THE MANAGEMENT OF COMPUTER SYSTEMS IN SMALL BUSINESS: A PRELIMINARY ANALYSIS OF THE ISSUES OF IMPORTANCE TO MANAGERS

Evan Patullock
School of Business
La Trobe University
Albury-Wodonga Campus
Parkers Road
Wodonga, Vic, 3689

ABSTRACT

Research investigating the relative importance of issues facing organisations in their management of Information Systems (IS) has grown rapidly since the early 1980s. However, this research has largely focused on large businesses, with little comparable data collected in the context of small businesses. This paper reports preliminary results from a pilot project investigating the relative importance of various IS concerns from the perspective of small business managers in the Albury-Wodonga region. Initial results confirm the operational focus of small business managers despite evidence of some concern with more strategic issues. In light of the preliminary nature of these findings, the paper concludes by identifying areas for further research.

INTRODUCTION

Investigating the relative importance of issues facing organisations in their management of Information Systems (IS) has been a popular research topic since the initial work of Ball and Harris (1982), and numerous benefits have resulted. For instance, we have been able to witness the evolution of Information Technology (IT) in organisations through noting changes in the importance of particular issues over time, as well as see how the rating of issues can be influenced by culture (Dekleva & Zupancic, 1996; Dexter et al, 1993; Doukidis et al, 1992; Moores, 1996; Palvia et al. 2002; Watson et al, 1997; Yang, 1996). And, as Watson (1989) states, "If IS educators, consultants, professional societies and researchers are to serve the IS community effectively, they must be aware of the key issues of IS managers."

However, despite this extensive body of research, it is not without deficiencies. For example, much of the work in this field reports the views of IS managers, which questions the validity of using findings as a measure of organisational concerns. As Pervan's (1998) early Australian study found, Chief Executive Officers (CEO) and IS managers assign different ratings to a number of issues. The research also lacks a balance of coverage since it is predominantly focused on large businesses, with little comparable research having been conducted within small businesses. Whilst this may have been understandable in the early days when few, if any, small businesses were able to afford a computer, the situation today is different. Since the advent of the Personal Computer (PC), price has become less of a problem for even the smallest of businesses, and as a result ownership levels have continued to increase. In Australia, for example, 94 percent of small businesses presently own a computer, a rise of 2 percent from the previous year (Sensis, 2004). Thus, similar issues research within small businesses is both feasible and overdue.

More recently in this journal Marshall and McKay (2003) and Lawson et al (2003) have made some progress towards understanding the adoption behaviour of smaller firms in this context. More specifically, both have identified a range of impediments that constrain the

acceptance and diffusion of e-commerce within small and medium-sized Australian enterprises. Similarly, Dholaia & Kshetri (2004) and Lucchetti & Sterlacchini (2004) have considered the adoption of Internet technologies by small firms in the US and Italy, respectively. Notwithstanding this progress, the asymmetric research effort focussing primarily on larger firms remains.

There are other reasons why greater research within small businesses is warranted. Firstly, since a small business is not simply a scaled-down version of a large business (Dandridge, 1979; Delone, 1981; Flavel, 1996; House of Representatives, 1990; Raymond, 1985; Welsh & White, 1981), findings from large business research will not necessarily apply to small businesses. However, small businesses experience similar pressures to large businesses when it comes to IT investment decisions (Reimenschneider & Mykytyn, 2000), even though they potentially face greater challenges in implementing computerised systems (Stair et al, 1989). More specifically:

- Small businesses have a much smaller financial base from which to work (Flavel, 1996), thereby having to potentially spend larger proportions of available funds to purchase computers.
- Unlike larger organisations that have had the opportunity to gradually introduce computers, and adapt to their use, over many years; small businesses have a significantly shorter timeframe in which to 'catch up' in order to remain competitive (Yap et al, 1994).
- To exacerbate the difficulties, small businesses usually have to implement technology without the support of dedicated IT staff often employed by larger businesses (Flavel, 1996; Gable, 1991; Thong & Yap, 1994).

And finally, the importance of the small business sector to a country's economy (Caree et al, 2002; Hawkins, 1993) ensures that it warrants specific research attention. Within Australia, for example, Australian Bureau of Statistics (ABS) data shows that approximately 97 percent of all private sector businesses are small, and account for 49 percent of all private sector employment (Trewin, 2001). Similar figures are found within other OECD countries (Schlőgl, 2004). Smaller organisations have also under-pinned employment growth since the early 1980s (DIST, 1995; Hawkins, 1993; Julien, 1995; O.E.C.D., 1993). Obviously, a healthy small business sector benefits the economy as a whole, and by encouraging small enterprises to flourish, societies can realise a range of economic and social objectives (Schlőgl 1994). Therefore, by better understanding the issues small businesses have in managing their computer systems, we may be better placed to provide advice on their efficient and effective use (Watson, 1989).

This paper makes tentative progress towards identifying the relative importance of issues confronting small business managers in the context of managing their existing computer systems. Preliminary in nature, the paper extends the range of issues identified by earlier work focusing on larger firms to the perceptions and attitudes of smaller Australian enterprises. The paper itself is organised into seven main parts. Section two provides a working definition of small businesses to underpin subsequent analysis. Section three offers a synoptic review of pertinent literature and positions the present work in the context of earlier work. The research design framework and results from a survey of almost 200 regional firms are presented in sections four and five whilst section six provides a preliminary analysis of results. Section seven offers some brief concluding remarks and identifies areas for future research.

DEFINING SMALL BUSINESS

There is no universally accepted definition of small business (Forsaith et al, 1995), with different countries adopting their own definition depending on a set of local factors and conditions (Hall, 1995). Commonly used definitions are either qualitative, which attempt to list criteria common to all small businesses, or quantitative, which specify a particular metric.

Qualitative definitions, whilst inadequate for classifying a business for statistical purposes (Forsaith et al, 1995), provide useful insights into the nature of small business. For example:

- small enterprises are often cash-starved, and not able to employ full-time specialist staff to manage all of the functions and demands upon the entity, (Flavel, 1996; Thong et al, 1996);
- small enterprises are more dependent on external sources of technological assistance than larger ones (O.E.C.D., 1993);

Quantitative definitions frequently use employee numbers, assets or sales as a metric (Forsaith et al, 1995; House of Representatives, 1990). Whilst employee numbers is the most common, there are non-trivial differences in the figure used, with values ranging from less than 20 up to 500 (Forsaith et al, 1995). Australia uses a combination of measures, depending on the particular industry sector (Trewin, 2001), and as with other countries, the definition has undergone changes over time. Originally small meant having less than 100 employees (House of Representatives, 1990), whilst a later ABS definition specified small as fewer than 20 persons irrespective of the industry in which it existed. In keeping with this latest trend, the latter definition has been employed within this research.

PREVIOUS RESEARCH INTO SMALL BUSINESS COMPUTING

Whilst there is a growing body of research investigating computers within small businesses, most has focused on usage, training, and the purpose of implementation (Ray et al, 1994; Riemenschneider & Mykytyn, 2000). Other research informs us that not all small businesses employ computers, with usage appearing to increase in proportion to organisational size (Sensis, 2004; Thong & Yap, 1995; Van Beveren & Thomson 2002).As a result, some researchers deliberately exclude smaller organisations from their surveys in order to improve the chances of sampling from computerised firms (Raymond, 1985; Raymond, 1987). The take-up of computers in a small business can be inhibited by a range of factors, including a lack of resources (Flavel, 1996), the absence of highly educated staff (Lucchetti & Sterlacchini 2004) the perception that existing manual systems are adequate for the task, and a belief that computers will not reduce costs or be as efficient as existing manual systems (Chen, 1993; Keeling et al 2000). Some factors positively affect usage, such as the decreasing cost and increasing performance of hardware, the fear of being left behind as competitors take up technology, and an increasing awareness that computers can lead to a reduction in production costs (Farhoomand & Hrycyk, 1985; Keeling et al 2000). Management traits have also been shown to impact on usage. For instance, managers with a positive attitude to the adoption of computers, and those who are more innovative and/or knowledgeable about computers, are more likely to incorporate them within their business (Thong & Yap, 1995). Managers' perceptions of potential benefits have also been shown to

be significant in this context (Poon & Swatman 1999).

Whilst the proportion of small businesses using computers has increased over time, little appears to have changed in the way they are used, with the main focus remaining on increasing operational efficiency through controlling day to day operational activities (Cooley et al, 1987), primarily using either accounting or word-processing software (Chen, 1993; Cheney, 1983; Lai, 1994; Malone, 1985; Nazem, 1990; Nickell & Seado, 1986). Little priority would appear to be afforded strategic applications, such as using information to support management decision making (Chen, 1993; Levy et al, 1999), despite the argument that small businesses need to adopt a more strategic approach to technology in order to remain competitive (Information Industries Taskforce, 1997). Various propositions have been offered to explain the primarily operational focus. One is that managers of small businesses may perceive the use of computers differently to those in large business (Doukidis et al, 1994) where a more strategic focus is adopted (Pervan, 1996; Pervan 1998; Watson et al 1997). Similarly, Glynn & Koenig (1995) suggest that many small businesses neglect the use of technology for strategic advantage because of resistance by management. They also propose that small businesses will only adopt IT when forced to do so, or in order to remain competitive. This view is supported, in part, by Dholakia & Kshetri's (2004) empirical work which showed a significant relationship between Internet adoption by SMEs and perceived competitive pressures. However, Cragg and Zinatelli (1995) suggest that applications used by a small business will be determined primarily by the availability of packaged software, and that, if such software is not available, custom making it is usually not considered due to limited financial resources and low levels of internal IT expertise. Such a view is also supported by Palvia et al (1994) and Thong and Yap (1994).

By exploring the perceived relative importance of IT issues confronting small business managers we may be able to trace changes over time. Notwithstanding studies that have focussed primarily on adoption, to the knowledge of the author, comparatively few studies have directly addressed the relative importance of management issues confronting small business operators with their existing computing systems, particularly in Australia. Rivard et al (1988) surveyed IS managers in Canadian small and large organisations, and found managers of small firms were more concerned with operational issues than were managers of large firms. Similarly, in their examination of US small businesses, Alpar & Ein-Dor (1991) asked managers "What is your major concern in respect to the use of computers in your firm?". Whilst 'No Problems' was the highest frequency response, concerns related to reliability, systems quality, change and cost. An additional US study sought open-ended responses from small firms by asking managers "What is the single most important thing you have learned about managing the use of Information Technology in your firm?" The most frequently mentioned factors related to keeping up to date with IT, training and education, getting information quickly, and the importance of accurate data (Riemenschneider & Mykytyn 2000). A key issues framework and Delphi methodology was adapted from Niederman et al (1991) by Pollard and Hayne (1998) to identify the top three issues for a sample of Canadian small firms: 'Using IS for competitive advantage', 'Improving IS project management practices' and 'Improving the effectiveness of software development' were ranked highest.

Whilst these earlier studies offer some promise, in the present context their application to Australian small businesses is problematic on two grounds. Firstly, the classification of small businesses employed in these earlier studies varies markedly from that which defines small business in Australia. For instance, Pollard & Hayne (1998) define small firms as employing less than 200 staff whilst Riemenschneider & Mykytyn (2000) use a threshold

of 500 employees.   Secondly, the response solicitation techniques are likely to prove vexatious. For example, open-ended questions give rise to serious inconsistencies in the interpretation phase. By way of contrast, a closed-ended framework is likely to become outdated since issues of importance change over time, mainly as a result of technological developments (Watson et al 1997). In addition, the Delphi methodology employed by Pollard and Hayne (1998) results in significant burdens on respondents who must confront multiple rounds of questions.

 A way forward would appear to reside in deploying an issues framework with closed-ended responses that is sufficiently malleable to accommodate the context of small Australian enterprises.   This might then serve as a benchmark for future work.   Of particular promise is the framework developed by Pervan (1998) which sought to understand the relative importance of IT issues from the perspective of CEOs in the US. The advantage of this framework is that it targets CEOs rather than IS managers, and is therefore more akin to the range of concerns confronting small business managers. However, Pervan's framework sought to measure the 'critical value' of issues. This was defined as the mean of the rating of an issues' 'importance' and it 'problematic' status. In light of the preliminary nature of the present investigation a simple rating of 'importance' was judged likely to provide a useful starting point.

RESEARCH DESIGN

A variety of methodologies have been employed in previous research into the importance of IS management issues, including mail-out questionnaires, telephone and face to face interviews, and using both open-ended and closed questions. This project utilised a mail-out questionnaire containing a closed set of issues to be rated. Accordingly, the approach broadly mirrors similar work in the context of larger firms (see, for example, Pervan 1998) but in this instance the framework is deployed to gain initial insights in the context of Australian SMEs.

One of the drawbacks associated with mail-out questionnaires is the possibility of achieving low response rates, potentially in the order of ten to twenty percent (Lambert and Harrington, 1990), which in turn can lead to problems associated with non-response bias and self-selection (Larson and Chow, 2003; Van Kenhove et al, 2002). A review of previous research projects, particularly those using the Delphi approach, showed response rates as low as 7 percent (Pervan, 1998). Whilst the Delphi approach per se may not be totally responsible for such low rates, it does rely on participants continuing to provide responses over a number of rounds. Therefore, based on the possibility that time-poor small business managers may not have been prepared to participate in multiple rounds, a single administration of the questionnaire was used as a means of maximising the response rate.

The questionnaire comprised two sections. The first section sought information about the business such as its size, age, industry sector, its use of computers, and the like.   In addition, this section contained four questions aimed at understanding how managers perceived the use of computers within their business. Respondents were asked to use a 5-point Likert scale to indicate their 'comfort' with using computer technology; the perceived advantages of computer systems; the extent to which improvements were sought with the use of the computing system; and the extent of the firm's reliance on the computer system. Section two of the survey contained a list of twenty issues, with respondents being asked to rate the important of each issue on a scale of 1 to 10 (1 for least important to 10 for most important).

The list of issues was developed from Pervan's (1998) framework and modified as a consequence of focus sessions with small businesses. This approach accords with Watson et al's (1997) observation that a re-think of the existing key issues research framework may be appropriate given that little has changed in respect of the methodology used and the actual issues being investigated since it first began. Hence many of the issues in the earlier work are either not relevant for small businesses, or are expressed in a language which may not be comprehendible to a non-technical, small business manager. Since the response rate can be influenced by whether or not a respondent can understand the language used (Erdogen and Tagg, 2003), the issues used in this research needed to reflect this.

Whilst every attempt was made to keep as close as possible to the original framework, a number of changes were made as a result of focus sessions with small business managers:

- Irrelevant issues were removed, such as "Developing and Managing Distributed Systems".
- Others were re-worded to eliminate much of the jargon. For example "Building a responsive IT infrastructure" was changed to "Having a 'computing infrastructure' that supports the needs of my business".
- The issue "Recruiting and developing IS human resources" was re-worded and split into two separate issues. Small businesses do not generally seek to employ designated computing staff (Blili & Raymond, 1993), and feedback from the focus sessions suggested that recruitment and staff development were two separate matters. Hence the two issues included in the questionnaire were "Recruiting 'computer literate' employees" and "Developing 'computer literate' employees".
- Issues based upon some of the qualitative definitions of a small business were included, relating to managing relationships with vendors, finding money for hardware and software, and keeping up to date with technology.
- Watson et al (1997) commented that the existing key issues framework contained few new and emerging issues. In this survey two such issues were included, one relating to implementing e-commerce and the other to controlling computer viruses and worms.

As a result of this process, a total of twenty issues were identified, including both operational and strategic issues. Following the work of Pervan (1996; 1998), these were classified into four groups, as shown in Table 1.

Table 1: Classification of Issues

Technology Management (TM)

Have a 'computing infrastructure' that supports the needs of the business

Plan and manage computer networks

Measure the effectiveness and productivity of computer systems

Establish effective disaster recovery capabilities

Plan, implement and manage office automation

Select and integrate 'off-the-shelf' software

Manage and control computer viruses and worms

Find money for hardware and software

Keep up to date with new technology

Strategic Management (SM)

Using computer technology to facilitate and manage changed business
practices

Identify opportunities for the strategic use of computer systems

Outsource selected computing services

Develop appropriate funding levels for computer systems

Facilitate/manage computer systems that assist managers in making
decisions

Plan and implement electronic commerce systems

People Management (PM)

Recruit 'computer literate' employees

Develop 'computer literate' employees

Manage relationships with computer vendors

Data Management (DM)

Manage data and document storage

Improve information security and control

The final change related to the wording of the preamble. In research undertaken within large businesses, respondents have been asked to consider the importance of each issue over a three to five year time period. Small businesses, however, are more likely to engage in short-range planning (Welsh & White, 1981), and therefore respondents in this survey were asked to rate the importance of each issue "at the present time, and for the foreseeable

future".

A copy of the issues and the explanation that accompanied each can be found in the appendix A.

Administration of the Survey

The survey was conducted in the Albury-Wodonga statistical district, a region covering six local government areas in north-east Victoria and southern New South Wales, encompassing the cities of Albury and Wodonga where the majority of the population of approximately 100,000 resides. Over 5,000 small businesses are known to exist within the region, employing approximately 19,000 people, and covering all industry categories in both the government and private sectors (Investment Albury-Wodonga, 2003). The area was deemed suitable for this project since it contained a mixture of city and rural businesses.

Five hundred and fifty private sector small businesses were randomly selected from a register compiled by a local business development agency. Since the register was over twelve months old at the time of its use, a manual check of business names was undertaken, resulting in the removal of seventeen businesses that could no longer be found the telephone directory. The questionnaire was therefore sent to 533 businesses.

A variety of techniques aimed at maximising the response rate have been proposed for use in mail-out questionnaire research (Larson and Chow, 2003; Erdogan and Tagg, 2003; Van Kenhove et al, 2002; Paxson, 1995). Those used in this project included:

- The questionnaire was professionally printed, incorporating a glossy cover page and the university logo to identify sponsorship.
- A signed, department-headed covering letter, including the researcher's name and position accompanied the questionnaire.
- An assurance of total confidentiality was provided.
- A summary of research findings was offered to all participants.
- Return envelopes were hand-stamped rather than using a reply-paid envelope.
- The chance to win one of two monetary prizes was offered to those who responded.
- A follow-up letter was sent out two weeks after the initial mail-out.

SURVEY RESULTS

Six questionnaires were returned as undeliverable, and a further three businesses made contact to advise that, whilst their office contained fewer than twenty employees, they were part of larger enterprises and thus were constrained in the way they operated.

Completed responses were received from 192 businesses, of which 8 indicated that they employed 20 or more people. The final sample was therefore 184 small businesses, equating to a response rate of 35.3 percent. Using data published for businesses in the Albury Wodonga region (Investment Albury-Wodonga, 2003), a χ^2 test confirmed that respondents were representative of the small business population in respect of their size and industry category. Whilst there are no published data on the age of businesses, either within this region or nationally, the strong representation of 'older' firms in the sample is perhaps explained by the 'survivorship' principle that pervades SMEs generally.

Managers were asked to provide details of their use of computer, and their responses

showed:

- 91 percent used a computer in their business, with only 4 not owning their own equipment.
- 75 percent were connected to the Internet

Table 2 summarises the relationship between business size and computer usage, and size and Internet connectivity within the sample data.

Table 2: Computer and Internet Usage against Business Size

Business Size	Use a Computer	Internet Connectivity
1 to 5 employees	86.7%	67.8%
6 to 10 employees	92.9%	76.8%
11 to 15 employees	100%	80.6%
16 to 19 employees	100%	100%

Usage figures mirror those published for Australian small business (Sensis, 2004), and whilst connectivity figures appear lower, it was not significantly different at the 5 percent level. Both connectivity and usage would appear to be positively correlated with business size in this case.

A PRELIMINARY ANALYSIS OF MANAGEMENT ISSUES

The ranking of the 20 issues in order of their perceived importance is shown in Table 3 below

Table 3: Ranking of Issues of Importance

Rank	Key Issue	Issue Category	Mean Rating	Std Devn
1	Manage and control computer viruses and worms	TM	9.27	1.71
2	Establish effective disaster recovery capabilities	TM	9.08	1.72
3	Manage data and document storage	DM	8.46	2.15
4	Improve information security and control	DM	8.38	2.27
5	Have a 'computing infrastructure' that supports the needs of my business	TM	8.13	1.97
6	Keep up to date with new technology	TM	8.07	2.19
7	Find money for computer hardware and software	TM	7.45	2.54
8	Develop 'computer literate' employees	PM	7.44	2.48
9	Manage relationships with computer vendors	PM	7.15	2.83
10	Use computer technology to facilitate and manage changed business practice	SM	6.98	2.40
11	Plan, implement and manage office automation	TM	6.83	2.64
12	Measure the effectiveness and productivity of computer systems	TM	6.80	2.48
13	Recruit 'computer literate' employees	PM	6.76	2.79

14	Determine appropriate funding levels for computer systems	SM	6.74	2.56
15	Select and integrate 'off-the-shelf' software	TM	6.65	2.83
16	Identify opportunities for the strategic use of computer systems	SM	6.53	2.69
17	Plan and manage computer networks	TM	6.41	3.27
18	Facilitate/manage computer systems that assist managers in making decisions	SM	6.36	2.67
19	Plan and implement electronic commerce systems	SM	5.71	2.93
20	Outsource selected computing services	SM	5.38	3.22

A number of observations can be made from the results. Firstly, the range of mean ratings is relatively small, with even the lowest ranked issue achieving a mean score above 5. This may be an indication that all issues, irrespective of their rank position, are considered to be at least of moderate importance to small business managers. Secondly, technology and data management issues tend to rate higher than strategic management issues. Indeed, the highest ranking achieved for a strategic issue was tenth, with four of the six ranked amongst the bottom five positions. This is probably not unexpected, given previous research highlighting the operational focus of small business (see, for instance, Dholakia & Kshetri 2004).

The results also appear to confirm that recruitment and development of staff within small business are two separate issues, with development assuming a higher level of importance. As previously noted, small businesses seek out people who have the requisite business skills rather than technology skills, and subsequently develop additional skills, such as computer-literacy, were necessary.

A final observation is that there was general unanimity on the ranking of issues across a range of categorisations, such as business size, industry, and whether or not they used the Internet. There was also agreement on the ranking irrespective of how the respondent perceived the use of computers within their business. This general agreement on the relative importance of issues across the sample is of interest since, a priori, variations may have been expected. For instance, one proposition from previous small business research was that managers with a positive outlook towards technology might rate issues differently (Thong & Yap, 1995). This was not supported by the data. It might also have been expected that finding money for hardware and software would be more of a problem for smaller businesses than larger organisations, but this was not evident in these data. And finally, previous research within large businesses found that the rating of issues varied across industry groupings (Niederman et al, 1991; Palvia et al 2002). No similar variation could be found in this survey.

There were, however, two issues where the rank appeared to be influenced by the category:

- Managing computer networks was more important for larger-sized businesses than for smaller ones. One possible explanation is that organisations with more employees may require a greater number of computers, thereby increasing the potential for networking.
- Using computer systems to assist managers with decision making was rated higher for newer businesses than older ones ('newer' being defined

as less than five years old and 'older' greater than five years). One explanation may be that many managers of older businesses were making decisions without the use of computers prior to their introduction, and are content to continue using such practices. On the other hand, newer managers, without such prior experience, may look to other tools to assist them, including the use of computers.

Top Ranked Issues

Issues ranked in the top ten places appear to reinforce the importance of computers within small businesses. Given the high usage levels of computers and the Internet, as well as managers' responses to how they perceive computers within their businesses, it is not surprising that technology and data management issues, and to a lesser extent people management issues, would rate so highly. So, for instance, viruses and worms have been a concern for a number of years, and have the potential to negatively impact on organisational computer systems despite advances in anti-viral software and the availability of security software such as firewalls. Putting in place disaster recovery procedures and ensuring the protection of valuable data are two ways of overcoming the risks associated with a high reliance on technology. At the same time managers need to keep up to date with the changing world of computers, to understand how they can be used to best effect within their business, and be able to find sufficient funds to purchase and maintain computing resources. When one considers that they are having to do all this, at the same time as running their businesses, this may explain why they have little time to consider other, more strategic, uses of their computers, especially without access to their own IT support staff. Put simply, the 'here and now' of operating small businesses constrains managers' capacity to focus on strategic issues – including strategic IT.

Strategic Issues

The low ranking of strategic issues differs with the results of research in large businesses (Pervan, 1998; Watson et al, 1997). Whilst these findings are probably not unexpected, they are difficult to reconcile with other parts of the survey data. More specifically, a large number of respondents indicated in the first section of the survey that they actively sought new or improved ways of using their computer systems. Respondents were not asked to provide details of what these 'new or improved' uses are, but it would appear from the results that they are not strategic.

Planning and Managing E-commerce Systems

This was one of two contemporary issues included in the survey, and was ranked in 19th position overall, achieving a low ranking across all business categorisations, including those that use the Internet. The relatively low ranking of the importance of e-commerce is of interest, especially given the proactive role played by Australian governments to increase small business involvement. One explanation for this phenomenon may be the limited understanding of the concept amongst small business managers (see, for example, Pease and Rowe 2003). Whilst a low rank position does not necessarily mean a lack of importance, the findings of this project provide at least some grounds for questioning the effectiveness of government programs in this domain.

Outsourcing

This was the lowest ranked issue overall, and given that only four respondents did not own their computers, its position is not unexpected. However, the relatively high mean rating of 5.4 is of interest. This may support the view that outsourcing is irrelevant for the vast majority, but is of significant concern for the few engaged in outsourcing.

CONCLUDING REMARKS

Stair et al (1989) proposed that small businesses would move through the same stages of technology adoption as larger businesses, albeit at a faster rate and with a different focus at certain stages. In addition, the highest stage reached in Nolan's (1979) adoption model is 'Maturity' where the organisation perceives its technology as a strategic resource. The data collected for this research suggests that small businesses in Australia fall well short of this lofty state. Despite the majority of respondents indicating that they were looking for new or improved ways of using their computer systems, it appears that they place more importance upon managing the existing technology than looking towards applications that have a more strategic focus.

This project is one of relatively few that have investigated the issues faced by small businesses in the management of their computer systems and attempted to establish the comparative importance of those issues in an Australian context. As such, the data analysed herein should be considered as a prelude to future work in this field.

Any conclusions drawn from this study must also be considered against the limitations of the work. Firstly, whilst the response rate in this project was much higher than in other published surveys, mail-out questionnaires cannot always ensure that representative data are captured. Secondly, the choice of issues to include in this type of research requires further refinement. For example, the inclusion of the 'managing viruses and worms' issue, upon reflection, might be better encapsulated under a broader heading like 'annoyances' associated with using computers. Similarly, additional issues could be integrated into this approach. In this regard Pervan (1996, 1998) identified a fifth category of issues, namely end-user computing. Whilst this category was excluded on the basis of the focus sessions that preceded this survey, its inclusion in future work may be warranted.

Hopefully, further research will resolve these problems and result in an enduring issues framework that can trace the behaviour of small businesses over time. Ultimately, this might improve the policy responses to the challenges confronting small business and enhance performance.

REFERENCES

Alpar, P. and Ein-Dor, P (1991) "Major IS Concerns of Entrepreneurial Organisations", **Information and Management**, Jan, Vol 20, No 1, pp 1-11

Ball, L. and Harris, R. (1982) "SMIS Members: A Membership Analysis", **MIS Quarterly**, Vol 6, No 1, pp 19-38

Blili, S. and L. Raymond (1993) "Information technology: threats and opportunities for small and medium-sized enterprises", **International Journal of Information Management**, Vol 13, pp. 439-448

Caree, M., van Stel, A., Thurik, R. and Wennekers, S. (2002) "Economic Development and

Business Analysis: An Analysis Using Data of 23 OECD Countries in the Period 1976-1996", **Small Business Economics**, Nov, Vol 19, No 3, pp 271-290

Chen, J.C. (1993) "The Impact of Microcomputer Systems on Small Business: England 10 Years Late**r"**, **Journal of Small Business Management**, July, Vol 31, No 3, pp 96-102

Cheney, P.H. (1983) "Getting the Most Out of Your First Computer System", **American Journal of Small Business**, April-June, Vol 7, No 4, pp 50-60

Cooley, P.L., Walz, D.T. and Walz, D.B. (1987) "A Research Agenda for Computers and Small Business", **American Journal of Small Business**, Winter, Vol 11, No 3, pp 31-42

Cragg, P.B. and Zinatelli, N. (1995) "The Evolution of Information Systems in Small Firms", **Information and Management**, Vol 29, N 1, pp 1-8

Dandridge, T.C. (1979) "Children Are Not Little Grown-Ups: Small Business Needs Its Own Organizational Theory", **Journal of Small Business Management**, Vol 17, No 2, pp 53-57

Dekleva, S.M. and Zupancic, J. (1996) "Key Issues in Information Systems Management: A Delphi Study in Slovenia", **Information and Management**, October, Vol 31, No 1, pp 1-11

Delone, W.H. (1981) "Firm Size and Characteristics of Computer Use", **MIS Quarterly**, Vol 5, No 4, pp 65-77

Department of Industry, Science and Technology (1995) **Fifth Annual Review – Small Business in Australia, August 1995**, Commonwealth of Australia, Canberra,

Dexter, A.S., Janson, M.A., Kiudorf, E. and Laast-Laas, J. (1993) "Key Information Technology Issues in Estonia", **Journal of Strategic Information Systems**, Vol 2 No 2, pp 139-151

Dholakia, R. and Kshetri, N. (2004) "Factors Impacting the Adoption of the Internet Among SMEs", **Small Business Economics**, Vol 23, No 4, pp 311-322

Doukidis, G.I., Smithson S. and Naoum G. (1992) "Information Systems Management in Greece: Issues and Perceptions", **Journal of Strategic Systems**, March, Vol 1, No 2, pp 63-75

Doukidis, G.I., Smithson S., and Lybereas, T. (1994) "Trends in Information Technology in Small Business", **Journal of End User Computing**, Fall, Vol 6, No 4, pp 15-25

Erdogen, B.Z. and Tagg, S. (2003) "The Advertising Agency Manager's Response Patterns to a Mail Survey and Follow-ups", **Marketing Intelligence and Planning**, Vol 21, No 6, pp 392-399

Farhoomand, F. and Hrycyk, G.P. (1985) "The Feasibility of Computers in the Small Business Environment", **American Journal of Small Business**, Spring, Vo 9 No 4, pp 15-22

Flavel, R. (1996) **Seeking to Improve Your Business: A Guide For Owner-Managers and Business Advisors**, Australian Government Publishing Service, Canberra,

Forsaith, D., Fuller, D., Pattison, B., Sutcliffe, P. and Vincente, W. "Defining Enterprises by Size: Australian Emperical Evidence on the Interchangeability of Alternative Definitions at the Industry Level", in Dunlop, W. and Gibson, B. (1995) "Skills for Success In Small and Medium Enterprises", **Proceedings of the 40th World Conference of the International Council for Small Business**, June, Newcastle

Gable, G.G. (1991) "Consultant Engagement for First Time Computerization: A Pro-Active Client Role in Small Businesses", **Information and Management**, Vol 20, No 2, pp 83-93

Glynn, K. and Koenig, M.E.D. (1995) "Small Business and Information Technology", **Annual Review of Information Science and Technology**, Vol 30 , pp 251-280

Hall, C. "Skilling for Internationalisation: Findings From OECD Research on the Globalisation of SME's", in Dunlop, W. and Gibson, B. (1995) "Skills for Success In Small and Medium Enterprises", **Proceedings of the 40th World Conference of the International Council**

for Small Business, June, Newcastle

Hawkins, Dr B. (1993) "The Strategic Importance of SMEs in Creating Employment and Wealth", **OECD World Conference on SMEs and Job Creation: Strategic Issues for Business and Government**, December

House of Representatives – Standing Committee on Industry, Science and Technology (1990) **Small Business in Australia – Challenges, Problems and Opportunities**, Australian Government Publishing Service, Canberra,

Information Industries Taskforce, **The Global Information Economy: The Way Ahead**, Department of Industry, Science and Tourism, Australian Government Publishing Service, Canberra, 1997, (http://www.dist.gov.au/itt/golds/html/execsumm.html)

Investment Albury-Wodonga (2003) **Albury-Wodonga Economic Indicators 2002**, Albury

Julien, P. (1995) "New Technologies and Technological Information in Small Business", **Journal of Business Venturing**, Vol 10, No 6, pp 459-475

Keeling, K. Vassilopoulou, K. McGoldrick, P. and Macaulay, L. (2001) "Market Realities and Innovation in Small to Medium Enterprises: Facilitators and Barriers to the use of Electronic Commerce", **New Product development and Innovation Management**, Vol 2, No 1, pp 57-70

Lai, V. (1994) "A Survey of Rural Small Business Computer Use: Success Factors and Decision Support", **Information and Management**, Vol 26, No 6, pp 297-304

Lawson, R., Alcock, C. and Cooper, J. (2002) "Diffusion of Electronic Commerce in Small and Medium Enterprises", **Australian Journal of Information Systems**, Vol 9, No 2, pp 123-134

Lambert, D.M. and Harrington, T.C. (1990) "Measuring Nonresponse Bias in Customer Service Mail Surveys", **Journal of Business Logistics**, Vol 11, No 2, pp 5-25

Larson, P.D. and Chow, G. (2003) "Total Cost/Response Trade-offs in Mail Survey Research: Impact of Follow-up Mailings and Monetary Incentives", **Industrial Marketing Management**, Vol 32, pp 533-537

Levy, M., Powerll, P. and Galliers, R. (1999) "Assessing Information Systems Strategy Development in SMEs", **Information and Management**, November, Vol 36, No 5, pp 247-261

Lucchetti, R. and Sterlacchini A. (2004) "The Adoption of ICT Among SMEs: Evidence from an Italian Survey", **Small Business Economics**, Vol 23, No 2, pp 151-168

Malone, S.C. (1985) "Computerizing Small Business Information Systems", **Journal of Small Business Management**, April, Vol 23, No 2, pp 10-16

Marshall, P. and McKay, J. (2002) "Evaluating the Benefits of Electronic Commerce in Small and Medium Enterprises", **Australian Journal of Information Systems**, Vol 9, No 2, pp 135-147

Moores, T.T. (1996) "Key Issues in the Management of Information Systems: A Hong Kong Perspective", **Information and Management**, September, Vol 30, No 6, pp 301-307

Nazem, S.M. (1990) "Sources of Software and Levels of Satisfaction for Small Business Computer Applications", **Information and Management**, September, Vol 19, No 2, pp 95-100

Nickell, G.S. and Seado, P.C. (1986) "The Impact of Attitudes and Experience on Small Business Computer Use", **American Journal of Small Business**, Spring, Vol 10, No 1, pp 37-48

Niederman, F., Brancheau, J.C. and Wetherbe, J.C. (1991) "Information Systems Management Issues for the 1990s", **MIS Quarterly**, December, Vol 15, No 4, pp 474-500

Nolan, R. (1979) "Managing the Crises in Data Processing", **Harvard Business Review**,

March-April, pp 115-126

Organization For Economic Co-operation and Development (1993) **Small and Medium-Sized Enterprises: Technology and Competitiveness**, OECD,

Palvia, P., Means, D.B. Jr and Jackson, W.M. (1994) "Determinants of Computing in Very Small Business", **Information and Management**, Vol 27, No 3, pp 161-174

Palvia, P.C., Palvia, S.C. and Whitworth, E.J. (2002) "Global Information Technology: A Meta-analysis of Key Issues", **Information and Management**, March, Vol 39, No 5, pp 403-414

Paxson, M.C. (1995) "Increasing Survey Response Rates: Practical Instructions from the Total-design method", **Cornell Hotel and Restaurant Administration Quarterly**, Vol 36, No 4, pp 66-73

Pease, W. and Rowe, M. (2003) "Issues Faced by Small and Medium Enterprises (SMEs) and Their Take-Up of E-commerce in Australian Regional Communities", **Proceedings of the 4th International We-B Conference**, Perth, 24-25 November

Pervan, G. (1996) "Results From a Study of Key Issues in Australasian IS Management – 1996", **7th Australasian Conference on Information Systems**

Pervan, G. (1998) "A CEO View of the Key Issues In Australian Information Systems Management 1997", **Australian Journal of Information Systems**, Vol 5, No 2, pp 51-59

Pollard, C.E. and Hayne, S.C. (1998) "The Changing Face of Information System Issues in Small Firms", **International Small Business Journal**, Apr-June, Vol 16, No 3, pp 70-87

Poon, S. and Swatman, P. (1999) "An Exploratory Study of Small Business Internet Commerce Issues", **Information and Management**, Vol 35, pp 9-18

Ray, C.M., Harris, T.M. and Dye, J.L. (1994) "Small Business Attitudes Towards Computers", **Journal of End User Computing**, Winter, Vol 6, No 1, pp 16-25

Raymond, L. (1985) "Organisational Characteristics and MIS Success in the Context of Small Business", **MIS Quarterly**, March, Vol 9, No 1, pp 37-52

Raymond, L. (1987) "Validating and Applying User Satisfaction as a Measure of MIS Success in Small Organisations", **Information and Management**, Vol 12, No 4, pp 173-179

Riemenschneider, C.K. and Mykytyn, P.B. (2000) "What Small Business Executives Have Learned About Managing Information Technology", **Information and Management**, August, Vol 37, No 5, pp 257-269

Rivard, S., Boisvert, C. and Talbot, J. (1988) "Key Management Issues in Information Systems: A Comparative Analysis", **Proceedings of the Annual Conference of the ASAC 1998 Conference**, pp 32-42

Schlőgel, H. (2004) "Small and Medium Enterprises: Seizing the Potential", **The OECD Observer**, Organisation for Economic Cooperation and Development, May, pp 46-48

Sensis (2004) "Sensis e-Business Report – The On-Line Experience of Small and Medium Enterprises" http://www.sensis.com.au

Stair, R.M., Crittendon, W.F. and Crittendon, V.L. (1989) "The Use, Operation, and Control of the Small Business Computer", **Information and Management**, Vol 16, No 3, pp 125-130

Thong, J., Yap, C. and Raman, K.S. (1994) "Engagement of External Expertise in Information Systems Implementation", **Journal of Management Information Systems**, Fall, Vol 11, No 2, pp 209-221

Thong, J. and Yap, C. (1995) "CEO Characteristics, Organisational Characteristics and Information Technology Adoption in Small Business", **Omega International Journal of Management Science**, Vol 23, No 4, pp 429-442

Thong, J.Y.L., Yap, C.S. and Raman, K.S. (1996) "Top Management Support, External Expertise and Information Systems Implementation in Small Business", **Information**

Systems Research, Vol 7, No 2, pp 248-267

Trewin, D. (2001) **Small Business in Australia: 2001**, Australian Bureau of Statistics, Australian Government Publishing Service, Canberra

Van Beveren, J. and Thomson, H. (2002) "The Use of Electronic Commerce by SMEs in Victoria, Australia", **journal os Small Business Management**, Vol 40, No 3, pp 250-254

Van Kenhove, P., Wijnen, K. and De Wulf, K. (2002) "The Influence of Topic Involvement in Mail-Survey Response Behaviour", **Psychology and Marketing**, Mar, Vol 19, No 3, pp 293-301

Watson, R.T. (1989) "Key Issues in Information Systems Management: Australian Perspective – 1988", **The Australian Computer Journal**, August, Vol 21, No 2, pp 118-126

Watson, R.T., Kelly, G.G., Galliers, R.D. and Brancheau, J.C. (1997) "Key Issues in Information Systems Management: An International Perspective", **Journal of Management Information Systems**, Spring, Vol 13, No 4, pp 91-115

Welsh, J.A. and White, J.F. (1981) "A Small Business is Not a Little Big Business", **Harvard Business Review**, Vol 59, No 4, pp 18-32

Yang, H.L. (1996) "Key Information Management Issues in Taiwan and the US", **Information and Management**, August, Vol 30, No 5, pp 251-267

Yap, C.S., Thong, Y.J.L. and Raman, K.S. (1994) "Effect of Government Incentives on Computerization in Small Businesses", **European Journal of Information Systems**, Vol 3, No 3, pp 191-206

APPENDIX A

In your opinion how important is it to:
1.   have a 'computing infrastructure' that supports the needs of my business?
In order for small businesses to remain viable and productive they must have the appropriate hardware and software that not only supports the existing business, but also remains responsive to change. This task is made more difficult due to the continuing rapid developments in technology.
2.   use computer technology to facilitate and manage changed business practices?
To remain viable in today's competitive business environment, many managers are looking for new ways to run their business. In some cases managers are looking to achieve this via use of their computer system, since the innovative use of such systems can often assist in this change process. This is proving difficult for many managers since this may be a new or foreign way of using their computers.
3.   plan and manage computer networks?
Many businesses are connecting their computers together into networks to allow communication amongst employees, as well as to share hardware such as printers. Although there are many advantages from using computer networks, it takes considerable planning and on-going management to maximise the advantages and reduce some of the negatives, such as possible security breaches.
4.   recruit 'computer literate' employees?
Few small businesses have employees who are both 'computer literate' and understand the workings of the business. Usually it is the manager who has to be competent with both. To make effective use of any computer technology, a business needs to recruit 'computer-literate' staff.
5.   develop 'computer literate' employees?
Staff who both understand the operations of the business, as well as understand and can use technology, are vital to the success of any business. Hence ways must be found to retain such staff, and one way to achieve this is to provide the means by which these people can continually update both their computing and business skills.
6.   identify opportunities for the strategic use of computer systems?
Most small businesses only use their computers to perform routine business processes such as maintaining accounts, whilst others have seen that their computer systems may also be used strategically to possibly gain an advantage over their competitors. The difficulty is to identify such opportunities.
7.   measure the effectiveness and productivity of computer systems?
Understanding whether, and how, computer technology impacts on the bottom-line of a business is important for justifying any future investment in technology. Additionally, measuring the performance of computer systems is necessary for effective management of them. Measurement of these systems is becoming more important as businesses attempt to reduce operating expenses in order to remain both viable and competitive.
8.   outsource selected computing services?
For businesses that don't possess the skills to make effective use of computer technology, or those that do not wish to purchase either the hardware or software themselves, it might be more appropriate to have outside contractors provide these services. Finding suitable service providers, and managing the relationship with them, can prove to be a difficult task for many managers.

9.   manage data and document storage?

Information stored in both electronic and paper-based form is accumulating at an accelerating pace. The challenge is find a means of storing this data that also allows for ease of access when it is required again. Appropriate use of computer technology can assist in this process.

10.   establish effective disaster recovery capabilities?

Many businesses rely to some extent on their computer systems, and there are risks to these organisations from the loss of such systems. Effective recovery plans must be in place, and tested regularly, to ensure that losses are minimised in the event of such a disaster. As businesses become more reliant on their computer systems, the risks become greater.

11.   determine appropriate funding levels for computer systems?

There is generally no accepted way of determining how much money should be directed to computer systems relative to the other funding needs of the business. Under-spending on these systems can be as detrimental to the business as over-spending, and a method needs to be established to allocate monies appropriately.

12.   plan, implement and manage office automation?

Office automation is being implemented by many businesses to improve productivity. This is achieved by computerising certain routine office/business procedures. Problems arise in determining how this should be done and what resources are required. Careful planning needs to take place to ensure the process is successful.

13.   improve information security and control?

As businesses increase their dependence on computer systems, there are risks to the business from the destruction and alteration of data, the disclosure of information to outside sources, or a disruption due to the system 'crashing'. To overcome these risks, tight security controls need to be put in place, and reliable, 'fault-tolerant' systems need to be devised and implemented.

14.   facilitate/manage computer systems that assist managers in making decisions?

Increasingly small businesses are investigating ways in which computer software may be used to assist managers in the decision making process. However these efforts have often met with mixed success, and businesses need to carefully plan and manage how these will be used in future.

15.   select and integrate 'off-the-shelf' software?

Few small businesses can afford to have computer software specially designed to suit their individual needs, and hence have to rely on packaged 'off-the-shelf' software. Whilst this is the cheaper alternative, it may prove difficult to integrate all the different software that a business uses. Additionally such software might not always meet the specific needs of the business, meaning compromises in its use and a resulting decrease in its benefit.

16.   plan and implement electronic commerce systems?

With the increasing globalisation of markets, and customers and suppliers looking to conduct business on-line, many small businesses are looking for ways in which to proceed with this new form of doing business. This often means looking in detail at the way they presently conduct their business, a re-appraisal of present practices, and an increased reliance on their computer systems. The task is made more difficult because there are few successful models for managers to use to guide implementation.

17.   manage relationships with computer vendors?

Most small businesses have to rely on the advice of third-party computer vendors when it comes to anything to do with computer hardware and software, simply because there are rarely people with the necessary skills within the business itself. It is important, therefore,

to develop good working relationships with these vendors in order to receive informed, reliable and independent advice based upon the needs of the business.

18.   manage and control computer viruses and worms?

Despite the advances in anti-virus software in recent years, computer viruses still pose a problem. With more businesses becoming reliant on their computer systems and the Internet, the potential for viruses to either destroy data, or at worst render such systems inoperative, means that managers must take steps to either eliminate the problem altogether, or at least manage the risks.

19.   find money for computer hardware and software?

Although prices for computer hardware and software continue to fall relative to the capability of such systems, the purchase of a computer system still represents a significant investment for a small business. Given the scarcity of funds, and the competing demands for these resources, it is often difficult to find money for such systems.

20.   keep up to date with new technology?

With the rapid advances being made in computer technology, many people feel threatened by it, whilst others often have difficulty keeping up with new developments. As businesses become more reliant on such technology, managers are under increasing pressure to stay abreast of developments, as well as apply be able to adapt it within their own business.