A review of research on managing information technology in New Zealand

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Abstract

This literature review analyses the status quo (March 2005) of academic literature published in the field of research into managing information technology in New Zealand. The defined field was explored in the major domains of managing IT in small and medium sized enterprises, in large enterprises and aspects of managing IT that are not focused on organisation size. Identified literature in this field consisted mainly of periodical articles (51%), conference papers, workshop papers and books; the identified articles were mainly based on qualitative research methodologies (81%). A total of 47 articles was identified to be relevant in the sub domains of small and medium sized enterprises (9 articles), large enterprises (6 articles) and issues not focused on organisation size (32 articles). It was also discovered that organisation size was not a factor for MIT research issues particularly security-related factors.

Keywords

Managing information technology, information technology research, New Zealand

1. Introduction

In this review paper articles on research into managing information technology (MIT) in New Zealand are analysed. The time period for these articles was restricted to the period 2000-2005. The focus in this paper is firstly on the research methods adopted in conducting research in managing IT in New Zealand and secondly in the domain areas of MIT research. The literature review method is discussed including sources of articles and methods of retrieval utilised. An analysis of possible bias from difficulties in the retrieval process is also discussed. Research types and strategies and the types of publications processed in this report are given. Special attention is paid to the number of peer reviewed articles, the year published and the inquiry strategies used. A literature map helped place MIT research conducted in New Zealand in context.

2. Sources and Retrieval of Material

Forty seven research articles on MIT research were sourced from: EBSCO and ACM e-

databases; the internet search engines Google and Google Scholar; UNITEC, Auckland University of Technology and Auckland University libraries (books, journals and magazines); and personal collections of publications.

Whilst more time was spent searching e-databases, this was not the most fruitful method for finding articles on MIT research conducted in New Zealand. The international search engines did not offer an appropriate search filter to locate research located in New Zealand or about New Zealand. Internet search engines were used with caution because there was no way of knowing whether material was peer reviewed (even although the peer-reviewed box was ticked on the search engine page). Libraries at Auckland's tertiary institutions were searched for print material as well. Journals provided the best source of peer reviewed material.

3. Research Classification

Research methods utilised in the 47 articles retrieved were classified firstly into quantitative methods, qualitative methods and mixed methods.

3.1 Quantitative Research

Zikmund (1997) describes quantitative research as research "conducted to identify cause-and-effect relationships among variables" (p.39). One main method of quantitative research is statistical analysis which is value free and independent of context. In statistical analysis the researcher appears to be detached (Neumann, 2000).

The purpose of quantitative research is to deduce a reliable theory of a cause and effect relationship with both independent variables and dependent variables. The instruments used to test a relationship vary with the nature of a narrowly defined problem (Creswell, 2003, pp. 6-8, 13-14, 20). Only 3/40 of the research articles on MIT in this sample used statistical research

3.2 Qualitative Research

Qualitative research is based on the goal of constructing social reality or a cultural meaning. It has a strong focus on interactive processes or events. In contrast to a quantitative research approach, values are present and explicit and qualitative research is constrained in certain situations. The analysis of the cases or subjects is not of statistical nature but thematic and the researcher is involved explicitly (Neumann, 2003, p.16). In qualitative research activities are carried out in a real or natural environment (in contrast to experimental settings) and these research activities are not isolated from their context. Therefore, the settings can change during the research, resulting in unexpected results (Creswell, pp. 14-21, p.181). In this collection of MIT research papers published in New Zealand 38/47 papers used some form of qualitative research.

3.3 Mixed Methods Research

Mixed methods research is a pragmatic approach to a given problem (Creswell, 2003, p18). Accordingly, the researcher bases the methods on how to best solve the problem and therefore does not necessarily work with predefined research methods. Therefore, it is possible to combine research methods, as the name mixed method implies, and use both quantitative and qualitative methods of research. In these findings, six articles were identified as utilizing a mixed methods approach.

3.4 Case Studies

By using a diversity of data gathering techniques, case studies provide an in-depth look into certain events and processes - mostly in order to investigate entire companies (Creswell, 2003, p.15). This is advantageous when organisational problems are examined as the researcher is dependent on the client whose operations are ongoing. Ways of collecting data are mostly through interviews and documents provided by the client. 12 of the 47 research papers used case studies to gather the examined data. An example of case study research is seen in Fielden (2004b) that described innovation

acceptance for new software product development.

3.5 Field Studies

Field study research uses field work notes and the experience and knowledge of people within the studied research area. Furthermore, it can also include analysis of secondary statistical data. Three research articles used field study research. Bibby (2000) shows the results of field study research in a conference paper on technology infrastructure planning. Parker's book "The littlest clue" (2002) and the journal article about relationship building in boundary crossing teams by Pauleen and Yoong (2001) draw on field study research as well.

3.6 Discussion Papers

Discussion papers are usually based on prior research that has been conducted. Discussion papers bring together the point of view of the researcher and the opinion of other experts in the field of research to a combined narrative (Creswell, 2003, p.16). As articles with expert opinions were found, they were classified as "discussion". These articles made up 19% of the total research identified. Bland (2001) interviewed implementers of ERP solutions in SMEs and several vendors in that market segment to condense their information to ten hazards in the implementation process and how to avoid them.

3.7 Pilot Studies

Research carried out with the use of pilot studies is mostly utilized with explorative research problems. As it does not apply meticulous standards, various research techniques are be used and can include different interview methods. Only two research articles were found in the articles reviewed that used a pilot study as an inquiry strategy.

3.8 Secondary Data Analysis

A large portion of the qualitative research carried out was found to rest upon secondary research. This means that the data was already collected and reused. Secondary research can be combined with new developments or theories that are then applied to test them in order to come to new conclusions or to detect limitations. Furthermore, secondary research is used to apply existing theories to cases not related to the initial theory to create new theories. Being the largest inquiry strategy in the identified research, 15 of the 47 articles belong to this subgroup.

3.9 Surveys

Surveys are the most common quantitative research method in MIT. Six papers made use of data collected through questionnaires and surveys: Birkenkrahe (2002), Chan (2001), Clark, Bowden and Corner (2003), French (2000), Greenwood (2004), Te Puni Kokiri, Ministry of Maori Development (2001).

4. Distribution

Secondary data analysis was the dominant identified inquiry strategy within the findings with a total of 32% followed by case study (26%) and discussion (20%). Survey (13%) and pilot study (4%) were found out to be relevant but not as highly relevant as secondary data analysis and case study.

4.1 Classification of Publications

Whilst information on the Internet is the most easily accessible, research is usually made public in printed journals initially. Conferences and workshops too are places where current knowledge is presented in form of research papers, discussed, and eventually published in proceedings. These proceedings are sometimes released on the internet. Books are probably the least up-to-date form of research publication. In this

section, different forms of publication will be defined and the result of the literature review conducted accordingly, categorized and analysed.

4.2 Forms of Publication

The following publication types were identified during the research project:

Periodical articles

51% of the literature found was categorized as periodical articles of which 50% were found in journals, hence, 25.5% of literature found was published in journals.

Conference papers

Ten papers found were categorized as conference papers that appeared in conference proceedings making 21.3% of all literature found.

Workshop papers

Workshops were differentiated from conferences and it was found that 10.6% of the literature reviewed was classified as workshop papers.

Government publications

Any article or paper that is published through the government is classified in this report as government publication. This category accounts for 8.5% of all research found in this literature review

Books

8.5% of research reviewed was published in form of books.

4.3 Peer Review

The quality of a specific piece of literature can be judged by being either peer reviewed or not. But the notion of "peer reviewed" is not a standardised measure of quality. Whether a journal or magazine is said to publish peer reviewed articles depends on the existence of a certain "barrier of entry" that every journal/magazine can set for itself. A standardised minimum requirement for labelling an article or rating a journal/magazine "peer reviewed" does not exist. Still, peer reviewed articles tend to be of higher quality compared to non-peer reviewed ones as at least some "filter of publishing" (Hildebrand,Simmer and Fielden, 2003) is applied although the actual quality of an article should rather be judged according to the reputation of the publishing journal/magazine.

As the concept of peer reviewing suggests that colleagues in similar professions review and possibly challenge the findings of the research in question, conference papers, workshop papers and governmental publications can be categorized as "peer reviewed". Concerning books, the research can be considered as peer reviewed if the book was edited. In this literature review 78% of the literature found was rated as "peer reviewed".

4.4 Year of Publication

The year of publication indicates the timeliness of research conducted. Next to the quality of research conducted, the 'up-to-date-ness' of the research is an important consideration when reviewing and judging literature. In this literature review, 36% of research found was published in 2004, the least recent ones in 2000 (15%). Only one article was found in 2005 as this literature review was written in the first quarter of 2005.

4.5 Inquiry Strategies in Publications

Looking at the inquiry strategies used in different forms of publication, it can be concluded that discussions and case studies are predominantly found in periodical articles. Analysing the inquiry strategy used in periodical articles further, it was found out that discussions predominate in magazines, whereas in journals case studies and secondary data analysis are more prevalent. Pilot studies were only found in magazines.

Secondary data analysis appears to be the major inquiry strategy for literature found in this review.

4.6 Content Analysis

This literature review presents the current development of New Zealand's qualitative, quantitative and mixed methods research activities in the domain managing information technology and the sub domains: SMEs; large enterprises and research that is not focused on organisation size. For a detailed content presentation, the literature map (Figure 1) shows each publication and relevant categories. Many of the publications did not focus on organizational size (Figure 1). A major finding from this literature review was the concentration of research on e-commerce in New Zealand.

5. Discussion

The major category headings adopted for this literature review were based on organisational size. However it was discovered that 32/47 of the articles reviewed did not regard organisational size as an issue (Figure 1). Security was a major research issue (11 papers). Security issues explored included: establishing frameworks for enterprise security management (Bradley and Josang, 2004); the design and usability of secure systems Clear (2002); security services for electronic tendering (DU, Foo, Boyd and Fitzgerald, 2004); and a layered approach to network security (Sathu, 2002). E-commerce (9 papers) was also an important research topic and included the following: issues for SMEs (Al-Qirim, 2003); the impact of e-commerce on IS professionals (Cash, Yoong and Huff, 2004); e-business in New Zealand (Clark, Bowden and Corner, 2003); internet strategies for retailers (Doolin, McLeod, McQueen and Watton, 2003); and e-commerce strategic direction (Swain, 2001). Technology infrastructure (9 papers) covered the topics of: Investment in physical infrastructure (Devine, 2000); and planning New Zealand's science and technology infrastructure (Simpson, 2000). Other categories of research into MIT including human resource management (Pauleen and Yoong, 2001), knowledge management (Shibl, Fielden and Pain, 2004), stakeholder analysis (Fielden, 2004a), decision support systems (Shibl, Fielden and Pain, 2004) and education management (McSporran and King, 2001; Skelton, 2003) were all relevant in this particular sample of paper on research into MIT.
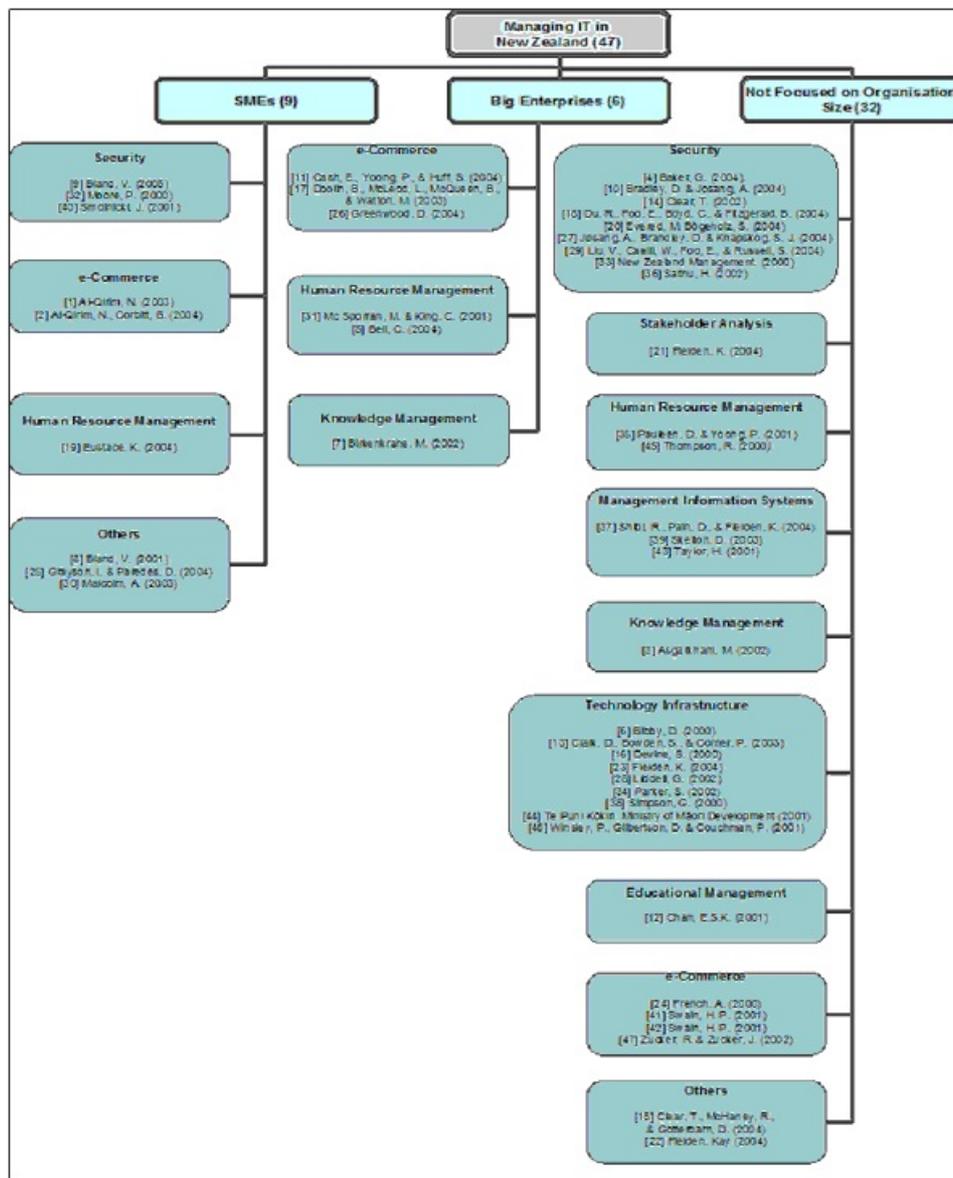
Figure 1. Literature Map - Managing IT in New Zealand

Based on prior knowledge of MIT research in Europe (particularly Germany) and the expenditure on research activity in larger countries the amount of research being conducted in a small country geographically distant from other regions is impressive.

6. Conclusion

It is evident that there is a dynamic MIT research culture in New Zealand considering the total research budget compared to the US or Europe. Therefore, it is impressive how much high quality research is realized in such a small country. The predominance of qualitative research (and the consequent multiplicity of research methods) underlines the diversity of New Zealand MIT research. Besides the application of New Zealand's research in its own country, the Asia Pacific Region and large countries like China or the United States, New Zealand's research is especially vital for many small countries around the globe, in particular for the Asia Pacific region but also for small Asian countries like Singapore. In addition to that, small European countries like Switzerland are also required to deal with similar conditions - especially technology infrastructure, a high number of SMEs and a relatively small population. Therefore, the international importance of New Zealand's IT research activities should not be underestimated.

The articles reviewed show also a strong focus on the practical application of MIT research, which is generally important in the IT sector but especially important in the field of security, e-commerce and technology infrastructure. These disciplines were identified as the fields with the highest research activity.

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