Conference Programme

The Inaugural

New Zealand Information Systems Doctoral Conference (NZISDC)

30 July 2010

Massey University
Albany Campus
Auckland, New Zealand
Welcome from the Conference Chair

It is my pleasure to welcome you to the Inaugural New Zealand Information Systems Doctoral Conference (NZISDC). The Conference has been many, many hours in the making by the Programme Committee and the Organising Committee. We offer New Zealand’s first forum for 25 Information System doctoral students to present their research-in-progress – current research ideas, approaches, interests, issues, and methodologies – and to receive feedback from fellow students and leading academics in the field.

NZISDC is a student led and managed event. The eight doctoral students on the NZISDC Programme Committee have cooperatively produced the programme and will manage the conduct of the conference today. The Conference Programme Committee is:

- Nicole Braun (Victoria University)
- Jim Danenberg (University of Auckland)
- Toktam Ebadi (University of Otago)
- Hartmut Hoehle (Victoria University)
- Brad McKenna (University of Auckland)
- Max Rohde (University of Auckland)
- Diane Strode (Victoria University)
- Shahper Vodanovich (University of Auckland)

NZISDC is offered under the auspices of the Professors and Heads of Information Systems in New Zealand (PHIS-NZ). PHIS-NZ was formed in December 2008 as a peer network of the IS professoriate and heads of departments / schools who are responsible for administering IS research and education in New Zealand universities. This Conference is PHIS-NZ’s first major initiative and has been guided by the Conference Organising Committee:

- Michael Myers (University of Auckland)
- Felix Tan (Auckland University of Technology)
- Dennis Viehland (Massey University)

Please join me in gratefully acknowledging the contribution of our sponsors shown on the facing page. Thanks to their generosity we offer you something very unusual in the world of academic conferences – no registration fee.

I invite you to learn, question, engage, network, and relax today as you enjoy the best of Information Systems doctoral research that New Zealand has to offer.

Dennis Viehland
Conference Chair, NZISDC
Associate Professor, Information Systems
Massey University
Conference Schedule

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Conference Participants

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<td>Adrian Bradshaw (Univ of Canterbury)</td>
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<td>Max Erik Rohde (Univ of Auckland)</td>
<td>Ahmad Ghandour (Univ of Otago)</td>
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<td>Arzoo Atiq (Univ of Auckland)</td>
<td>Allan Sylvester (Victoria Univ)</td>
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<td>Luiz Mendes-Filho (AUT)</td>
<td>Hartmut Hoehle (Victoria Univ)</td>
<td>Nor’ashikin Ali (Massey Univ)</td>
<td>Tony Thistoll (Victoria Univ)</td>
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<td>Fuad Baloch (AUT)</td>
<td>Haslinda Hassan (Massey Univ)</td>
<td>Norliza Katuk (Massey Univ)</td>
<td>Yasir Javed (Massey Univ)</td>
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<td>Raja Haslinda (Massey Univ)</td>
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THE BATTLE FOR THE SUPREMACY OF WIRELESS BROADBAND ACCESS (4G)

Competitions between technologies or technical standards may have multiple potential outcomes. Lessons can be learnt from historical cases such as Video Cassette Recorder (VCR), keyboard layout, operating systems, Internet browsers, video game consoles etc. The latest emerging occurrence of such cases is for the supremacy of 4th generation (4G) high-speed wireless Internet connectivity platform.

The contenders are Worldwide Interoperability for Microwave Access (WiMAX) and Long Term Evolution (LTE). WiMAX has the capacity to deliver high-speed Internet connectivity on much wider areas such as campuses, last mile coverage, and cities. LTE is the next leap from third generation (3G) networks, offering high-speed Internet and cellular connectivity.

In this study we firstly examine the economics of competition for standards, based on published literature and technological competitions from the past. Secondly we outlay the technical aspects and prominent features of these competing technologies (WiMAX and LTE) in the coming future and contrast their areas of competition. Finally we suggest how we can attempt to develop a model of competition between WiMAX and LTE for achieving the supremacy for the 4G technical standard using Agent-based Computational Economics (ACE), a branch of Agent Based Modeling (ABM).

The importance of this research can be justified. Firstly, because this research involves new technologies. Secondly, there are many perspectives about this competition are being talked about in tech blogs, news, corporate white papers, etc so there is opportunity to analyze these debates and perspectives in order to provide a detailed story that combines multiple views about the subject. Thirdly the competition is occurring right now (2010) so the research can provide market watchers valuable information about this problem. Lastly but more importantly this research provides us with one of the unique opportunities to use ACE as part of our methodology for this prediction as it occurs in real time.

Our first contribution is to contribute toward agent based modelling computing techniques especially the creation of agents with ‘learning’ capabilities and simulation of a technological battle while it is occurring. Secondly we wish to point out the significance of this battle; in the case of keyboard layout battle it was about a small component of a computer, and in case of video games or VCR standard the battle was amongst single companies. This competition for the 4G standard is no ordinary one, as it’s a war between the two technological camps, as opposed to single companies. Finally we are using ACE to implement and observe the effects of economics concepts on this competition. In doing so this study is attempting to breach the gap between economics literature and ABM, which is applied to an area of information systems.
KNOWLEDGE BETWEEN CONTEXT AND CAPABILITY: TOWARDS SEAMLESS KNOWLEDGE MANAGEMENT

Knowledge is a key resource for today’s organizations (Drucker, 2001), and there is little doubt that increasing the productivity of those working with knowledge can be extremely beneficial (Davenport, Thomas, & Cantrell, 2002). Although knowledge management is an established stream of research in many disciplines, organizations nowadays still struggle to manage and facilitate knowledge to their full potential.

This research is based on a theoretical foundation, which understands knowledge as two-folded concept: (1) as static capability of organizations; and (2) as deeply embedded in the context of its application. Organizations apply knowledge in the continuous challenge to adapt themselves to a changing environment (Weick & Sutcliffe, 2006). Herein, organizational knowledge bases are often too inflexible to be of use for the situational application of knowledge. Moreover, knowledge creation activities are often perceived as interfering with every day work practices (Kwan & Balasubramanian, 2003). This misalignment between knowledge capabilities and the contexts, in which knowledge is applied, is a persistent gap preventing efficient organizational adaptation.

Organizational literature discusses the tension between formalized routines and their enactment (Levinthal & Rerup, 2006). However, the implications for knowledge in the tension between static capability and dynamic enactment are often not explicitly considered. The pursuit of knowledge management processes such as externalization and internalization often leads to knowledge management practices, which are invasive with the natural way of conducting routines. This research seeks to investigate how context-sensitive organizational knowledge can be facilitated in seamless integration with organizational practices.

Simon (1996) proposes that scientific enquiry can be facilitated and guided by the introduction and observation of artefacts. This process can lead to new theoretical insights (Gregg, Kulkarni, & Vinzé, 2001). In IS research, design science is a valid approach to address a practical problem while arriving at new theoretical insights (Hevner, March, Jinsoo, & Ram, 2004). For this research, we adopt a multi-methodological approach based on Nunamaker, Chen and Prudin’s (1991) work. Therewith, this research involves the design, implementation, and evaluation of a framework, architecture and software implementation in order to “discover through design” (Baskerville, 2008) new insights into the research question proposed above. The software implementation aims at providing a domain-independent tool to express organizational information in a dynamic and distributed information network. An early version of the prototype can be downloaded from http://www.linnk.de. The architecture is aligned to guide the design and implementation of systems and IT landscapes, which enable the contextual integration of information, building on semantic web mechanisms (see Rohde and Sundaram, 2010). The framework is designed as a maturity model, which can guide organizations in implementations of network-oriented knowledge support systems.

Software implementation, architecture and framework are designed and evaluated in an iterative process, building on industry-standard software development methodologies. Additional validation is sought by user feedback garnered using social platforms, expert interviews, and software usage logs.

References are provided upon request.
IMPACT OF CONSUMER-PROVIDER INTERACTIONS IN THE DESIGN OF TECHNOLOGY ENABLED SERVICES

This research investigates the interactions of consumers and providers during the process of technology-based services’ design. It will further explore the output or value that these interactions co-create. For this research, ‘design of services’ encompasses design of new services as well as re-design of old services. In the current research, we frame consumer-provider interactions in designing of services using a service science lens (IfM and IBM, 2007). The service science paradigm emphasizes the co-definition of service value as collaboration among providers and consumers of the service.

Information Communication Technology and Services (ICTS) are designed for everyone irrespective of their age, gender, and skills. Service delivery mechanisms try to be personalized and customized. Glushko and Tabaas (2007) state that the mindset of front-end designers is towards managing experiences while back-end designers are still worried about efficiency and scalability. There is a need of collaboration between the two mindsets towards the entire network of services.

There are two basic research questions for this research. First is how can organizations facilitate the re-design processes of their service offerings through consumer interactions? Second research question is what impact these interactions have on the value of services. When properly executed, the outcome is an experience with meaning and value. Value of service specifically is concerned with quality and performance of that service. Thus, this research question is directly concerned with the value that interaction co-creates.

The goal here is to use an empirical approach to construct a model of service design that involves the relationship between design, interaction, and value. While the research addresses issues that are of general interest to the service science community at large, the fieldwork of this project will be grounded in a developing economy. Communication services in developing economies offer a unique insight about how new services are designed and deployed in environments where access to cutting edge services needs to be affordable and effective.

The research design will be qualitative, using ethnography as the research methodology. We will carry out the research procedures at one of the largest telecommunication provider in Pakistan. The researcher will spend more than twelve weeks in the organization to study the three communication services, their designers, and their consumers. The services, which will be under investigation, are 3G wireless service, IPTV service and Value added services on fixed line. The underlying philosophy is interpretive, which focuses on the social constructions like language, shared meanings, and instruments.

The research has the potential to contribute to existing theoretical knowledge surrounding service science, interactive services, consumer services, consumer services in developing countries, ethnography in organizations research approaches, and consumer input in services design process to name a few.

Similarly, as the research design is ethnography, which provides an in-depth analysis of the context, the research outcomes will help in the formulation of concepts that may guide the development of new adaptive and flexible technology-enabled services.
SUSTAINABLE STRATEGIC ALLIANCE SOCIAL NETWORKING SYSTEMS (SSA-SNS): THEIR REALIZATION AND VALIDATION

A strategic alliance is a collaborative approach among firms formulated and implemented to collectively meet shared objectives, provide the means of developing and attaining new markets, acquiring new means of distribution, gaining access to new technology and new markets as well as the pooling of resources. Sustainability, in economic, societal and environmental terms, is about the capacity to endure, meeting the challenges which can bring about a more stable and orchestrated future for firms, the planet and citizens. There is immense interest from policymakers, firms in various industries, consumers and the public in general in the management of strategic alliances and for meeting sustainability challenges on a global scale.

We suggest that sustainability practices are appropriate for and can be well utilized within strategic alliances. We also suggest that more research is needed to identify and understand how a Sustainable Strategic Alliance (SSA) business model could be best utilized for today's rapidly changing global business environment. We found that while a significant amount of research has been done on strategic alliances and sustainability, there is a paucity of research specifically regarding SSA.

Social networks allow users to realize and develop the collective intelligence of a community. This research explores the use of Social Networking Systems (SNS) to support the implementation and management of SSA. We will identify and investigate the techniques and technologies of SNS which may help to overcome the barriers to effective and efficient collaboration within a SSA in an effort to meet the challenges and capture the value of both sustainability and strategic alliances. Our objective is to identify and explore the key problems, key requirements, and key characteristics of SSA in order to design, develop, validate and utilize a SNS specifically designed for SSA. Results from this research will include a SSA-SNS and the associated design guide and implementation roadmap. We will conduct Delphi studies on a global scale with sustainability experts, strategic alliance experts, social networking experts, as well as various industry and international business experts in order to advance the initial theories, models, frameworks, guides, roadmaps and instruments for SSA-SNS research.
UNDERSTANDING HOW USER-GENERATED CONTENT (UGC) EMPOWERS ONLINE CONSUMER BEHAVIOR IN THE TRAVEL INDUSTRY

User-generated content (UGC) such as online travel reviews written by tourists on virtual communities are more available and used frequently to transmit travel-related decision. Importantly, the content generated by the Internet users is empowering online travellers in the planning and buying processes of their trips (Schegg, Liebrich, Scaglione, & Ahmad, 2008). A single common conception of empowerment is not appropriate across all disciplines and across all contexts (Sehgal & Stewart, 2006). There has been no prior research that explores how UGC empowers online consumers in the travel industry.

Following Rappaport (1987), Consumer Empowerment is defined in the context of this study as a process by which tourists gain control over their own destiny using the user-generated content when making a travel plan. By employing the Uses & Gratifications and Dual-Process Theories, we propose that Consumer Empowerment in the context of UGC can be formed through Content Empowerment, Social Empowerment and Process Empowerment. The three components of U&G theory (Content, Social, and Process) are proposed to form the concept of Content Empowerment, Social Empowerment and Process Empowerment, respectively in the Consumer Empowerment construct. Dual-Process Theory is used to help determine the Content Empowerment dimensions (argument quality, source credibility, information consistency, and information framing), and Social Empowerment dimensions (recommendation consistency, and recommendation rating). Process Empowerment dimensions are derived from U&G’s process gratifications studies (medium and entertainment).

The purpose of this study is to theoretically propose and empirically test a set of factors that integrate UGC adoption with Consumer Empowerment variables to enhance our understanding of how UGC empowers online consumer behaviour when making a travel plan. To undertake this study, a theoretical framework using the Theory of Planned Behaviour (TPB) as its basis was established. The following research questions will be examined based on the Consumer Empowerment construct and from the structure of TPB: What dimensions of Consumer Empowerment influence the use of UGC when making decisions about accommodation booking? What dimensions of TPB influence the use of UGC when making decisions about accommodation booking? The behaviour in question is the intention to use UGC when making a travel plan. The directionality stated in each hypothesis is derived from the three empowerment constructs (Content, Social and Process) and from the structure of TPB.

A focus group with ten international backpackers staying in the Auckland YHA hostel has been employed to validate the preliminary instrument developed based on items identified by relevant prior research. Also, a group of 50 backpackers has been chosen to pre-test the pilot questionnaire to ensure that the items will adapt appropriately to the current context, as well as modify the wording of measurement items. Surveys with international backpackers will be employed to test quantitatively the hypotheses. The questionnaire will be distributed to 250 backpackers staying at Auckland YHA. After the data collection the research model will be validated using Partial Least Squares (PLS), a technique comprised of measurement and structural models.
Utilizing Critical Realism as a Methodological Approach for IS Research

Critical Realism allows for the exploration of problem areas involving humans and technologies from a philosophical perspective that is neither strictly positivistic, nor dependent upon value-laden subjectively created truths. The escape from the two conflicting poles allows for a deeper understanding of rich IS artefacts like the Internet, which involve a complex set of relationships between competing stakeholders. This paper examines the application of Critical Realist approach in its ability to sustain a research process that intends to examine the governance processes that take place on the Internet from a holistic viewpoint. It is argued in the paper that Critical Realism’s ability to both guide the epistemological pursuit of knowledge and its ability to define the ontology of complex IS entities like the Internet make Critical Realism a methodological approach of choice for IS researchers involved with ambiguous entities.
KNOWLEDGE, COMPETENCIES AND THE ROLE OF CONSULTANTS DURING IS IMPLEMENTATION PROJECTS IN SMES

Small and medium-sized enterprises (SMEs) depend on the services of external consultants to successfully implement information systems (IS). This is due mainly to the nature of SMEs as lacking the requisite resources, knowledge and skills to implement IS themselves. However, research on the role that consultants play in implementing IS in SMEs is under-developed. Although research recognises the importance of IS consultants it does not provide an explanation of their impact on SMEs. Additionally, previous research identified consultant effectiveness as a predictor of IS success in SMEs (Thong 2001), there is a lack of research towards the theoretical development of this relationship. Previous research does not determine what attributes are necessary for consultants to be effective in implementing IS in SMEs. This study attempts to fill this gap by proposing a model of the role and effectiveness of consultants and their effect and impact on SMEs.

This study explores the role and impact of consultants on SMEs resulting from the implementation of IS. To investigate this phenomenon, this study adopts a theory of the firm perspective; in particular the resource based view (RBV) (Barney 1996) and its enhancement the knowledge based view (KBV) (Spencer and Grant 1996) combined with organisational knowledge creation theory (Nonaka and Toyama 2005). Surprisingly, theories of the firm have not been widely used in previous research to examine the implementation of IS in SMEs.

The study is divided into two phases, phase one attempted to answer the question:

• How do consultants impact SMEs when engaged to implement IS projects?

With the specific objectives:

• To determine the role of IS consultants
• To determine how, by engaging in that role, consultants affect IS success
• To develop a high-level model of consultants’ role and effectiveness in SMEs

Phase two poses the following questions:

• How does consultant engagement influence knowledge assets in SMEs?
• How does consultant engagement influence organisational IS competencies in SMEs?

With the following propositions:

• Consultants influence the creation and exploitation of IS knowledge assets and compensate for IS competencies in SMEs.
• For consultants to be effective they must positively influence IS knowledge assets and IS competencies.

The results of the study are an important step in developing a model of IS consultant effectiveness in SMEs. It provides a link between the impact of consultants, competencies and knowledge which are considered the strategically significant resources that a firm possesses. The study is also of practical significance as it should assist both SMEs and consultants to understand the role that consultants play and the overall benefits that SMEs can derive from engaging consultants.
In New Zealand, many businesses are investing in setting up their websites to sell goods and services as online trading becomes more popular. This action has caused disillusionment for some companies as it is difficult to clearly articulate the real benefits which could be derived from being online. This is may be due to the lack of an evaluation framework that enables owners to diagnose the performance of their eCommerce website. Current evaluative approaches presented in the literature are based on the users’ experience and fail to address the owner's concerns. The research presented here is focussed on how to evaluate eCommerce websites based on the owner's experience point of view.

In order to be able to evaluate eCommerce websites, this study: (a) proposed a conceptual framework for eCommerce website evaluation, (b) developed measurement scales for the conceptual framework, (c) collected data based on owners' perceptions (experience) with their websites, (d) tested the scale in businesses implementing eCommerce websites, and (e) investigated the relationship between the dimensions in the conceptual framework.

The proposed research model is based on the current conceptualisation of Information Systems (IS) success models which suggest that success is a multidimensional construct. However, the customer experience is the dominant view taken in these success models. In the proposed model, and in order to address the concern of businesses setting up a website, evaluation is considered from the owner point of view. That is, a process model which links website offer to its payoffs through usage. Extra theoretical perspectives were necessary to account for the shift to the owner’s experience. Since the evaluation is based on the owner’s process understanding of creating a website, the owner satisfaction is included in the process as a contextual variance. This will enable factors in the evaluation model to be clearly linked in causal relationships that lead to owner satisfaction as an ultimate favourable result.

Data were collected from 225 New Zealand businesses that have an eCommerce website through an online survey. The research model was tested using the two-step approach of Structural Equation Modelling (SEM) where the structural model and measurement model were separately analysed. A set of measurement models was used to determine indicators that capture each construct and a structural model was used to determine the relationships between concepts. Each measurement model was tested in isolation, then factors forming the endogenous variables, followed by factors forming the exogenous variables were each separately tested, and finally a collective network was determined and tested.

The key findings of this research showed that there are four factors that explain the change of performance in the website. These factors are: website offer, usage, financial returns, and owner satisfaction. The study concluded that websites could be evaluated along those four factors the effectiveness of which could be monitored along their measurement scales. It is also premised on the same variable that these factors function in a serial manner and the ultimate measure of effectiveness is owner satisfaction. The study also concluded that these factors explain the success of a website; each factor is necessary but not sufficient on its own to explain the success of a website.
ONLINE AND MULTI-CHANNEL SERVICE QUALITY IN THE NEW ZEALAND PUBLIC SECTOR – AN ORGANIZATIONAL LEARNING INVESTIGATION INTO SERVICE DELIVERY DESIGN MOTIVATION

Motivation for the study: There is a growing body of evidence that suggests multi-channel organisations are often more successful than single channel configurations. However, merely adding channels without a clear strategic intent is not a guarantee of service delivery success. Indeed, increased channel choice can inhibit service quality. The creation of a successful delivery systems strategy is critical to ongoing online service quality. My scans of the current research lead me to conclude that organisations are often quite good at understanding the standards they are required to comply with. In addition, they frequently have a good appreciation of the best practice requirement that they need to have demonstrable competence in. Where I believe there is a gap in the understanding of online multi-channel service quality is in the cultural dynamics that underpin the key decisions that are made in service delivery systems design.

Purpose of the research and any research questions, objectives or propositions being investigated:

• Primary question: How do managers, designers and implementers of service delivery systems learn about the aspects of service quality that enables them to build effective service capacity?
• Sub Question A: What part does organisational learning play in the systems development life cycle of service delivery systems?
• Sub Question B: How do managers, designers and implementers of service delivery systems recognise and apply their understanding of quality standards and best practice to the design of service delivery systems?
• Sub Question C: How can organisational learning strategies be applied to the support of managers, designers, and implementers who build service delivery systems?

The theoretical basis for the research: The service quality literature emphasizes that minimizing customer contact time increases service quality. So, providing more channel choices should not equate to making the customer work harder to achieve the same service levels they would have received via a single channel. My research uses organizational learning theories as a framework for looking beyond the seemingly obvious reactions to situations and considers why and how managers, designers, and implementers build systems in the way they do. I am hoping to identify new mechanisms that will encourage a deeper understanding of how personal learning and the learning of the wider organisation can be focused to bring about service delivery systems projects that deliver improved service quality. Frontline managers have an important role to play in closing the service-performance gap. These managers are well positioned to evaluate service delivery performance first-hand and initiate change. The objective of this research is to go some way towards accurately representing how participants approach learning about service delivery systems and how these participants influence the design and development of those systems.

Proposed research methodology: The research follows a systematic multiple-case, case study approach. The cases are organized into three dyads comprising of two local government agencies, two education providers and two central government agencies. The qualitative data has been gathered from interviews with level 2 and 3 managers, systems designers, and implementers.
Problem: Effective coordination is acknowledged as a critical element in both organisations (Van de Ven, Delbecq, & Koenig, 1976) and software development projects (Curtis, Krasner, & Iscoe, 1988; Kraut & Streeter, 1995). Nidumolu identified a critical problem concerning coordination in software development: “how can software development projects be coordinated more effectively in the presence of uncertainty?” (Nidumolu, 1995, p. 213). Agile methods (sometimes referred to as ‘agile software development’) are a class of system development methodologies (Iivari, Hirschheim, & Klein, 2004) that arose a decade ago, that have fundamentally changed software development practice (Abrahamsson, Conboy, & Wang, 2009; Agerfalk, Fitzgerald, & Slaughter, 2009; Baskerville, Pries-Heje, & Ramesh, 2007; Rajlich, 2006). Agile methods are explicitly designed to deal with change and uncertainty. However, these approaches de-emphasize many traditional mechanisms for achieving coordination, such as forward planning, extensive documentation, adherence to a pre-specified process, contracts, and role specialisation, in favour of intensive face-to-face communication and other simple practices. This raises a research issue: how is effective coordination achieved when agile methods are used in software development projects? Addressing this issue will contribute towards a greater understanding of this important approach to software development for the field of information systems development.

Purpose and Research Questions: The aim of this study is to examine how software projects are coordinated when producing complex software products using a team-based collocated agile development approach, and how this approach contributes to effective project coordination. The research questions are:

1. How is coordination achieved when using an agile development approach?
2. What is the impact of the coordination strategy of an agile development project on project coordination effectiveness?

Theory Base of Research: Malone and Crowston’s (1994) interdisciplinary coordination theory (CT) will be used to explore coordination within agile development projects with the purpose of identifying different coordination strategies.

Research Methodology: The study will be positivist and have two phases. Phase one will be a qualitative multi-case study (Eisenhardt, 1989; Pare, 2004; Yin, 2003) comprising four agile projects and one non-agile project. This will be used to develop a ‘coordination strategy’ construct. Phase two will be a quantitative study involving a survey to investigate the relationship between the coordination strategy used in agile software development and coordination effectiveness.

Potential Contributions: For practitioners, this study will provide knowledge on the appropriate practices to select from an agile method based on their coordinative properties and project dependencies, rather than adopting practices haphazardly or based on trial and error. For IS research, this study will provide a coordination-theoretic approach to the study of agile software development and will use this theory for prediction.

Current Status of the Study: Candidacy and HEC approval achieved. Data is in hand for one pilot and three further cases. Data analysis is underway.
CONSUMER INTENTIONS TO USE ELECTRONIC BANKING CHANNELS: THE ROLE OF TASK-CHANNEL FIT

Motivation for the study: The increase in electronically mediated self-service technologies in the banking industry is changing the way banks service consumers. Despite a large body of research on electronic banking channels, no study has been undertaken to explore the importance of the fit between electronic banking channels and banking tasks. Nor has there been research into how ‘task-channel fit’ and other factors influence consumer intentions to use electronic banking channels. This research proposes and tests a theoretical model addressing these gaps.

The theoretical basis for the research: Apart from the adoption (Diffusions of Innovations) and acceptance theories (TRA, TPB, and TAM), the theoretical grounding for this study comes from prior research on task-technology fit, or TTF (Goodhue et al. 1995). TTF argues that individuals using information systems with a high TTF will perform better than users carrying out similar tasks on technologies with a low TTF. Since its introduction, the TTF model has been applied in a diverse range of IS contexts. However, most researchers have studied the TTF of specific technologies in mandatory and organizational use settings. The present study adapted the TTF to examine not specific technologies, but rather delivery channels. The specific context is voluntary use of electronic banking channels at the individual level.

Research methodology: Five exploratory focus groups were conducted in order to re-assess the initial conceptualization of the research model. Next, measurement scales were developed using expert rounds and two pre-test evaluations. Central to the scale development was the measurement of the TCF construct. Drawing on IS strategy and alignment literature, a parallel instrument was created to calculate the TCF across five unique ‘task-channel fit’ dimensions. To test the research model quantitatively, data were collected from 280 consumers using Internet banking applications for two different banking tasks. The analysis of the TCF theory suggests that the TCF construct and other antecedents of consumer intentions to use Internet banking explain more than 70% of variance in the model.

Potential contribution of the study:

Theoretical value: This study adapts the task-technology fit theory (Goodhue and Thompson, 1995) by investigating consumers’ intentions to use an online delivery channel rather than a specific technology. To date, no previous study has used TTF theory for this purpose.

Construct and measurement value: This study also contributes to construct specification and measurement. The TTF theory was developed within an organizational context characterized by involuntary use. So far, very little is known how this concept can be applied at the individual level (Staples et al. 2004). This study addresses this issue since it developed and validated a survey questionnaire instrument to measure the TCF of electronic banking channels.

Practitioner value: The third contribution of this study is to banks and financial institutions distributing their products and services through electronic banking channels. This study conducted relevance checks with several senior managers working for three German banks. The interviews indicated that a measure of task-channel fit would be highly valuable for practitioners as it would enable them to better judge which banking products to offer via each of the channels their bank supports.
THE EXTENT OF E-PROCUREMENT ADOPTION IN NEW ZEALAND: AN INTEGRATED MODEL

E-procurement has long been accepted as a business-to-business purchasing practice that utilizes internet based technologies to identify potential sources of supply, to purchase goods and services, to transfer payment, and to interact with suppliers. In New Zealand, e-procurement has become the largest area of e-business interest. This is due to e-procurement’s ability to simplify business transactions between organizations, reduce paperwork and cycle times, expand supplier bases, eliminate errors, and the opportunity it provides for businesses to trade over regional and geographic boundaries at lower cost. Existing literature has given much attention to e-procurement adoption, rather than to the extent of e-procurement adoption. Hence, little is known about the degree to which e-procurement has been used within organizations.

Many studies have also concentrated on large organizations in Western (e.g. United States and Europe) and Asian (e.g. Singapore) countries, however, only very limited research into Small and Medium Enterprises (SMEs) exists, especially SMEs in Asia-Pacific context countries like New Zealand. This study is, therefore, conducted to develop a measure of the extent of e-procurement adoption and to examine the key factors that influence the extent of e-procurement adoption in New Zealand SMEs. SMEs are a key concern because they represent major businesses in New Zealand and form a significant portion of New Zealand’s Gross Domestic Product. The findings of the study will not only differentiate between the adopters and non-adopters of e-procurement, but also report on the breadth of e-procurement adoption, focusing specifically on the extent to which an organization takes advantage of the variety of e-procurement functionalities available.

An integrated model of the Technology-Organization-Environment (TOE) framework and Diffusion of Innovations (DOI) theory is formulated. The TOE framework is used to strengthen what has been generally ignored in the DOI theory. In general, the TOE framework identifies three contextual factors, namely, technological, organizational, and environmental contexts that may influence management’s decision to adopt a particular technological innovation. In the studying of the innovation adoption, these contexts provide a complete understanding of the decision process. In this study, it is hypothesized that the extent of e-procurement adoption in New Zealand SMEs is being influenced by the technological (i.e. relative advantage, compatibility, and complexity), organizational (i.e. top management support and employees’ IS knowledge), and environmental (i.e. competition intensity, partner readiness, and external pressures) contexts.

A cross-sectional survey using a self-administered questionnaire is employed for data collection purposes. The questionnaire will be distributed to the Chief Executive Officer (CEO) of the organization, who is generally the owner and manager of the business. SMEs are more likely to adopt e-procurement technology when their CEOs possess a greater knowledge of information technology and have a positive attitude towards the technology adoption. Measurement items are adapted from various sources, including the literature, software functionalities, and related websites. The questionnaire will be refined via several runs of experts’ reviews, pre-test, and pilot test before the actual distribution takes place. Data will be analyzed using Partial Least Square (PLS) technique.
THE EFFECT OF TEAM DIVERSITY ON THE PRODUCTIVITY OF SOFTWARE DEVELOPMENT TEAMS IN NEW ZEALAND

Software is a critical component of information systems and correspondingly software development is a key activity in developing information systems. Software development teams are increasingly ethnically diverse due to the growth in distributed software development and a globally mobile labour force. It is also common for software development teams to have gender diversity as between 10% and 40% of the IT workforce is female in most countries. Given that team composition is a critical determinant of team performance, it raises the question of how ethnic and gender diversity within software development teams affects the performance of those teams. Previous studies into this question provide some indications but are limited to either qualitative research or analyse diversity along dimensions other than ethnicity and gender. There appears to be an absence of any quantitative research into the effect of ethnic and gender diversity in software development teams, in a way that also takes into account other factors already known to affect software development productivity such as requirements volatility, programmer experience and team continuity.

Given the gap that exists, this research seeks to analyse the effect on productivity arising from diversity in software development teams. This is important as software related costs represent a significant component of business costs. Furthermore, the cost effective development of new or changed software is critical to support advances in today’s technology dependent society. Such research will aid a software producing organisation in answering questions regarding (1) the degree to which it should pursue diversity in its software development teams; (2) the effect on productivity it should expect from establishing software development teams with gender and ethnic diversity; and (3) the benefits of implementing programmes which result in more diverse software development teams.

A post-positivist perspective has been adopted in order to understand and quantify the relationship between diversity and productivity in software development. A mixed methods research approach will be employed using a concurrent embedded design with an emphasis on quantitative data. To support this, a conceptual model has been developed based on COCOMO II representing software development productivity as a socio-technical system. Using this model as a basis, data will be gathered on software projects completed over the previous 12 months by software-producing organisations within New Zealand. Information already held by participating organisations will be used where available. Where further data is required a combination of questionnaires and interviews with key project personnel will be used. A detailed analysis of the relationship between the variables that affect productivity will be undertaken to establish the correlation, and potentially causal relationships between team diversity and software development productivity.
WILLINGNESS OF STUDENTS' AND EDUCATORS' TO LEARN WITH MOBILE TECHNOLOGY: AN EMBEDDED MIXED-METHODS INVESTIGATION

Mobile technology has increasingly become a focus in academic circles as a way to enable learning that is not confined by time and place. A large number of research activities have looked at how this technology can be harnessed to elicit the benefits with which this tool affords both students and educators alike. Mobile technology is still in the early stages of adoption and its true value and impact on education is still to be clarified. The future adoption of mobile technology will largely depend on the perception of students and educators on whether mobile technology fits within their particular needs and concepts. The decision of both students and educators to adopt mobile learning is a complex process with a wide number of influencing factors. This study aims to highlight the factors that will impact on future use, or possible resistance to, the introduction of mobile technology within the tertiary environment.

Adoption theory was used, in this study, to describe the willingness of educators and students to use their mobile devices to support their teaching and learning. A high number of models and theories have arisen which aim to uncover the factors that will influence the adoption of technology. These factors range from the focus on the technology itself, through to the psychological characteristics of the individual. The UTAUT, which synthesis eight of the most widely discussed adoption models, was adopted to help provide an insight to the factors that will affect the adoption process.

This study draws on both qualitative and quantitative data, which will be used to answer the following research questions:
1. What is the current perception of mobile learning with reference to the perceived benefits and limitations which mobile technology afford learners and educators
2. What is the current level of preparedness of learners and educators to the possible introduction of mobile technology
3. What factors influence the perceptions of students and educators in regards to the use of mobile technology in education

In this research, a variation of the mixed method embedded design was adopted. The qualitative data collected in this study was collected to provide a supportive, secondary role to the quantitative data. The motivation behind the selection of this design was that a single data set was not sufficient to truly outline how mobile technology would be adopted and perceived in education, therefore different questions need to be answered, and each type of question required different types of data.

The initial phase of this research was to carry out a number of small scale case studies which introduce mobile learning into the academic environment. Data was collected using focus groups and interviews which focused on obtaining an insight into the attitudes and factors that influence adoption of mobile technology within the classroom. The second phase, currently being undertaken, will focus on a quantitative approach, where surveys will be distributed to students and educators at a number of polytechnics and universities in New Zealand. The survey focused on gathering student’s perceptions and in particular which factors may influence the future adoption of mobile learning.

Ultimately, this research aims to help illustrate how mobile technology could be used to support learning and to draw a framework of factors that will determine future adoption of mobile learning.
EVALUATING AN E-GOVERNMENT FRAMEWORK USING ANALYTICAL HIERARCHY PROCESS (AHP) METHOD

This research presents a new model of e-government in that it will be useful for local, state and federal governments. This new model focuses on e-government Web sites interaction from the perspective of citizens. Given the rising number of citizens visiting e-government Web sites seeking information, acquiring services, engaging in forums/dialogues and doing online voting and also increasing of budget being allocated for e-government initiatives, it is timely to investigate citizen’s responses on participating in e-government Web sites.

This research aims to investigate factors at personal or human computer interaction (HCI) and community or socio-technical levels of information system (IS)/ information technology (IT) system that influence citizen’s intention to participate in e-government Web sites. Personal factors of interest are privacy, usability and functionality whereas community factors of interest are fairness, public good and transparency. Government as a structure can be categorised into federal, state and local governments. In e-government context, types of interaction between government and citizens can also be divided into three parts: e-administration (e.g.: submitting and paying income tax, renewing of driver’s license or paying of traffic summons), e-negotiation (lobbying for reduce in good service tax, campaigning on environment issues against air pollution) and e-representation (having direct access of communication with representatives or participating directly in policy decision making process).

Main research question is to investigate both personal and community software properties factors influencing citizen’s intention to participate in e-government Web sites at different types of government and at different types of online interactions. This research will use survey questionnaire as instrument and data collection will involve both federal government and local government in Malaysia and New Zealand. AHP with goal programming (GP) method is adopted for this research where it is a technique of decomposing, making pair wise comparison and synthesising priorities of all criteria, sub-criteria and against a set of alternatives involved.

The expected contributions of this research are expanding the theory of planned behaviour (TPB) in IS field by investigating personal and community software properties factors in different types of interaction at both federal and local governments and different types of interaction. In addition, e-government Web sites that takes into account citizen’s concerns (citizen-centric) may likely to draw citizens to participate online with their governments. From practitioners’ perspective, by having citizens’ approval and acceptance at early stage of developing and implementation of e-government Web sites will save time and tax payer’s money.
The purpose of this research is to examine the factors that motivate users to act safely online in order to protect their data. As more people are online and more data is created, there is an increasing danger that this data may be damaged, released, or made unavailable as a result of an internet threat such as malware. While anti-virus software and firewalls can offer some protection to users, these technologies are still subject to decisions made by users. In order to better understand why users make particular decisions about security behaviours online, we can look to what motivates these decisions.

Other research has examined users’ internet security behaviours in terms of email use or the use of protective software. In contrast, this study takes a broader view, and instead focuses on what motivates users’ general security behaviours online. By understanding what motivates users to act safely online, it may be possible to create better training programmes, and better software that place more emphasis on what motivates users rather than focusing on the dangers as identified by security companies.

Researchers have started to examine questions of security motivations using health and behavioural theories including the Theory of Planned Behaviour and the Health Believe Model. This research examines internet security behaviours by utilising the concepts of (1) perceived severity, (2) perceived susceptibility, (3) perceived threat, (4) internal motivations, (5) external motivations, (6) benefits and barriers, (7) cyber security intentions, and (8) demographic factors.

This research is being carried out in two stages. The first stage utilised focus groups to gain a broad understanding of users’ perceptions of threats online and reasons why they do or do not engage in safe behaviour. This phase was completed in early 2010. The second phase of the research is currently in progress. During this phase individual interviews will be utilised to explore topics raised during the focus groups in greater depth.

In the first stage of the research, the results indicated that participants’ perceptions of threats were generally similar between the focus groups. Participants were most concerned about (1) malware, (2) fraudulent websites and (3) phishing threats. Based on these threats, participants were most concerned about the potential for (1) ID theft, (2) data loss, and (3) loss of confidentiality. Despite these concerns, participants generally agreed that laziness and lack of knowledge prevented them from taking actions to protect their cyber security. What did motivate people was a desire to protect their children and a desire to protect what they consider to be important data. The concept of prior experience was unique in the focus groups as it was a concept that had both a positive and negative influence on users’ behaviours. If participants did not have any prior experience with a cyber security incident, there appeared to be less concern about cyber security. In contrast, where users had prior experience with a cyber security incident they were much more likely to be proactive in protecting their data and computers from threats online.
A KNOWLEDGE MANAGEMENT SYSTEMS SUCCESS MODEL FOR HEALTHCARE

Knowledge management systems (KMS) have been a topic of interest for both healthcare practitioners and scholars, stemming from the very substantial investments in information technology (IT) in healthcare organizations during recent years. Although healthcare organizations have started to invest in knowledge management initiatives, there exists very little research, particularly in the form of empirical data to guide the healthcare stakeholders in the successful implementation of KMS. Previous studies in other industries have found that the implementation of KMS is often unsuccessful due to the reluctance of employees to use these systems to share knowledge. Merely implementing KMS does not guarantee success in KM initiatives. The effectiveness of KMS may be impaired by the lack of attention paid to social and cultural aspects. Motivated by such concerns, this study formulates a theoretical model to explain factors that can influence healthcare professionals to use KMS for knowledge sharing and retrieval. This study views employees’ behaviour in using KMS to share and retrieve knowledge as a critical factor for KMS success.

This research will provide an empirical study by constructing a set of questionnaire items to measure KMS and to answer this question: What are the determinants of KMS Success in healthcare? This research proposes an integrated theoretical model which combines the technological, social and organisational factors in determining the success of KMS implementation in healthcare. Kulkarni’s KM Success Model, which is an extension of the DeLone and McLean IS Success Model will be adopted and extended to suit the context of knowledge management systems in healthcare. This research will look at whether KM system quality, knowledge content quality, user satisfaction, perceived usefulness, leadership, incentive, culture of sharing, subjective norm and perceived security may have an influence on the use of KMS for sharing and retrieval.

This model will be validated through a cross-sectional survey of healthcare organisations with a healthcare professional as a unit of analysis. The instrument for the model was based on the literature review and existing instruments with some modifications to suit the context of KMS in healthcare. A content validity was assessed using expert judgments. To further validate the instrument, a pre-test and a pilot test will be conducted. Besides contributing to theory building in the area of KM in general and KMS in particular, the results of this study have implications for KM practitioners by providing better understanding of the factors that can influence knowledge sharing and that would encourage more use of KMS. Thus, this research will enhance development of KMS in healthcare.
EVALUATION OF AN INTELLIGENT TUTORING SYSTEM (ITS) WITH MULTIMEDIA THEORY

This research intends to study cognitive aspects of learners, so how educational practitioners factor them in designing Intelligent Tutoring System (ITS) is central to this study.

From the prior literature, we are now aware that whilst there have been various research directions in the ITS domain, many of them seem to have sidelined the effects of multimedia contents, arising from the cognitive nature of the learner, so quite how we can guide educational practitioners to effective multimedia content design remains elusive.

Multimedia contents have been used to serve different purposes in computer-based learning systems. Thus, this study focuses on the multimedia content representation, especially dynamic sequencing of the multimedia content. Simply put, many multimedia contents consist of texts and images for delivering knowledge to learners. Mayers’ theory of Multimedia Learning is a theoretical lens to see the pivotal differences between the media effect in learning. As an extension to this theory, some researchers have employed the effects of two different modes of texts (i.e., printed - visual and spoken - auditory) along with images (visual information). A number of psychological studies have managed to witness the combination of images (visual information) with spoken texts (auditory information) could produce better learning outcomes, for which can be described with the dual modality principle. In conjunction with the findings, we are interested to figure out whether or not the dual modality principle would be rehearsed in an ITS environment, where curriculum sequencing is the centre of its design practices.

We will also study the modality effect in ITS with an additional factor - types of knowledge, which would be the main contribution of this study to the research community. The types of knowledge can be divided into declarative (e.g., facts, theories, etc.) and procedural (e.g., process, procedure, etc.). As human memory has different ways of processing them, an empirical study investigating the effects of contents modality in ITS applications is beneficial. This research will evaluate the effects of modality in representing either declarative or procedural knowledge through three aspects of learning outcomes; 1) retention of knowledge (memorising the contents), 2) transfer of knowledge (applying knowledge in a new context), and 3) flow experience (concentration in learning).

To empirically ensure, this research will be implemented through two phases of experimental studies. The first phase will investigate the effects uni-modal (images + printed texts) for presenting declarative contents with the dynamic sequencing method in comparison with static sequencing method. The second experimental study will analyse the effects of uni-modal and multimodal (sound + images) in presenting declarative and procedural knowledge respectively.
A STUDY ON THE IMPACT OF NATIONAL CULTURE ON STRATEGIC INFORMATION SYSTEMS PLANNING

As organisations embrace internationalisation they increasingly face the challenge of conducting strategic information systems (IS) planning in multiple cultural contexts. Therefore, the mechanism of how a culture impacts this planning success is of considerable practical interest. In this study, the researcher summarises the available evidence on the determinants of strategic IS planning success, namely the level of user participation and management commitment. These determinants could be influenced by the cultural dimensions of collectivism, uncertainty avoidance, long-term orientation and power distance directly or via their determinants. The researcher uses the determinants of strategic IS planning and cultural dimensions to formulate a correlational model of the impact of national culture on strategic IS planning success. Methodologically, the researcher conducted a questionnaire survey to collect the data. While the model introduced in this study is novel, all of the constructs included in the model were tested elsewhere and have known validity and reliability characteristics.

The findings of this study will contribute to both theory and practice. It is believed that this study will increase understanding of the impact of national culture on information systems planning by providing such a model. It is also believed that this study will raise the awareness of the user and the top management of their own importance in terms of their participation in, and commitment to, the organization’s information systems planning. It is through such participation and commitment that organizations will reap the benefits of planning since they will be better able to adopt different policies for planning that suit culturally diverse locations.
DEVELOPMENT AND VALIDATION OF A COMPREHENSIVE MODEL OF E-LEARNING SYSTEMS SUCCESS

Over the past few years there has been an extensive growth in interest in the development of e-Learning systems in the higher education sector to improving teaching and learning processes. Previous research has identified that mere implementation of e-learning systems does not assure e-Learning success. Therefore, measuring success of e-Learning systems has been an important theme for practitioners and researchers in terms of justifying the enormous investments on e-Learning initiatives. Despite considerable empirical research in this area, the majority give insufficient attention to underlying e-Learning success dimensions that are essential in a comprehensive measure of e-Learning systems success. To gain a holistic view of systems success, a complete set of success dimensions of the development process, use process, e-Learning product and the impact or the consequences of system use would be more fruitful.

In an attempt to fill the void, this study addresses these limitations, in part by theoretically conceptualizing and empirically validating a comprehensive model to measure e-Learning systems success in the higher education context. This study aims to answer the research questions (1) How to formalize various facets of the concept of e-Learning systems success as a multidimensional measure? (2) What are the determinants of e-Learning systems success? After an extensive literature survey, fourteen success dimensions have been identified as important for measuring overall success of e-Learning systems. Two studies will be conducted. The first study will aim at identifying what factors contribute towards the development of a high quality course. This model will be tested with university lecturers. The second study will be concerned about e-learning system success from a learner perspective. The theoretical models were developed as extensions of the well accepted DeLone and McLean IS success model.

Methodologically, this study relies on a quantitative framework using a cross-sectional approach. Measurement of variables is based on existing e-Learning and information systems literature. For validation purposes the content validity, construct validity and reliability will be addressed. The content validity of the instrument was carried out by using the views of thirty e-learning researchers and practitioners and the necessary refinements to the instrument were carried out according to their suggestions. The construct validity will be explored by formulating structural models accounting for the determinants of e-Learning systems success. The relationships in the models are hypothesised based on the literature review. Data collection will be carried out using questionnaire surveys. The data collection consists of three stages; pre test, pilot study and the main survey. The contributions of this research are: firstly, to make a contribution to future research by informing what has been studied in the area of e-Learning systems success; secondly, to operationalise and validate a comprehensive model for measuring e-Learning systems success; and finally, the validated e-Learning success measurement model will be of interest and practical use for e-Learning practitioners as a means of identifying the overall success of their e-Learning initiatives.
MANIPULATIONS OF LIMB PERCEPTION USING AUGMENTED REFLECTION TECHNOLOGY

In recent years, the field of mixed reality has grown immensely. Practical applications for the use of this technology encompass many fields. Two of the prospering new fields are medical rehabilitation and pain management. We believe that through interdisciplinary research, by combining technology with clinical expertise, psychology, neuroscience and business, we can advance the understanding and improve the therapy of a wide range of neurological disorders such as complex regional pain syndrome (CRPS) or phantom limb pain (PLP). The overall aim is to provide technology that helps therapists to make the best possible decision in the therapy of such disorders.

CRPS is a chronic pain condition that commonly occurs following trauma to a limb. It has been estimated to affect 1 out of 2,000 persons injured in accidents. In many (up to 84%) cases, CRPS is coupled with body perception disturbance (BPD), e.g. patients perceive their limb to be bigger, longer or otherwise deformed. Mirror visual feedback (MVF) has been shown to be an effective way to reduce the pain in CRPS and PLP.

MVF is typically provided by a mirror vertically propped up between two limbs, with the reflective side towards the intact normal limb. The patient is asked to look into the reflective side where the mirror image of his healthy limb is shown; this creates the visual illusion of two healthy limbs and by moving the normal limb the sensation of moving the impaired limb is evoked. The use of an optical mirror however has several limitations and challenges related to suspension of disbelief, low limb ownership or invariance of the environment the limbs are displayed in.

These limitations can be overcome with Augmented Reflection Technology (ART). The problem that the chronic pain patient always sees the mirror and thus finds it is hard/impossible to believe that the mirrored image is the other limb, can be solved by decoupling the visual input from the output. In ART we record/capture the limb with webcams, process the video-images digitally and output the rendered images on a computer-screen. This allows a more natural view of the limb and facilitates the belief in the ownership of the limb i.e. people are more likely to believe that a limb, digitally mirrored and displayed on the side of the contralateral limb, belongs to them.

Our current research investigates the perception of limbs visualized using ART. In the first stage we are researching the changes of limb-perceptions of neurological normal participants on the visualisation of manipulated limbs. We believe that limb size and changes in the background of the displayed limb have the most impact among possible manipulations. We are currently exploring what manipulations are possible and suited for an experiment. Our hypothesis, encouraged by literature from cognitive neuroscience, is that minimising the displayed limb would decrease the sense of presence and ownership related to that limb. The present effort is to plan an experiment and find measurable factors that were either already reported in literature or are novel due to the new possibilities given by ART. The experimental design will be presented at the colloquium.
ADAPTIVE LEARNING ENVIRONMENTS: AN ONTOLOGY BASED APPROACH FOR LEARNING MANAGEMENT SYSTEMS

The knowledge age we live in demands continuous learning support in accordance with the needs of learners. The opportunities of learning are changing with the advancement in technologies. The paradigm in learning is shifting from conventional e-learning towards context-aware learning. As a result, learning becomes more project-oriented and nomadic, in the sense that learners spend their daily life as “nomads” in transit between many physical places (“oases”) such as classrooms, labs, museums, home etc. Therefore, the concept of nomadic learning has been evolving in order to provide adaptive learning contents according to the learning context. Traditionally, current learning management systems (LMS) are used to deliver learning contents with limited adaptive functionality, ignoring contextual aspects. Therefore, we require quick and robust approaches for developing adaptive learning environments, which can support the delivery of adaptive learning contents from any platform in any format to any device through any network at anytime anywhere.

Ontology-based design approaches have gained interest as a technology in learning environments because they may provide the platform for solving problems raised by semantic heterogeneity in information systems based on different logical data models, they inherently work on a semantic rather than syntactic level. However, current literature on how ontology-based design approach can possess the necessary flexibility to respond to nomadic learner activities in adaptive learning environments is limited. Therefore, further work is needed to identify the main concepts used in adaptive learning process that might be represented as domain, learner and context ontologies. We may then leverage these ontologies to develop adaptive LMS environments for nomadic learners.

This research will be based on the applicability of ontological based systems and will address some important research questions such as:
• How does an ontology-based approach support access to information in nomadic learning environment?
• How does the usability of a system support access to information in nomadic learning environment?
• How do adaptive learning contents help nomadic learners to support their knowledge and skills?

In order to answer these research questions, the design science methodology is proposed. Activity-oriented design methods (AODM), based on the Activity Theory, are applied in order to support early phases of the prototype design namely: the processes of gathering and analysing system design requirements, generating research questions, system evaluation and communication findings in the design activity. For measuring the usability of the prototype, ISO usability metrics will be used for the evaluation of the adaptive mode of delivery in different learning contexts. In addition to that experimental method will be used for evaluating the learning experience of the learners. In short, we are assuming that by implementing ontology-based design approach will lead us to provide equal level of opportunities for supporting nomadic learners in adaptive learning environments.
ENTERPRISE MOBILE SECURITY: THE DETERMINANTS AND THE IMPACT OF USER SECURITY BEHAVIOURS

Security incidents involving mobile devices may lead to unauthorized disclosure of sensitive data, financial loss, public relations failures, and ultimately loss of revenue. While in the past information security research primarily focused on technology-based countermeasures, there is a growing interest in the role of user security behaviours, mainly with regard to using Bluetooth technology, sending and receiving emails, and browsing the internet. When an employee in an enterprise carries mobile devices around, the device is likely to be exposed to a variety of networks with different security standards, resulting in security risks. Virus spreading in mobile networks is also influenced by social interaction between users who carry mobile devices. Social interactions can be divided to two main categories; interactions between strangers who meet sporadically, and interactions between people who meet on purpose (such as colleagues or customers and service providers), possibly more regularly and for longer periods of time.

These situations lead to the main objective of this study which is to assess the likelihood of particular behaviours resulting in enterprise-wide mobile malware or virus propagation and, ultimately, enterprise damage. The most viable approach to studying mobile security appears to be simulations, as these allow exploration of what-if scenarios to be carried out very inexpensively and safely. Therefore, simulation is the methodology that is used in this research. A simulation model describing the user security behaviours in using mobile devices is formulated. The simulation program then is developed and run using NS-2 simulator. By executing the simulation at different control parameter values, it will determine how the user behaviours in using mobile devices influence the malware or viruses spread throughout the enterprise. The findings of this study could contribute to both theory and practice. It is believed that the results obtained could provide the data describing the pattern of security-relevant behaviour and the impact of user behaviours on mobile enterprise security. In practice, these findings could be used by the management as well as the policy makers to create new policies or improve current polices on mobile device usage in the enterprise.
PRENEURIAL AGENCY IN IT CREATION

The research problem emanates from the practitioner community where entrepreneurs and intrapreneurs endeavour to bring an Information Technology (IT) based innovation into being and realise that they cannot do so by themselves. How these entrepreneurial actors go about securing and using the resources they need, in order to act upon the entrepreneurial opportunity and achieve their aim, is at the core of the phenomena being investigated. This research is motivated by personal experience in how difficult it is to develop an IT innovation and how the entrepreneur and entrepreneurial firm must seek out and leverage resources they do not have or even know about. New Zealand’s Information and Communication Technology (ICT) entrepreneurs must do much with little.

The entrepreneur though his/her actions or agency, as it is commonly referred to, are located in and participate in, social structures such as personal social networks and firms. In these social structures they interact with other people in order to secure and combine the resources required to bring their entrepreneurial vision into being. These interactions are a specific focus of the research study. By gaining a better understanding of the factors impacting on the social interactions, it is hoped that entrepreneurs and managers within entrepreneurial firms may become more skilled, efficient and effective in their activities and processes needed to bring technology creations into being.

An interpretivist epistemology was adopted and the qualitative research method of grounded theory used for the research. Specifically, the Glaserian variant of the grounded theory method as interpreted for use in IS studies is used. The approach taken in the generation of theory was inductive, allowing the theory to emerge from the data, rather than from preconceptions.

Technology innovation research has largely focused on adoption and diffusion issues. The IT innovation field is concerned with understanding the factors that facilitate or inhibit the adoption and diffusion of emerging IT-based processes or products within a population of potential adopters. This research investigates what occurs prior to the technology creation coming into being. How does an intangible idea become tangible and become expressed as a prototype?

The research study comprised twenty-four interviews with entrepreneurs, intrapreneurs and key actors they interacted with, in order to create their respective IT innovations. Through applying the constant comparative process within the grounded theory method, a Basic Social Process of Preneural Agency in IT Creation was identified which explained the actions both the entrepreneur and intrapreneur went through when creating the IT artefact. This process has six stages: Designing, Establishing, Acquiring, Guiding, Validating and Extricating. The findings of the research are currently being written up as part of the Ph.D. Dissertation.
SUPPORTING MASS EVACUATION: USING ONTOLOGY TO IMPROVE SHARED SITUATION AWARENESS

Situation Awareness (SA) is a critical element of emergency decision making where time and information needed to make decisions are insufficient and lives are at stake. Better SA can improve operational effectiveness by facilitating the planning process improving the quality and timeliness of decisions, and by providing better feedback about the consequences of early actions. The biggest challenge in improving SA is to improve the shared SA of the team involved in the emergency decision making response. Team members with different environmental, personal, social, task and spatial-temporal contexts make it challenging to provide a single system for all members. We will analyse how semantic technologies might be used to address these challenges. We suggest that an approach featuring domain ontologies, reasoning capabilities, semantic queries and semantic integration techniques, provides the basis for an integrated framework for improving shared SA of a team. Primary research questions include:

1. What are the information needs of emergency managers for decisions about mass evacuation?
2. How do emergency managers build their conceptual representations to make collaborative sense of complex situations?
3. How to extract entities and relationships from multiple individual representations to generate shared representation?
4. How to provide guidance for users in identifying the right information to search for and integrate it with existing information?
5. How ontology can be used to improve collaborative sense making?
6. What are the fundamental design principles of Emergency Decision Support System with special reference to mass evacuation?

Design research methodology is being used for this research. The data collection will start with information needs of emergency managers following recognition of a risk of volcanic eruption. These needs include determining the type of information required and the process of collection, integration, synthesis, presentation, and sharing of information. Modelling the processes to reach a decision will underpin the design of the emergency decision support system (EDSS) for mass evacuation. Clearly, evacuation causes financial, physical, psychological and social upheaval and the disruption should only be considered when the benefits of leaving are judged to out-weigh significantly the risks of staying. Incorrect and untimely decisions can cost lives and poorly managed evacuations can also lead to a strong resentment of the authorities which can jeopardize their future ability to act effectively.

Cognitive Task Analysis (CTA) will be used to study the process of shared SA development. Based on information requirements an EDSS for mass evacuation will be designed and prototyped. The prototype will be evaluated using a method called SAGAT which has been empirically validated in providing valid and reliable assessment of SA. The results will be generalisable to many other team decision scenarios and emergencies. Other anticipated outcomes include better understanding of how emergency managers develop their individual and shared situation awareness, how they make critical decisions under stressful conditions and improved emergency management and response capability.
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