship. Stakeholder theory sees the firm as the hub centric to the spokes representing various stakeholders who were in essence equidistant to the firm, and survival and continuing profitability of the corporation depend upon its ability to fulfil its economic and social purpose, which is to create and distribute wealth or value sufficient to ensure that each primary stakeholder group continues as part of the corporation's stakeholder system. Stakeholder theory in its instrumental version, argues that if a firm pays attention to the stakes of all stakeholder groups (and not just shareholders), it will obtain higher levels of financial performance. With this premise in mind, the aim of this research project is to discuss and test the use of stakeholder theory in the IS business value stream of research, in order to achieve a better understanding of the impact of IS/IT investments on firm performance (moderated by stakeholder management). To achieve the expected impact from an IS/IT investment, it is argued that firms need a strong commitment from these stakeholder groups, which lead us to the need of a "stakeholder orientation". When firm financial performance is measured by returns on assets (ROA), returns on investments (ROI) and returns on sales (ROS), the results show that "stakeholder orientation" impact positively in the relation between IS/IT and firm performance, using a sample of Portuguese large companies.

**Keywords:** IS/IT investments, impacts, financial performance, stakeholder orientation

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## **Towards a Model-Based Approach to Evaluate the Effectiveness of e-Learning**

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**Abstract:** There is a lack of a standard based approach that can be used to evaluate the effectiveness of different e-learning models due to their diversity and complexity. This paper introduces a new evaluation approach to assess the effectiveness of e-learning models. This approach is derived using: (i) the ISO 25010 "Systems and software Quality Requirements and Evaluation (SQuaRE): System and software quality models" and (ii) the ISO 25012 "Systems and software Quality Requirements and Evaluation (SQuaRE): Data quality model". Hence, the proposed evaluation approach is based on the following three main models: (i) quality in use, (ii) product quality and (iii) data quality models. In this research the proposed evaluation approach has been applied to compare and evaluate capabilities of five different e-learning models. In addition to core qualities of ISO25010 and

ISO25012 models, new qualities such as pedagogical, semantic and process-based techniques are defined to accommodate domain-specific aspects. The application of the proposed evaluation approach reveals promising results such as: (i) its ability to abstract the semantic heterogeneity between different terminologies used to describe the capabilities of different e-learning models and (ii) its holistic approach as well as its ability to be extended to assess unstructured e-learning contents. Additionally, this research identifies a list of e-learning models' capabilities where some are common between different models e.g. interoperability and re-usability; and others are specific to certain models such as processability.

**Keywords:** e-learning effectiveness, e-learning evaluation, data quality, product quality, quality in use, e-learning capabilities

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## **Using Business Analytics to Secure a Position in the Supply Chain**

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**Abstract:** Implementing business analytics across a large company is more about understanding that organization's culture, than it is about the actual technology. Understanding an organization's motivation, advantages and roadblocks is imperative for successful implementation and benefit. This research examines the cultural advantages at the largest steel producer in North America, and discusses how these historical advantages sometimes become roadblocks for implementing business analytics on a large scale. First, this research provides a historical context of the company, identifying a low-cost business model, and enormous divisional autonomy as hindrances to the implementation of a common, shared ERP. A timeline of business analytics at the company is given, beginning in 2002, at which point a culture shift occurred through the acquisition of a major competitor. Divisional autonomy at this time, began to be challenged, leading to easier integration of reporting systems and cross-company data analysis. Then, details are provided as to how this company is making a case for a new, innovative, business model and how it is developing needed expertise in the area of business analytics. Changes in the steel business are requiring companies to move from a low-cost model to a value-added model increasing the need for innovation in all areas of the company. These innovations inevitably require the use of more complex data analytics that cut across the entire company, instead of a limited, independent division. Finally, this paper looks at how a current, actual, implementation is being planned and employed within the culture. Through the use of "Best Practices" teams, the company is facilitating communication and collaboration among previ-

ously autonomous divisions. These teams are charged with developing processes that will allow for innovation and improvement in all areas of the business. Additionally, in-depth and timely details are provided in this discussion as this ERP implementation is currently underway. This research allows for a foundation as future work can investigate further developments in this migration of both the company's ERP and its culture.

**Keywords:** business analytics, business intelligence, enterprise resource planning, ERP, historical considerations

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## The Resource Based View of Cloud Computing: A Case Study

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**Abstract:** This case study is designed to explore how a Resource Based View (RBV) can be applied to cloud computing and in turn to determine the factors that affect cloud computing decision making. It further shows how RBV in Information Systems (IS) can identify the key IS resources of an organisation. The literature shows the more that IT infrastructures are being outsourced the more important the IS Human Resources become. These human resources consist primarily of the IS skills held by the organisation. This research was addressed using a single, cross-section, embedded, case study, which used a qualitative research approach. This involved the use of questionnaires and semi-structured interviews. The questionnaire comes from the IVI Cloud Life Cycle, a subsection of the IT-CMF. The results from these questionnaires helped to shape the semi-structured interview questions. This case study highlights the importance of IS technical skills and suggests that cloud computing decisions should be user centric rather than technology centric. A user centric cloud computing deployment that matches the staff's capabilities will allow them to work more efficiently and help to eliminate some of the wasteful operation duties they must perform.

**Keywords:** resource based view, information systems, information technology, cloud computing, dynamic capabilities

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# Illustrating What Alignment Dimensions Must be Addressed to Advance Person-Centred Healthcare

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**Abstract:** If development can not bring healthcare into line with information systems, information pathologies will continue rendering a gap between adding value to healthcare and leaving a negative reality of team tasks, care processes, distribution of power, responsibility and knowledge. Thus, risking scarce resources to be over-spent on ineffective health systems. In particular, when stakeholder views on new information technologies vary from ideal to no view at all development, whether for a single unit, a region or a nation, might cause conflict in the cross-sector of healthcare and IT. That is a challenge for healthcare management. The aim of this study was therefore to contribute to the creation of public value by investigating what frame of reference is needed for management to address critical issues of person-centred healthcare. We thus, inquired what alignment dimensions must be addressed to advance person-centred healthcare? A qualitative approach was chosen as it provided opportunity to explore the situation. The theoretical frame was based on a literature study covering person-centred healthcare and alignment dimensions. Primary data were collected through four interviews in Swedish healthcare. Secondary data were used to strengthen the primary data. The first report was a study, based on a process analysis of healthcare and homecare in Sweden. The second report by the national centre for e-health presents objectives for the period 2013-2018 on the subject of citizen's future means for participating and engaging in his/her healthcare. Data were analysed according to the theoretical frame and summarized in table form. Results illustrate that alignment is not just fit between IT and business. Moreover, alignment is a non-stop activity of value creation through synchronization of the enterprise and IS/IT. For the wider good of healthcare, we argue for alignment in terms of grouping of persons, their parties and powers. To cover their issues, infological and sociocultural dimensions must be effectively brought into account by healthcare management.

**Keywords:** alignment, information system, management, person-centred healthcare

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# The Construction of Financial Information in an Organizational Setting: The Interactions Between Social Actors and ERP Systems

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**Abstract:** Enterprise Resource Planning (ERP) systems are fundamentally bound up with organizational processes of accounting. They influence the design and structure of categorization and aggregation of transactions, and are involved with the systematization and co-ordination of records. Research on the interface between accounting and IT is however scarce, especially concerning how financial information is constructed in an organizational context. Previous researches argue that the practice of financial accounting and management accounting are both dividing *and* converging. The present paper develops a theoretical model to understand the processes of interactions between social actors and ERP systems when financial information is constructed in an organizational setting. It draws on the notion of occupational roles and explores the significance that an ERP system has in practices where financial information is constructed. The model is based on a literature review and further developed with the help of a case study of a medium sized manufacturer organization in Sweden. The case investigates the interactions between financial accountants and shop-floor workers in processes of recording and aggregating financial information. The model provides an understanding of how social actors construct financial information in interaction with other actors and with technology. It illustrates how they either focus on *getting the numbers right* or on *getting the business right*. It also shows how the tools connected to the occupational roles differ. Conflicts might arise because of that and actors have different possibilities to avoid or solve these conflicts. Here, the ERP system has a role to play as an enabler.

**Keywords:** accounting, ERP systems, financial information, occupational role, shop-floor worker

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# A Cross-Cultural Study on e-Service Delivery

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**Abstract:** Considering e-service provision as one of the top priorities in the national agenda, governments worldwide have allocated resources into online applications development. However, despite of huge resource investments, the adoption rate of e-government initiatives over the world is far from expectations. By the year 2014, a large number of UN member states remain in the bottom third of the Online Service Index (OSI). There's still a huge difference in OSI between countries sharing similar national income and telecommunication infrastructure levels. These evidences suggest that apart from technical aspects, non-technical aspect such as social and organizational factors as well as the heterogeneity between countries such as national culture should be taken into consideration when implementing e-government. Given the challenges discussed above, questions have been raised concerning what determinant might influence to the discriminant in e-service provision among countries. This topic has been of interest to researchers recently. However, most of studies either utilized primary data in which the results was constrained to a specific case study with small samples, or employed secondary data sources which can be criticized for lacking of explanatory power due to omitting important factors. In order to bridging this gap, this paper employs Technology – Organization – Environment (TOE) framework cooperatively with Hofstede's national culture dimensions to provide a comprehensive insight about e-service adoption process. For validating above hypotheses, this study utilizes secondary data from different sources: the culture dimension scores from Hofstede et al. (2010)'s survey; the World Economic Forum (WEF)'s Global Information Technology Report; and the IAC-Waseda E-government Ranking. The result suggests that management optimization process, government IT leadership, ICT legislation framework and national culture have influences to the e-service provision. The implications of this study would help policy makers to realize the strengths and weaknesses of the country's current status of e-government development, thus to provide proper adjustments.

**Keywords:** e-service, TOE, national culture, cross-cultural studies, Hofstede

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# Application of ICT Tools in Enhancing Education in Information Society

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**Abstract:** The paper investigates the possibility of using Information and Communication Technologies (ICT) in supporting education in information society. Following current trends in education and technology development we focused on supporting active learning (AL) paradigm by Virtual Learning Environment (VLE). First, over the course of a pilot survey conducted among Polish and UK lectures, we examined the current usage of ICT in teaching, incorporation of AL methods, and teachers' needs associated with developing university courses that support AL. The survey results indicate that the majority of lecturers rarely used AL methods and they are unaware which VLE tools could support this model of instruction. On the basis of our experience and survey results we propose a university course framework in which selected VLE tools and external VLE integrated applications support AL. The framework includes also suggestions for knowledge and technical teachers' skills assistance that could help them to implement AL methods. The results of the research might be useful for practitioners who would like to incorporate innovative methods of learning into an educational process and benefit from ICT.

**Keywords:** active learning, virtual learning environment, blended-learning, ICT application, education enhancement

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## Understanding the “Root Architecture” of the Enterprise From a Teleological Approach

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**Abstract:** The primary purpose of Enterprise Architecture is to coordinate various efforts in order to achieve the planned or unplanned ends of an enterprise. This essential view is represented in the teleological frameworks that usually guide any architectural effort. The main purpose of this paper is to present the fundamentals underlying the development of a holistic teleological framework which, in a meaningful and understandable way, should be used in the future to demonstrate

the limitations of current Enterprise Architectural Frameworks in order to understand their undesired consequences. Our current research addresses terms such as goals and objectives, purposes, visions, and missions as well as the demands and expectations of stakeholders. We call such a composite idea “Root architecture”. By this way, the Root architecture of an enterprise is an undivided part of Enterprise Architecture. Therefore, we define the purpose of an Enterprise Architecture as consisting of the extrinsic and intrinsic relationships between the core teleological ideas given above. The primary focus of this study is to elucidate the idea of Root Architecture in order to address the differences or similarities among the current Enterprise Architecture frameworks from a teleological perspective. Our logic of inquiry consists of searching and reviewing literature for architecting the domain of root architecture as well as transforming the existing models into a complete teleological framework. Lastly, we verify the validity and reliability of such transformation through real cases. The results of our study reveal that the Root Architecture of an Enterprise makes sense through the application of the following three essential principles: i) The principle of mutual supportiveness, ii) the principle of harmonizing stakeholders’ contradictory worldviews with their shared core-purpose, and iii) the principle of aligning global strategic goals with local action. We can conclude that the Root Architecture provides a fundamental ground for teleological completeness from a holistic perspective. Such completeness is required by the Enterprise Architecture frameworks in order to direct the management of proactive and innovative development of the enterprise towards obtaining both operational excellence and unique strategic outcomes.

**Keywords:** enterprise architecture, root architecture, teleological approach, alignment

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## **Towards a Classification of Technology Strategy Frameworks**

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**Abstract:** The formulation of a technology strategy is a critical first stage in the process of managing technology inside organizations. Numerous technology strategy frameworks have been proposed in the literature to provide structure to the communication of complex ideas and to contribute to the traceability and

transparency of information flows during the strategic decision making process. This research field has evolved considerably in the last decades and the varied contributions indicate a need for a novel classification to support the identification of relevant topics for further research. This paper presents a review of a number of technology strategy frameworks from the scientific literature. These frameworks are analysed according to the attributes (conceptual, applied, static and dynamic) of a meta-framework proposed by Shehabuddeen et al. (2006) aimed at improving the understanding of management frameworks. The frameworks are also analysed through the lens of two prominent schools of strategy: the positioning and resource based view schools. Based on the interpretation of underlying concepts and ideas, the reviewed frameworks are positioned in a three dimensional chart where two axes portray the attributes of the meta-framework and the remaining axis, the opposing schools of strategy. The classification of the reviewed frameworks in divergent axes suggests a dichotomous approach that has been followed in the development of technology strategy frameworks, where new developments attempt to challenge the ideas of previous models. The proposed classification also extends previous models, namely by Arasti and Packniat (2006). In the case of applied frameworks, their observation also revealed that the technology strategy formulation process has been consolidated into four core activities, each one of them encompassing a number of applicable tools. This investigation demonstrates the increasing centrality of the resource based view paradigm in the development of technology strategy frameworks, which can indicate a change in the perception on how organizations compete in technology markets. This paper also highlights the relevance of research on technology management methods and tools and the extent to which these contribute to the management of information and knowledge flows and to the decision-making capabilities of organizations. Future research should focus on the incorporation of additional attributes to provide a more comprehensive classification model of technology strategy frameworks, and also investigate the applicability of the proposed classification model in other management frameworks.

**Keywords:** technology strategy, framework, classification, resource based view

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# How CEOs of the Small Firms Make Decisions to Ensure Information Systems Resilience?

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**Abstract:** Information Systems are essential for successful organisation. If Information System interrupts, the whole business continuity is compromised. Organisational resilience has gained increasing attention in recent years. This paper focuses on an aspect of organisational resilience, i.e., on IS resilience. Given the potentially devastating implications of disruptions to organisations, understanding the dynamics of the successful adaptation of IS within organisations indicates an important avenue for future research. In this paper, we adopt Agency theory to develop a conceptual framework, focused on decision making and planning for IS resilience. Concourse theory and Q-methodology were used to develop a Q-sort questionnaire, which was refined through interviews with researchers and IS professionals. The resulting 37 statements were then sorted by eight managers. Q-sort methodology identified three types from the data, each representing distinct collective perspectives. Though three archetypes emerged but we decided to focus on a particular archetype called “Mindful decision maker”. This type demonstrate unique flavour of decision making under uncertain situation. This type is described and discussed in detail, along with implications of findings as well as suggestions for future research.

**Keywords:** information system resilience, agency theory, Q-methodology, CEO, decision making, SME

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## Case Management as a Tool for Forming Corporate Knowledge

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**Abstract:** Case Management is the management of collaborative processes that coordinate content, knowledge, and resources to progress a business to achieve a particular goal, where the path of execution is often unpredictable and where human judgment has significant influence for determination of how the end goal

can be achieved. The key characteristics of Case Management include: information complexity, knowledge-intensive, and variability. The knowledge-driven economy brings new challenges for business. Markets and business-processes are becoming more global, customers are more demanding, and product life cycles are shortening. The complexity of technologies, including Information Communication Technologies (ICT), is increasing. So while the knowledge economy represents new opportunities, certain actions are needed to support and take advantage of these developments. This evolution can be enhanced by the adoption of Case Management that has reduced the cost of gathering and disseminating knowledge. The contribution of Advanced Case Management (ACM) to innovation has been achieved most notably by reducing transaction costs between companies and other actors, especially in areas such as information search and buying. The main goal of this theoretical study is to evaluate the role of contemporary information systems (IS) and technologies for supporting Case Management as tool for forming corporate knowledge. Attention of many scientists and researchers in this subject field is focused on the study of Customer Relationship Management (CRM), Business Process Management (BPM), and Enterprise Content Management (ECM) or Electronic Document and Record Management (EDRMS) systems. But these technologies and systems are not sufficient to address the key problems. Enterprise Content Management and Business Process Management (BPM) with specific support for knowledge intensive processes can be discussed as more appropriate solution to Case Management successful implementation and use. BPM-based Case Management can take into account unpredictable or uncertain nature of cases and effectively combine processes and knowledge. It can consider as innovation in Data Management.

**Keywords:** knowledge, data management, case management, business process management, enterprise content management

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## **A Psychological Framework Modelling Decision Making in Emergencies**

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**Abstract:** Decision making is an essential aspect of emergency management and a successful response to an emergency situation highly depends on whether decisions are being taken in an effective and timely manner. Acute emergency situations represent decision environments that are characterised by high complexity, due to a large number and interdependence of variables involved, dynamism,

uncertainty and intransparency of the situation, information overload or lack of information, time pressure, risk, plurality of goals, and multiple players involved. To meaningfully support decision makers in emergencies, a comprehensive understanding of human decision making and its background processes is required. We therefore suggest bringing in psychological knowledge on human cognitive processing in information system research on computer-based decision support. A framework is presented that models the stages and components of decision making in the context of emergency management. To this end, psychological research on human perception and information processing, knowledge and competence modelling, human judgement and decision making, individual and situational factors, stress, and self-regulation are taken up and integrated. The psychological framework provides a basis for empirical studies on the perception and decision making process of emergency managers, for a better understanding of the involved cognitive processes and influencing factors. Based on this, the framework may provide useful input to different areas of work on decision support systems (DSS) for emergency management. It may be used for deriving requirements by systematically describing decision tasks in emergency situations and identifying needs for supporting them. The knowledge on human information processing and decision making represented by the framework can be translated into design principles feeding into and guiding the interface design. Furthermore, the psychological framework supports the design and implementation of training programmes by modelling emergency and decision making knowledge and competence. The psychological knowledge may also inform the evaluation of DSS by providing a theoretically founded representation of relevant aspects in emergency decision making and human-system interaction, which may facilitate the definition of variables to be addressed in user-centred evaluation.

**Keywords:** emergency management, psychology, decision making, information processing, decision support system

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# Alignment of Enterprise Architecture Principles: A Case Study

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**Abstract:** Enterprise Architecture (EA) is introduced as a general approach to aligning business and IT within an organization. Therefore, EA should guide organizations through the business, information, process, and technology changes necessary to execute their strategies. The developments in the various layers (business architecture, IS architecture and IT architecture) influence each other and, consequently, architectural matters are critical for achieving alignment between the business and its information systems. An essential component of EA is design principles, which strive to manage the complexities in business processes and IT systems. Some scholars argue that design principles are the essence of EA. Design principles can either align, or misalign, IT/IS artefacts with the architecture. If the principles are aligned, they will have a positive impact on the organizational effects and values, but if they are misaligned, they will have a negative impact on effects and values. Unfortunately, EA principles have not yet received much research attention, although there are a few scholars addressing EA principles from a conceptual point of view. Empirical insights regarding the role and usefulness of EA principles in practice are still lacking. The purpose of this empirical study is to describe how various dimensions of alignment are considered by design principles. One crucial design principle will be mainly highlighted, namely the delineation principle. Delineation principles focus on how to delineate IS or business domains and create “systems of systems” that are in harmony with different requirements of the business. A case study of a large Swedish insurance company is used as a basis for the analysis. The result shows that the IS and business delineation principles do not mirror each in regards of the dimension of alignment. The result also shows that design principles mainly consider the functional dimension of alignment. This paper argues that it is essential to evaluate IS and business design principles against each other based on functional, structural, socio-cultural and infological alignment.

**Keywords:** enterprise architecture, principle, design principle, architectural principle, alignment

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# Enhancing Participation Through Empowering Actor Autonomy in Workflow Management

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**Abstract:** The right information at the right time is a necessary but not sufficient prerequisite for responders in crisis situations. In addition to information on a current situation, crisis responders need to be able to reflect on the situation at hand to determine the right next action, often within minutes. Responders need to understand the consequences of their actions, they need to have insights in the possible consequences in the complex System of Systems in which they participate. This paper proposes a framework for exploring consequences of actions developed within the context of the FP7 EU BRIDGE project.

**Keywords:** quality of service, collaboration, crisis management, configuration, autonomy

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## Examining how IT Professionals in SMEs Take Decisions About Implementing Cyber Security Strategy

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**Abstract:** With the significant growth of cyber space, business organizations have become more alert than ever before that cyber security must be considered seriously and that there is a need to develop up-to-date security measures. It has become an increasing trend that cyber-attackers concentrate more on small and medium than on large enterprises, due to their known vulnerability towards cyber security. In exchange of successful cyber security measures in organizations, the security risks must be taken into consideration more closely that could be helpful for re-thinking their decision-making on cyber security. This article develops a theoretical framework on cyber security with three aspects taken in consideration: organizational, technological and psychological, that deserves the attention of IT professionals while and after creating cyber security measures in their SMEs.

The first two aspects (organizational and technological) focus on understanding the IT professionals' decision-making process, while the third aspect (psychological) focuses on understanding the IT professionals' post decision-making reactions. Firstly, the organizational aspect presupposes that the ones who create cyber security measures are exposed to unclear and undefined decision processes and rights that lead to system vulnerabilities. Secondly, the technological aspect focuses on disclosing how many IT professionals in their organizations fail to meet foundational technological measures, such as the existence of Internet firewall, logs of system events, existence of hardware and software inventory list, data backup, antivirus software and password rules. Lastly, the psychological aspect, explains how post cyber security decisions made by IT professionals may have a contra-effect on the organization. Our data analyses collected based on interviews with IT professionals across 6 organizations (SMEs) show that cyber security is yet to be developed among SMEs, an issue that must not be taken lightly. Results show that the IT professionals in these organizations need to strengthen and develop their security thinking, in order to decrease the vulnerability of informational assets among SMEs. We believe that a perspective on understanding decision-making processes upon the cyber security measures by IT professionals in SMEs may bring a theoretical redirection in the literature, as well as an important feedback to practice.

**Keywords:** cyber security, SMEs, IT professionals, decision-making, security counter measures

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**PHD**  
**Research**  
**Papers**



# Flexibility of Information Technology Infrastructure Capability

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**Abstract:** This paper presents a synthesis of recent research on IT capability by considering the relevant themes arising from the top ranking Information Systems (IS) journals. This research paper defines the concept of information technology capability (ITC). These definitions point to the main components of ITC by providing definitions and traits of IT personnel capability (ITPC), IT management capability (ITMC), and IT infrastructure capability (ITIC). Subsequently this study focuses on the characterisation of IT infrastructure capability (ITIC). Previous research indicates that ITIC, as a factor, is integral to organizational IT capability (Fink & Neumann 2007). As part of this discussion the various dimensions of ITIC flexibility are considered. Notably, the dimension of ITIC are considered the most important trait of IT infrastructure capability (Byrd & Turner 2000; Liu et al. 2013). This paper concludes by providing a proposal of study which explores the relationship between ITIC and an organization's strategy. Finally, the limitations of this study are acknowledged.

**Keywords:** IT capability, IT personnel capability, IT management capability, IT infrastructure capability, and flexibility of IT infrastructure capability

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## Tool Support for Maintaining Clinical Guidelines: A Case Study

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**Abstract:** Clinical guideline development is a complex and time-consuming process. Authors involved in the development of clinical guidelines need appropriate software support to develop the guidelines and to publish them in a sufficiently formal and systematic way as the contents require constant maintenance through the lifetime of the guidelines. This paper presents the results of a case study performed on the process of maintaining national clinical guidelines in Norway. The aim of the case study is to identify challenges and issues the guideline authors face during the process of updating, especially with respect to information sys-

tems support. Eight selected authors from four different organizations involved in the process of authoring, disseminating, and updating the guidelines participated in the study. Semi-structured interviews were conducted to collect feedback about the provided information systems in their organizations. In addition, the subjects were observed during a normal workday while maintaining guidelines. Analysis of the results shows gaps and shortcomings in the present information systems. The information systems designed to support guideline authors are neither integrated in a desired way nor do they fulfil the users' needs in terms of functionality. Some observed deficits are: proper reference management systems, standardized terminologies, version controls, archiving systems, tracking of updates, and provisions of proper guideline templates. In addition, the lack of process support by the information systems forces additional external communication between different guideline authors. The case study results contribute to establishing a common understanding of requirements for designing an integrated guideline development infrastructure.

**Keywords:** information systems, evaluation, tool functionality, clinical guidelines, authoring tools

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## **Barriers and Enablers of Digital Business Model Transformation**

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**Abstract:** This paper presents some current results from an ongoing research into how a non-digital business model may transform successfully into a digital business model. Amit and Zott's break-through business model construct is assumed here as the core conceptual foundation for digitalization. Its main focus on economic value creation and appropriation attempts to unify several contemporary theoretical strands (Schumpeterian innovation, value chain logic, product-market strategies, resource-based view of firm, transaction cost economics and strategic networks). Building upon this conceptualization and by using a digital transformation of a bookselling company as a means of illustration, we bring to the forefront two central arguments to be considered for a successful transformation of business model from non-digital to digital. First, digital transformations shift the notion of firm centric value creation and as such cannot be comprehended without the network. Thus the digital transformation of business models implies multi-actor coordination, where no single executive authority may command the desired behavior, other than by means of negotiations. Secondly, the economic characteristics of digital information challenge conventional managerial wisdom

such as the function of positive network effects being opposite to the conventional business logic, reduction of transaction costs and the negligible marginal costs, among others. A key assumption here is that managers' wisdom is challenged by these characteristics of digital information economics as they act as filters that enable and hinder opportunities, adequate analysis, planning and decision-making. A review of previous studies on business model change indicates that digital transformation of business models is rather under-researched. Analysis show that whilst these studies provide solid grounds on the factors that hinder and enable business model change, they may not be sufficient to explain and account for digital transformation of business models. Majority of these studies provide very weak connections of the business model with the value network thus disregarding the very distinct feature of business model. We consider that future exploration of these central arguments that this study advocates, would potentially provide insights on how to embark into a successful transformation, and thereby avoid the tragic fate of Blockbuster.

**Keywords:** business models, digitization, business model transformation, economics of information

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## **Are Brand-Oriented and Customer Retention-Driven SMEs More Inclined to Exploiting eMarketing Opportunities?**

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**Abstract:** This exploratory study is aimed at empirically investigating cogent factors that might be responsible for SMEs to make use of eMarketing channels for the singular purpose of enhancing their brand competitiveness in a business environment that is characterized by demand uncertainty as well as stern competition from the more established brands in the (e)marketplace. More specifically, this study examines the exploitation of eMarketing opportunities from the viewpoint of a firm's strategic orientation(s) as well as its demographics. Prior to arriving at some of the new insights we have provided in this paper, survey data of 205 effective responses were obtained from SMEs in Nigeria. A non-probabilistic sampling technique, more precisely the quota sampling method was adopted for the purpose of actualizing the main objective of the study. Importantly, within the confines of this study, we presented a broader dimension of eMarketing channels utilization by enterprises and it includes at least the use of one of these tools - corporate website, blogging service, online social networks, search engine optimi-

zation technique, mobile marketing (bulk/customized SMS), and email marketing. Based on the study's findings, there is evidence ( $p < 0.001$ ) to show that firms that are more customer retention-driven (CRD) are more highly inclined to exploit eMarketing opportunities for the purposes of enhancing their brand competitiveness, such as brand image projection, customers' collaboration, and offering 'customized' solutions to clients' needs in the (virtual) marketplace. Further, brand orientation (BO) on its own does not have a significant positive influence on the outcome variable (i.e., inclination to exploit eMarketing opportunities) but that the relationship is significantly moderated by CRD. The moderating effect is statistically significant ( $p < 0.001$ ) at high CRD versus high BO. Further findings suggest that firms' demographics are equally important drivers of SMEs capacity to exploit eMarketing opportunities for enhanced brand competitiveness. The findings in this study could be of strategic value to entrepreneurs, scholars, and including policy makers given the immense contributions of SMEs to the global economy, especially African economies. Finally, the author wishes to acknowledge the fact that the current study did not take into account industry differences given that the surveyed SMEs are from a multiple industry setting. Consequently, this limitation calls for further research in this highly under-explored context area.

**Keywords:** Africa, brand orientation, customer retention-driven, eMarketing opportunities, firm demographics, SMEs

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## **Assessment of Corporate Social Performance Based on MADM Methods**

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**Abstract:** Together with the managerial decision to run a business in accordance with Corporate Social Responsibility (CSR) principles, important questions dealing with the necessity of systematic CSR evaluation and measurement should be answered. Organizations could use varied evaluation tools and procedures such as a special CSR audit, a certification, a quality mark, a non-financial report, a standard or sustainability indices that differ in methodologies, complexity and scopes of their appropriate application in various business sectors or organization structures. The main aim of this paper is connected with the application of the multiple attribute decision-making (MADM) methods such as group decision-making analysis and Analytic Hierarchy Process (AHP) in a complex CSR assessment of selected telecommunication organizations operating in the Czech Republic (*T-Mobile Czech Republic, a.s., Vodafone Czech Republic, a.s. and O2 Czech Republic, a.s.*). A group

of stakeholders (employees, customers and managers) was asked to participate in a preferences appraisal of criteria and sub-criteria of a hierarchically structured decision-making task based on Saaty's Pairwise Comparison method. Their opinions and judgements were analysed by computations of Consistency Ratio (CR), Geometric Consistency Index (GCI), AHP Consensus Indicator ( $S^*$ ) and Geometric Ordinal Consensus Index ( $GOCl_G$ ). Based on a content analysis of existing CSR reports, internet presentations and CSR publications corporate social performance of the organizations was evaluated by one expert. Final results were described with respect to a distributive mode synthesis and an ideal mode synthesis. Both syntheses brought the same ranking of the organizations within the sample. Organization *Vodafone Czech Republic, a.s.* achieved the best scores and it was considered to be the ideal in 6 sub-criteria. Company *O2 Czech Republic, a.s.* took a second place and achieved the ideal values in 3 sub-criteria. Finally, *T-mobile Czech Republic, a.s.* was placed in the third position. It is shown that group decision-making and AHP could be used in the field of CSR evaluation and comparison.

**Keywords:** analytic hierarchy process, corporate social responsibility, group decision making, geometric consistency index, AHP consensus indicator, geometric ordinal consensus index

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# **Masters Research Paper**



# Implications of Patient Empowerment From an eHealth Perspective

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**Abstract:** Ever more nations are struggling to meet the demand for have high-quality and affordable health services. Changes in fiscal environments, scarce resources together with the increase in aging population, chronic diseases and other illnesses have, however, made the needs of the modern-day patient more difficult to meet. Faced with these challenges, healthcare systems are moving from a traditional environment to an information environment, known as eHealth, to better meet health demand. In addition, many have called for patients to be involved in the production of health, a concept known as patient empowerment. A co-production is also believed to leave patients more satisfied with outcomes due to their involvement. To enable co-production, structural alterations need to be made and new methods applied to activate the role of patients. This paper discusses the implications of empowering patients so to enable them in becoming co-producers of health from a health practitioner's perspective. Hence, the study has made use of a qualitative driven approach so to enable an understanding of the ongoing empowerment of patients in the Västra Götaland Regional Council of Sweden. Therefore, semi-structured interviews were conducted with eight professionals all working at various levels within the public health sector. The professionals interviewed are a chief physician, psychotherapist, process manager, head of business development, nurse, physician, midwife, and physiotherapist. The yielded results provided a relatively common perception on the implications faced by the realization of empowering the Swedish patient. These implications touched upon five broad categories; time, knowledge, resource allocation, information and mistrust. As a conclusion, the paper stresses the need for healthcare providers to take into consideration the five identified factors hindering the progress of patient empowerment.

**Keywords:** patient empowerment, co-producing health, clinical relationships, health literacy, eHealth

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# **Work In Progress Papers**



# Research Proposal: Business-to-Business IT Capabilities as Conditioner of Business Model Reconfiguration

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**Abstract:** This paper presents a research proposal aimed to explore coevolution of firms' B2B-IT capabilities, at the relationship and network level, and interfirm collaborations to understand how those IT-enabled relationships affect value creation and appreciation through Business Model Change. In the recent years, interfirm collaborations have become critical for competitive success as digital interconnection between products and processes within and across industries proliferated and in turn disrupted traditional industries. Today's competitive landscape forces firms to constantly persuade strategic change and business models are dynamic IT enabled mechanisms which firms execute their intentions for strategic change and interfirm collaborations. Two sets of IT capabilities mentioned to be necessary for Business model reconfigurations, yet IS researchers have not studied how those capabilities are acquired in relation to the firms strategic intentions and how pre-existing capabilities affect adaptation of new strategies. Adopting a coevolutionary perspective, we aim to study this phenomenon through an explorative case study.

**Keywords:** business model change, B2B IT capabilities, coevolutionary perspective

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## Development of a Training Tool for Correct use of Protective Clothing

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**Abstract:** This work in progress paper will look at the steps that will be taken for the S-HELP (Securing Health Emergency Learning and Planning) project to develop

a training tool on the correct technique for donning and doffing personal protective equipment (PPE), from the initial development of operational definitions of the task to the potential role that simulation and video tagging can play in this training process. One of the central aims of the S-HELP project is to develop and deliver a holistic framed approach to healthcare preparedness, response and recovery. One component of the S-HELP solution will be training in the correct process of donning and doffing PPE. Availing of expert knowledge, we will develop objective, validated and operationally defined steps for task completion derived from a detailed task analysis of the donning and doffing process. These operational definitions will be defined explicitly to meet three criteria: objectivity, clarity and completeness. This allows for the elimination of inter-observer and intra-observer variability and standardises codification. Learning, training and assessment will be based on these objectively established definitions and standards. Proficiency-based progression will be employed as a method of training and will be achieved through the process of deliberate practice which involves the provision of immediate feedback on the performance of a task. Breaking down the task into its constituent parts allows for the implementation of deliberate practice at specific instances of the process rather than simply repeated practice of the entire procedure. It is deliberate rather than repeated practice that allows the person to effectively move beyond their current capability level. Simulation is a reliable method of skill development that can support the learner on the path from novice to become an expert in a safe and controlled manner. ASSERT simulation suite will track and monitor end user training in donning and doffing and support the learning process. Training content (lectures, simulations, video streams) will be tagged with task specific information for use and reuse across the different end user groups. Video recording and scenario playback with appropriate tagging will create a tagged data set linked to end user defined categories allowing for intuitive and seamless data search and dissemination. This will enhance learning and help refine behaviour. The integration of this training programme into a DSS solution will go beyond a mere technical-only solution and ensure the most appropriate information is readily accessible when required.

**Keywords:** donning, doffing, deliberate practice, metrics, technology-enhanced learning

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# USSD System for TB Contact Tracing: Server, Database and Security Issues

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**Abstract:** This paper discusses issues involved in the development of a mobile-based Tuberculosis (TB) contact tracing system. The proposed system involves the use of Unstructured Supplementary Service Data (USSD) technology to contact and interact with contacts of TB patients via a mobile phone to ask a set of questions to determine if a follow-up or TB test is required on the contact. Central to this system is use of a secure centralized database that will store data and provide health workers with access to the collected data to analyze, follow-up and view individual submissions, summaries and reports through either a mobile or web interface. An essential step in the development process is the setup of major infrastructure for the system which involves setup of the application and database server(s), USSD connectivity setup, and determination of the interaction process which is fundamental to the implementation of the mobile application. Issues involved include database setup and interoperability, protection of personal health information, and system security issues, both at the frontend and backend. This paper discusses these issues and decisions taken to address them. In addition, future work is outlined.

**Keywords:** USSD system, mobile phone, TB contact tracing

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# **Abstracts Only**



# Incorporating Mindfulness Mechanisms in Designing Support Systems for Multi-Agency Interoperability in Emergency Management

**Alexis Amaye, Karen Neville and Andrew Pope**  
**University College, Cork, Ireland**

**Abstract:** The design of information systems for multi-agency use has to consider a broad spectrum of functionality, environmental constraints, and system specifications. System complexity coupled with the complexity of disaster situations can challenge the quality of decisions made by multiple agencies coordinating in emergency management (EM). Mindfulness is a key aspect of high-reliability organization based on the capability to contain, recover and have foresight to prevent errors; these capabilities are also critical to groups engaged in preparedness of threat and risk analysis [Van de Walle and Turoff, 2008]. Through mechanisms which support mindful anticipation and mindful containment, group decision support systems (GDSS) can be designed to improve capabilities that help discover and manage unexpected events, thus improving the reliability of both multi-agency coordination and system functionality. This research paper aims to identify GDSS processes and methods that encourage mindfulness-based mechanisms common, necessary and associated with multiagency coordination in emergency management. Through consideration of design based on the collective mindfulness of strategic decision-makers models, procedures and structures can be created to enable organisation reliability [Butler and Gray, 2006]. Awareness of the cognitive processes which occur in groups of strategic decision makers in emergency situations should influence the design of support systems and tools that encourage positive feedback and counteract documented effects of disaster-induced stress [Plotnick and Turoff, 2008]. In this paper, we propose that that system design should incorporate adaptive processes based on a rational comprehensive approach with features which allow users to make sense of the reality they face to make better collective decisions. This is an investigation into GDSS mechanisms that help achieve organizational reliability in complex, changing environments. Drawing from studies on DSS features which support real-time decision making among groups described in existing literature, this paper will examine the concept of incorporating mechanisms to promote mindfulness in support of multiagency coordination. Using end-user requirements to reveal expectations on system functionality in the area of situational awareness, this paper will highlight mechanisms by which systems can assist groups anticipate threats for improved initial emergency response. Based on the expert insights related to situational awareness, the design of a GDSS can be influenced to support emergency response steps taken to anticipate and contain hazards and threats thus integrat-

ing a conceptual approach to influence performance outcomes. While the literature emphasizes the importance of information extraction and fusion, meaningful real-time decisions are made when awareness encourages the construction and maintenance of a situation model mindful of the critical needs of the operational picture. As academic researchers and system designers, the creation of systems which help achieve organizational reliability through mindful-based design can ultimately improve the quality of decisions made in emergency situations and performance of multiple agencies coordinating during emergencies. The findings can be used by system designers and policy makers to frame development with improved performance as an outcome and reliability as an achievable goal.

**Keywords:** multi-agency coordination, mindfulness, emergency management, IS design, decision support

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## **A Performance Analysis of ROK-MND's M-BcN Based on Private Investment Project**

**Sungtae Kim and Jinsoo Park**

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South Korea**

**Abstract:** The finances for construction and operation of public facilities related to rights for living of people should be secured from tax in principle, but there are limitations in national finances and necessary public facilities are continuously required. So procuring the finances which are insufficient from private capital is the core of private investment project. Private Investment Project basically refers to maximization of public works by introducing private capital and privately-specialized management techniques while maintaining its publicity. If introducing private investment project, the government can provide various essential facilities which are required for the nation in good times with the least government financial burden in a short period of time and provide quality service compared to cost based on the efficiency of private sector. The public functions of government and the private capital and technology are combined for construction and operation of public facilities. So the government can provide major public facilities to people in good times, in other words, social utility and obtain complementary effects that they can make up for insufficient finances as well. The Republic of Korea Armed Force established the M-BcN(Military-Broadband convergence Network) early through the Build-Transfer-Lease project. This paper reviews M-BcN projects in operation, and looks at the major effects of such a project: 1) early establishment of broadband convergence network owned by armed forces, 2) real-time sharing of forward area situations, etc. In addition, with respect to problems and subse-

quent improvement directions, this paper proposes development plans: 1) improve the limitations of proper timing for maintenance and repair of particular military forces, 2) improve the lack of clearly-designated mission manager who is responsible for wartime network management, 3) improve the limitations of network control function by army, etc.

**Keywords:** performance analysis of ROK-MND's military broadband convergence network

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