Selected Thesis Abstracts

The following Abstracts should provide you with an indication of the sort of work I like to supervise, in terms of topic as well as method. In each case the full thesis citation is shown, and the thesis can be downloaded from the link provided.

You should also carefully read the material provided by the University regarding enrolment for graduate studies – either at Master’s or PhD level – including the important information regarding Scholarships for study:

- Master’s: http://www.otago.ac.nz/study/masters/index.html
- PhD: http://www.otago.ac.nz/study/phd/otago009275.html

The Scholarships are highly competitive, but if you are a student with very good grades you will have a good chance of securing financial support for your studies.

Before you contact me you should read through all the information on my website so that you are sure that we will work well together. If you have not read this material I am unlikely to reply. You might even read one or two of my papers to get a feel for the research that I conduct! While many are available online I’d be happy to email them through to you if you indicate those of particular interest. Note also that, as part of the admission process, I will ask you to prepare a draft research proposal, so that I can assess the extent of your commitment as well as your research interests.

I look forward to hearing from you!

Professor Stephen MacDonell
This thesis examines the adoption of mentoring practice across the Information Systems (IS) project management process in the context of project success improvement. The purpose of this research is to propose a model expanding on prevailing theories and research by explaining the nature and effects of mentoring practice adoption in IS project management (Gregor, 2006). This study adopted a two-part multiple-method research approach. As little was known about the nature and characteristics of IS project management mentoring in practice, an exploratory survey was conducted to assess the landscape of mentoring practice adoption. Practising IS project managers who were staff of multinational companies (MNCs) based in Malaysia were asked to relate their mentoring adoption experiences and perceptions as mentees across the IS project management process. Forty-six IS practising project managers participated in the initial web-based survey. Subsequently, in-depth one-to-one interviews were conducted using open-ended and semi-structured questions. To this end, McCracken’s (1988) long-interview technique was used to draw out the experiences and perceptions of interviewees in narrative form. Narratives were collected from twenty-one IS project managers who were a subset of the initial group surveyed. The collected interview narratives were analysed using the iterative and constant comparison analysis technique of Miles and Huberman (1994).

Drawing on a combination of theoretical frameworks, including Kolb’s theory of experiential learning (D. Kolb, 1984; D. A. Kolb et al., 1999), social exchange theory and communitarian theory (Gibb, 1999), the three models of mentoring (apprenticeship, competence and reflective models) (Maynard & Furlong, 1993), and the mentoring model of Anderson and Shannon (1995) this research has made significant contributions. This research not only contributes to IS literature but also IS project management practice and policy.

The espoused theory of IS project management mentoring provides a better understanding of the requirements, nature, and extent of the role of mentoring in effective IS project management. In this regard, four key findings emerged from this study. Firstly, mentoring support was affirmed as an effective mechanism for project success improvement and problem-solving enhancement. Secondly, mentoring support nurtures IS project managers. Thirdly, learning is a key and effective outcome under IS project management mentoring; mentoring as a learning platform was efficacious. Fourthly, human capital can be fostered and social capital enriched through mentoring adoption. The study found that participating IS project managers were provided with tactical support towards project success over the duration of the project and, over the long term, their competencies were perceived as being enhanced. IS project management mentoring therefore brings about the suggestion of advancement and maturation of competencies to IS project managers.

As for key contributions to IS project management practice and policy, this research underscores the efficacy of mentoring adoption in the soft-skill development, strategic overviews and development of key deliverables, and improvement of key project processes that are related to scheduling, staffing and costing. This research also brings knowledge of key impediments to mentoring practice adoption, and this can serve as early warning signals. Last but not least, the strengthening of IS project management competencies can be done by advocating purposeful adoption of IS project management mentoring practice and/or by institutionalizing the role of IS project mentors in IS projects. These pragmatic advices to practice and policy may lead a greater human capital investment realization of the person of IS project manager.
Context: Systematic literature review (SLR) is a methodology used to aggregate all relevant evidence of a specific research question. One of the activities associated with the SLR process is the selection of primary studies. The process used to select primary studies can be arduous, particularly when the researcher faces large volumes of primary studies. Another activity associated with an SLR is the presentation of results of the primary studies that meet the SLR purpose. The results are generally summarized in tables and an alternative to reduce the time consumed to understand the data is the use of graphic representations. Systematic mapping (SM) is a more open form of SLR used to build a classification and categorization scheme of a field of interest. The categorization and classification activities in SM are not trivial tasks, since they require manual effort and domain of knowledge by reviewers to achieve adequate results. Although clearly crucial, both SLR and SM processes are time-consuming and most activities are manually conducted. Objective: The aim of this research is to use Visual Text Mining (VTM) to support different activities of SLR and SM processes, e.g., support the selection of primary studies, the presentation of results of an SLR and the categorization and classification of an SM. Method: Extensions to the SLR and SM processes based on VTM were proposed. A series of case studies were conducted to demonstrate the usefulness of the VTM techniques in the selection, review, presentation of results and categorization context. Results: The findings have showed that the application of VTM is promising in terms of providing positive support to the study selection activity and that visual representations of SLR data have led to a reduction in the time taken for their analysis, with no loss of data comprehensibility. The application of VTM is relevant also in the context of SM. Conclusions: VTM techniques can be successfully employed to assist the SLR and SM processes.
Computer-based information systems (IS) play an increasingly pervasive and important role in contemporary organisations. Despite decades of continuing research and the development of an extensive prescriptive literature, IS development projects continue to be problematic, with many failing or being seriously challenged. In addition, the IS development environment has changed significantly in recent years, with rapid advances or shifts in technology, increasing devolution of IS responsibility and expenditure to user groups, high levels of packaged software acquisition and customisation, greater outsourcing of IS development, and an increasing emphasis on enterprise-wide and inter-organisational IS. In many cases these changes are interrelated and involve more flexible, ad hoc or non-traditional development approaches. Combined with the fact that at the same time IS have become increasingly sophisticated and integrated, the potential for unpredictable or unintended consequences has also increased.

Together, the continued problematic nature of many IS projects and the changing IS development environment, suggest that there is an ongoing need for a fuller understanding of IS development processes and practices. Given the limitations of factor-based, prescriptive studies, an understanding of how contemporary IS development is enacted needs to be grounded in and built upon the cumulative body of research that attempts to understand the complexity and dynamic nature of IS development. Accordingly, this study uses a conceptualisation of IS development as a process in which an IS emerges from a dynamic and interactive relationship between the technology, its social and organisational context, and the negotiated actions of various individuals and groups. The thesis presents the results of an extensive empirical investigation into contemporary IS development practices based on data collected from New Zealand. The study uses a range of research methods and ultimately develops a sociotechnical process model of IS development as situated action.

Following Walsham’s (1993) emphasis on the content, context and process of IS-related organisational change, the methods used in this study are three-fold. First, an extensive literature review is undertaken to provide a comprehensive synthesis of contemporary empirical knowledge about the content of IS development. Second, a survey is used to collect contextual data about IS development and acquisition practices in New Zealand. Finally, these both support an in-depth longitudinal case study of the IS development process in an organisational setting.

The literature review synthesises the results of recent empirical studies of the various influences that shape IS development, using a classificatory framework based around actors, project content, IS development processes, and context. The review shows that, while a number of traditional factors influencing IS development continue to be relevant, other factors have emerged as important as a result of changes to the IS development environment and to IS development practice. In particular, increasing recognition within the IS literature has been given to the relative importance of people and process and of the organisational and environmental context in which IS development takes place.

The results of the literature review inform the design of a survey instrument intended to provide an updated assessment of IS development and acquisition practices in New Zealand organisations. A Web-based survey was administered to a sample of senior IS managers in 460 public and private sector organisations with 200 or more FTEs. Based on the 106 usable responses, the results of the survey confirm the ongoing relevance of a number of traditional factors identified in the IS literature as facilitating or inhibiting IS development. However, a number of factors were identified as emerging or increasing in relevance in light of changes in the IS development environment.

While the survey provides a useful description of contemporary IS development and acquisition practice in New Zealand, it does not enable a detailed understanding of IS development in action. To address this, an IS project in a large New Zealand organisation was followed in action for over two years. The project involved the development of a sophisticated financial database model using a
purchased commercial software package and external consultants. As such, it provides a useful exemplar of development in a contemporary IS environment. The case study illustrates how a seemingly small, well-defined project experienced delays and difficulties as might be expected in larger, more complex projects. It offers insights into the significance of external actors, the importance of full stakeholder participation, the influence of initial characterisations of the nature of the project, and the observance of project management processes. Consideration of the project outcome reveals its multi-dimensional, subjective and temporal nature.

A process approach (Markus & Robey, 1988) is employed to structure the analysis of the case study. A combination of temporal bracketing, narrative analysis and visual representation is used to analyse the sequence of social action and organisational processes involved in the project and to develop a process explanation of how and why the particular project outcome in this case study developed over time. Underpinning and informing this analysis is the construction and utilisation of a model of IS development as a situated, sociotechnical process. Drawing on theoretical concepts from structuration theory and the sociology of technology, the model considers the situated actions and practices of various individuals and groups involved in IS development, the ways in which these are enacted within different contextual elements, and the role of existing and new technological artifacts in this process. IS development is characterised as iterative and emergent, with change occurring dynamically from a trajectory of situated interactions (in which meanings and actions are negotiated) and intended and unintended consequences.

As a whole, this PhD highlights the changing nature of the IS development environment and the way a complex ensemble of ‘factors’ interact to influence IS project outcomes. Common themes emerge around the importance of people and process, and the context in which IS development takes place, while at the same time explicitly including a consideration of technology in the analysis.
This thesis investigates the role of technology-use mediation in supporting the work of global virtual teams.

The work is set in the context of a longer term action research programme into collaborative computing and global virtual teams, initiated by Auckland University of Technology in New Zealand and Uppsala University in Sweden. Over the period since 1998, global virtual collaborations involving teams of students from both universities have been conducted annually. This thesis investigates the 2004 collaboration cycle, in which participants from St Louis University Missouri joined the collaboration. This was the first triadic collaboration, and covered Northern, Southern and Western aspects of the globe while traversing three widely divergent time-zones.

In spite of the extensive experience in collaboration possessed by the coordinators at all three sites, the results of the global virtual trial were at best mixed. This repeated experience of dissatisfaction in our global virtual collaborations, in spite of the technology being in place has been a primary motivator for this work. Why is global virtual collaboration difficult? What roles and activities are critical? How can we do it better? These are not issues solely to do with the student actors in the global virtual teams, but more to do with the supporting cast, engaged in “activities which involve the shaping of other users activities of [technology] use” (Orlikowski et al., 1995, p.425). Thus came about my interest in exploring the topic of technology-use mediation.

This thesis applies a research framework adapted from DeSanctis & Poole’s “Adaptive Structuration Theory” (1994) by the author. Initially applied to “facilitation” in virtual teams “Extended Adaptive Structuration Theory (EAST)” (Clear, 1999a), has undergone further development. The resulting research framework “Technology-use Mediated AST (TUMAST)” is applied here for the first time to investigate technology-use mediation activities performed during the global virtual collaborative trial.

A corpus of data based on the email communications of supporting parties to the collaboration is analysed in depth in this study, applying a combination of grounded theoretic and structurational techniques. Thus a very rich and firmly grounded picture of the processes of technology-use mediation is built. This thesis represents the first known in-depth longitudinal study of technology-use mediation in a real global virtual team setting.

From this exploratory study some novel theorizations have resulted. Methodologically it demonstrates analysis of technology-use mediation applying the TUMAST framework in a manner that captures the richness and evolution over time of these complex activities. Substantively it proposes a novel theory of “Collaborative Technology Fit (CTF)”. It is hoped that future global virtual team coordinators and researchers may apply the theory in order to map their situation, and diagnose their degree of collaborative alignment on multiple dimensions, thus enabling corrective actions to be taken. While the work arises in a tertiary education context, it reflects the reality of professionals at work in a global virtual team. Its application within other domains remains to be proven, but readings from the literature, and personal experience within global virtual software development teams suggest its wider applicability.
In contemporary software development, frequent user engagement throughout the development process is commonly viewed as good practice, leading to increased development productivity and user satisfaction with the product. Contemporary Agile software development methodologies, as adopted by many practitioners, promote such frequent and timely involvement of users. The quality of this user involvement may be variable in its contribution to the software project, however. While there are many factors that may influence the quality of the user involvement, in this thesis it is posited that the degree of alignment or misalignment of expectation of user involvement among the development and user groups is an important factor in the quality of user involvement. There is little documented research in this alignment of expectations of user involvement, and an investigation of this in practice is the basis of this thesis. Furthermore there is no consistent meaning to the notion of “quality of user involvement” in related literature and so another aim of the thesis is to get a deeper understanding of the meaning of “quality” in user involvement.

The scope of the investigation presented in this thesis is to develop an instrument for comparing expectations and use this to identify patterns of alignment in expectations by role. The linking of alignment of expectations to project success is beyond the scope of this investigation. A framework for conceptualising “quality” in the context of user involvement, as well as characterising significant barriers and enablers to high quality user involvement, are also goals of this research.

The approach to the investigation is based on a systematic, role-by-role comparison of user involvement expectations using Repertory Grid techniques. The standardised grids of constructs and elements related to user involvement were constructed from a synthesis of relevant current literature. Three grids were used for comparison of expectations by role: the nature of the involvement, the modes of communication associated with the involvement, and the characteristics of the user that influenced user involvement. In addition to the Repertory Grid data, interview data were gathered from participants through a series of semi-structured interviews. Thematic analysis of the interviews was used to develop conceptual frameworks related to the notion of “high quality user involvement” as well as to identify the significant enablers and barriers to high quality user involvement.

Two Agile software development organizations based in New Zealand, were the case organizations for this study. A total of nineteen interviews were conducted with technical roles including Developer, Project Manager, Business Analyst, Tester and user roles such as the Product Owner and Subject Matter Expert. The results show no strong misalignment of expectations of user involvement across both the user roles and development roles for the case organizations studied, and some interesting patterns were uncovered. Some significant barriers and enablers of high quality user involvement are also identified, providing some useful insights to guide the design of future techniques and tools to support high quality user involvement.
Software comprehension is a complex and ongoing challenge facing the software development industry. The often immense number of interrelated components in contemporary software systems places a high cognitive load on software stakeholders, whose job requires deep understanding and awareness of those constituting components. Among many approaches, 3D visualisation of the software static structure has recently emerged as a promising approach that is increasingly being demonstrated to significantly help in alleviating that cognitive burden by exploiting and leveraging humans’ natural perceptual abilities.

Furthermore, in addition to easing comprehension and increasing awareness of constituting software artefacts, this technology has the potential to bring visible various important aspects of the software process that could potentially make this technology a valuable tool for a wider spectrum of software practitioners. Recent literature, however, shows that the majority of prior research has limited itself to visualising the software product and in the best cases, only highlighted some effects of the software process.

This thesis identifies and attends to this gap in software visualisation research by introducing a novel visualisation approach named Conceptual Visualisation. It asserts that visualising the software process not only has several potentially beneficial implications for the software industry, but that from a cognitive perspective, visualising those process in the context of the software structure is particularly suitable and significant to increase human awareness and understanding of both the processes and their implemented product artefacts. The proposed approach is designed and constructed following a systems development research methodology and adhering to the principles of sound design science research. It is then assessed via functional demonstration, being applied to six open source systems of varying size and complexity. Conceptual Visualisation is shown to make a novel contribution to the software visualisation research literature, addressing many prior stated requirements in doing so. Once developed beyond a proof of concept, its use in practice should bring multiple benefits to a range of software stakeholders.
Information technology, information systems and applications have become key survival factors in modern organisations. Technology can transform and redefine organisations and the way they operate. As the power of information technology (IT) intensifies and organisations work to exploit the full capacity of IT, the role of IT management in those organisations becomes more and more important. This importance is reinforced by the increasing pervasiveness of IT along with highly competitive operating contexts. As IT initiatives are generally implemented via projects, the management of IT projects has come under increasing scrutiny. IT projects continue to fail; as a result, while research in IT project management has grown, many challenges for research and practice remain.

There have been many studies of the IT project management context; however, very few have considered project initiation decisions. The primary intent of this research is therefore to investigate IT projects particularly in terms of their initiation. As these projects originate from decisions made by management, it is important to understand the drivers of these decisions. Therefore, the objective of this research is to explore the influencing factors in IT project decisions during their initiation.

A combination of semi-structured interviews and the repertory grid data collection and analysis method was employed to investigate the motivating factors and primary drivers that influence individual IT Managers’ project initiation decisions. Eighteen participants representing six medium and large organisations were interviewed. A total of forty-nine IT projects were identified by these eighteen managers. A rich data set was collected and in-depth analysis was conducted. The results showed that there are multiple underlying reasons for the decisions made at this early stage and that there are some common patterns of decision drivers among the interviewed IT Managers. For instance, most projects are still motivated by a desire to achieve efficiencies or cost savings, their potential tends to be assessed using cost benefit analysis, and packaged software solutions along with consultancy services are widely employed in solution development and delivery.

Drawing on the results as well as prior research, an ‘IT Project Pre-Initiation Decision Framework’ is proposed to assist IT Managers and others in their evaluation of rationales during the preliminary project initiation decision-making process. This multidimensional matrix evaluative framework is intended to assist IT Managers in ensuring the cogency of rationales with an ability to make objective appraisals. In order to justify the proposed approach as a universal evaluative framework, it is necessary to conduct in-depth and longitudinal case studies from different perspectives. Future research is also needed in identifying to what extent project initiation decision(s) might lead to successful or unsuccessful project outcomes.
MCIS (Hons.II(i)), Self-organising Maps (SOMs) in Software Project Management, AUT, L. Dai, 2011 (Role: Joint Supervisor. Co-supervisor: J. Buchan, School of Computing and Mathematical Sciences) http://hdl.handle.net/10292/4516

Although numerous researchers have devoted much time and effort to the issue, generating a reliable and accurate cost estimate at an early stage of the development life cycle remains a challenge to software engineers. In recent years an increasing number of studies have turned their attention to the employment of machine learning, especially Artificial Neural Networks (ANNs), in performing such estimation activities. A Self-Organising Map (SOM) is a particular type of ANN that utilises a neighbourhood function that can be used as an unsupervised clustering tool. Its ability to project multi-dimensional data into a two-dimensional map makes the SOM appealing to software engineers.

In addition, the vague and ambiguous nature of real world software data demands techniques that can handle fuzziness. Accordingly, researchers have introduced fuzzy logic approaches such as fuzzy sets, fuzzy rules, fuzzy inference and the associated fuzzy clustering techniques into the original area of neural networks. Following a thorough literature review, it was decided that Self-Organising Maps could be an appropriate candidate for estimation in software project management. In order to investigate our hypothesis we build predictive models using Self-Organising Maps and compare them with Linear Regression models. The Fuzzy C-means algorithm is utilized in our study to pre-process ambiguous and vague real world data, which also refines the clustering outcome.

This study presents and analyses the results of three case studies that use data sets from different software projects. The findings indicate that Self-Organising Maps surpass Linear Regression in all three cases (even when noise was introduced), both in terms of generating more accurate estimates and presenting easy-to-understand relationships among the project features, when compared to Linear Regression models. Alternative approaches and extensions are suggested in order to overcome the limitations of the study. Other recommended future study areas include, but are not limited to, exploring alternative approaches to forming Fuzzy Self-Organising Maps (FSOMs), adopting new versions of the Fuzzy C-means algorithm, and investigating further the sensitivity of SOMs and FSOMs.
The software industry has been plagued by the staggering failure rate of projects, which have resulted in the loss of billions of dollars. The well-known Chaos Report by the Standish Group declared that software projects are in chaos with only 16.2% of software projects actually being successful in the year 1994 and a more recent study by them suggest that 32% of the projects were successful in the year 2009 (Eveleens and Verhoef, 2010; Dominguez, 2009; Bishop, 2009).

The post-mortem examination of failed software development projects reveals that failures do not happen overnight and that long before the failure, the projects render significant symptoms or “early warning signs” of trouble (Kappelman, McKeeman and Zhang, 2006). A warning sign is an indication or an event that predicts or alerts impending problems. Early warning sign provide an indication of manifesting risks. This research mainly focuses on a new and innovative concept known as early warning signs which could be incorporated into ongoing project risk management to ameliorate the project success rates by addressing early warning signs encountered during the project. The project risk management theories are not closely integrated with the early warning phenomenon but this can apparently be utilised as a tool in project risk management (Nikander, 2002).

The study utilises the System Development Research Methodology. The models simulating a typical project environment were designed using a simulation tool known as SimSE. For the evaluation of the models two experimental techniques namely “Individual EWS Testing” and “Controlled Experimental Study” were used. Findings of the research suggest that the implementation of early warning phenomenon has positive effects on the project outcomes. Also, there is a positive impact on the project outcomes if the corrective actions are taken early. The concept of early warning signs looks promising and this study is just one step in this direction and has introduced this new concept to the research arena.
MCIS (Hons.I), User Directed Search Based Reverse Engineering, AUT, F. Schmidt, 2010 (Role: Joint Supervisor. Co-supervisor: Dr A. Connor, School of Computing and Mathematical Sciences) http://hdl.handle.net/10292/836

The current research represents the planning, design, implementation and evaluation of a user directed software clustering approach that utilizes Search Based Software Engineering (SBSE). The aim of this research is to examine if a user directed software clustering approach contributes to the quality of software clustering. Because of the explorative and constructive character this research project utilises the System Development Research Methodology.

This research is enabled by the implementation of the Search Based Reverse Engineering (SBRE) component. The SBRE component features multiple similarity measurements and the inclusion of user constraints in the clustering process to create different implementation perspectives of the software system depending on the requirements and preferences of the stakeholders. These similarity measurements are based on software metrics, which measure different software-attributes. The SBRE component utilizes a greedy and tabu search algorithm for the identification of the cluster landscape of the analyzed software systems.

The evaluation showed that a user controlled SBSE cluster approach is able to adapt to different user configurations and derive corresponding cluster landscapes from software systems. Different measures are introduced to control the cluster process. It has been shown how these measures contribute to the quality of the clustering. It is demonstrated that tabu search is applicable in the field of software clustering. Finally, it has been examined that a multiple metric approach allows adapting the clustering process to the requirements of the stakeholders and the design of the software system to optimize the clustering result.
MPhil (Hons.I), The Value and Validity of Software Effort Estimation Models built from a Multiple Organization Data Set, AUT, K. Deng, 2009 (Role: Primary Supervisor) http://hdl.handle.net/10292/473

The objective of this research is to empirically assess the value and validity of a multi-organization data set in the building of prediction models for several ‘local’ software organizations; that is, smaller organizations that might have a few project records but that are interested in improving their ability to accurately predict software project effort. Evidence to date in the research literature is mixed, due not to problems with the underlying research ideas but with limitations in the analytical processes employed:

- the majority of previous studies have used only a single organization as the „local” sample, introducing the potential for bias
- the degree to which the conclusions of these studies might apply more generally is unable to be determined because of a lack of transparency in the data analysis processes used.

It is the aim of this research to provide a more robust and visible test of the utility of the largest multi-organization data set currently available – that from the ISBSG – in terms of enabling smaller-scale organizations to build relevant and accurate models for project-level effort prediction.

Stepwise regression is employed to enable the construction of ‘local’, ‘global’ and ‘refined global’ models of effort that are then validated against actual project data from eight organizations. The results indicate that local data, that is, data collected for a single organization, is almost always more effective as a basis for the construction of a predictive model than data sourced from a global repository. That said, the accuracy of the models produced from the global data set, while worse than that achieved with local data, may be sufficiently accurate in the absence of reliable local data – an issue that could be investigated in future research.

The study concludes with recommendations for both software engineering practice – in setting out a more dynamic scenario for the management of software development – and research – in terms of implications for the collection and analysis of software engineering data.
In contemporary software development, an emergent understanding of the problem domain and envisioned goals forms the basis of designing, testing and development activities. Lack of a common understanding of the domain can result in costly rework or client dissatisfaction. Research shows that the development of shared understanding in this context is a complex and error-prone process and there is room for improvement. Is this because practitioners are not following suggested practice from literature? Or are the actual barriers to shared understanding not being addressed by current tools and techniques? Is the development of shared domain understanding even viewed as problematic (or even important) by practitioners? These are some questions that need to be investigated in order to effectively design process improvements and tool support in this area, yet there is little information related to this.

This study takes a multi-case study approach, which incorporate semi-structured interviews with representative from ten small-to-medium organisations. This study focuses on the vendor’s perspective and includes a mix of application-domains. Result of the interviews is analysed to discover themes and patterns related to an analysis framework constructed from the literature review.

The findings indicate that vendors perceive the process of developing shared application domain understanding with their clients as being both problematic and important to a successful implementation. Twelve barriers have been identified from the analysis. The results also confirm that the process of sharing understanding development is generally perceived as being evolutionary and collaborative. This process is described by most interviewees comprises iterative phases of elicitation, confirmation and refinement of the understanding. A definite preference for face-to-face interaction is evident at regular times throughout development, particularly in early stages, although the importance of ad-hoc communications by phone or email, as domain knowledge needs arise, is also emphasised. Access to cooperative domain-expert throughout development is generally seen as a critical success factor. Several companies report using in-house domain-experts as client “proxies” in this regard. There is a mix of attitudes apparent regarding the direct communications of developers with client stakeholders. This ranged from insisting that developers are involved from initial elicitation and “kick-off” meetings, to “shielding” developers almost entirely from client. In terms of representations of understanding, participants relate natural-language, screen-shots, mock-ups, prototypes and product demonstrations as the most useful artefacts for sharing and confirming understanding of the problem domain. They emphasise the importance of flexibility and client familiarity with the representations. In general, there is no clear separation between problem and solution spaces evident when the interviewees discussed representations of understanding, and the preference seems to be for concrete rather than abstract representations.

In conclusion, comparisons between the findings and literature generally confirm contemporary thinking regarding domain knowledge sharing, although a number of barriers were given particular emphasis in this field study. The use of computer-based tool support is not widespread and the need to improve the domain knowledge sharing process and tool support in practice is widely acknowledged by the participants in this investigation. This study has identified some fruitful areas of research in this regard.
Software engineering techniques have been employed for many years to guide software product creation. In the last decade the appropriateness of many techniques has been questioned, given unacceptably high rates of software project failure. In light of this, there have emerged a new set of agile software development methodologies aimed at reducing software projects risks, on the basis that this will improve the likelihood of achieving software project success. Recent studies show that agile methods have been gaining increasing industry attention. However, while the practices recommended by agile methodologies are said to reduce risks, there exists little evidence to verify this position. In addition, it is posited that the very processes recommended by agile methodologies may themselves introduce other risks.

Consequently, this study addresses the risks inherent in the human collaboration practices that are central to agile methods. An analysis of the risk management literature reveals that personality conflicts and customer-developer disagreements are social risks that occur through human collaboration. These risks negatively affect team cohesion and software project success. Personality conflicts are said to be mostly influenced through poor team formation, whereas customer-developer disagreements are induced through excessive customer direct interaction. However, these risks are not adequately addressed by standard risk management theories. Furthermore, an evaluation reveals that these risks are also not considered by existing software tools.

This study therefore designs and implements a web-based solution to lessen the social risks that may arise in agile projects. The Agile Social-Risk Mitigation Tool (ASRMT) offers support for personnel capability assessment and management and for remote customer feature management, extending the customer’s access through an interface. Using software engineering experts to evaluate ASRMT, the tool is shown to effectively address social risk management theories, and is considered likely to assist agile developers in their handling of social risks. In addition, above and beyond its intended purpose, ASRMT is also likely to assist agile teams with general project management. The findings of the ASRMT user evaluations demonstrate sufficient proof of concept to suggest that such a tool could have value in live software projects.
This thesis investigates project risk management issues in smaller software teams. Certain gaps in the literature are identified. There is limited literature on what risk management techniques software practitioners use. The studies that are published tend to focus on large software teams. This thesis investigates what risks these smaller teams consider to be important. It also investigates what techniques are perceived to address these risks and how effective those techniques are considered to be. One of those risks is found to be of primary importance, yet this risk is not suggested by the project management literature. This thesis goes on to conduct a more in-depth exploration of that specific risk in the context of these smaller teams.

Interviews were selected as the most appropriate method to achieve the objectives of the thesis. Nineteen interviews in eight software organisations are conducted to collect data for this thesis. Three different perspectives on project risk were investigated. Those were the perspectives of the; service managers, project managers and developers. Hence a large store of rich information is collated. The results are analysed and a rich set of information is presented in this thesis.

As a result of this research it is suggested that smaller software teams may find it useful to consider the 16 risks discussed in this research and how applicable those risks are to their individual organisation. Service managers may need to do more to raise the awareness of the importance of risks associated with ‘customer relationship issues’ within their own organisations.

Three risks stood out as areas where future research might be most fruitful. They were; customer relationship issues, introduction of new technology and unrealistic schedules and budgets. Risks related to customer relationship issues were of particular significance and have tended to be overlooked in the project management literature. It is submitted that research into standard project risk management approaches may need to be combined with business risk management approaches to gain a full understanding of the risks faced and addressed by these smaller teams.