Chapter 8

The use of Information and Communications Technologies by SMEs

TIM MAZZAROL[1] SOPHIE REBOUD[2] AND DELWYN CLARK[3]

Introduction

Across most of the world's economies small to medium enterprises (SMEs) comprise the majority of all firms. For example, throughout the group of 34 advanced industrial economies that comprise the Organisation for Economic Co-operation and Development (OECD), SMEs account for 99 per cent of all firms (OECD, 2010). In Australia, where an SME is defined as a firm with fewer than 200 employees (ABS, 2002), they comprise around 99.7 per cent of the 2.1 million firms operating within the economy (DIISR, 2011). The majority of these firms (approx. 60%) are non-employing businesses with only the owner-manager as an employee. The remainder are micro-firms (24.2%), which employ less than 5 people, small businesses (11.4%) that employ 5 to 19 employees, and medium sized firms (4.1%), which employ 20 to 200 employees (ABS, 2002; DIISR, 2011). This is similar to New Zealand where just over 97 per cent of all businesses have fewer than 20 employees and firms with less than 50 employees provide more than half that country's employment (MBIE, 2013).

Increasingly the world is moving to a digital, online and mobile market place (Acs and Preston, 1997; Accenture, 2014). Major corporations are rapidly transitioning towards digital management systems such as e-business, e-commerce and e-marketing (Iansiti and Lakhani, 2014). For SMEs this digital revolution poses both a major threat and significant opportunity. The threat is that SMEs which fail to embrace these digital technologies will become less competitive and locked out of a globally expanding online market. However, for those SMEs that embrace information technology there is the opportunity to secure the same operational and market advantages from such technologies that were once the exclusive preserve of large firms (Mele, 2013).

The application of information and communications technology (ICT) to SMEs can be found in a variety of areas with at least three specific points of focus. The first is e-commerce, which can often be confused with e-business. The term 'e-commerce' generally refers to the use of online ICT to buy and sell either business-to-business (B2B), or business-to-consumer (B2C) (Daniel, Wilson and Myers, 2002). By contrast the term 'e-business' refers to the use of ICT as a

[1] Tim Mazzarol, University of Western Australia, tim.mazzarol@uwa.edu.au
[2] Sophie Reboud, Groupe ESC Dijon, Bourgogne, France, sophie.reboud@escdijon.eu
[3] Delwyn Clark, University of Waikato, New Zealand, dnclark@waikato.ac.nz

mechanism to enhance the firm's business operations and customer engagement processes including supply chain management (Holsapple and Singh, 2000). Finally, the term 'e-marketing' is generally used to describe the use by firms to undertake marketing and promotion so as to support their e-commerce and e-business strategies (Corley, Jourdan and Ingram, 2013).

This study seeks to address the issue of how SMEs use ICT and the factors that might influence their use. It also examines the benefits that they get from ICT use. It explores three inter-related research questions:

1. How do SMEs use Information and Communications Technologies (ICTs)?
2. What are the factors that influence their adoption of ICTs?
3. What are the main benefits SMEs get from using ICTs?

This chapter draws on a qualitative study comprising interviews of 289 small business owner-managers across 30 different industry sectors. It follows the structure for case study research design outlined by Eisenhardt (1989) commencing with the factors leading to the study, then moving onto the case selection process, design of case study protocols and data collection instruments, data coding and analysis development of research propositions and the enfolding of the literature, before reaching conclusions and implications for research, education, policy and practice.

Methodology

The antecedents of this study can be traced back to 2003 as part of research project undertaken in small business management within the MBA program at the University of Western Australia (UWA). Students were tasked to undertake interviews with small business owner-managers and work in groups to prepare industry benchmarking studies. Each student would interview two owner-managers and groups of 4 to 5 students would have 8 to 10 cases from firms within a selected industry sector. This project quickly identified that many small business owners were not operating at best practice and often faced challenges such as cash flow management, marketing, business planning, staffing and the pressures of competition and government regulation. It was decided to prepare a specialist course for owner-managers and to undertake research to examine the management practices of these individuals.

Case study selection

Eisenhardt (1989) suggests that case study selection should be theory-driven and that cases should be selected to represent the range of dimensions that define the key units of analysis that form the focus of the research study (Garson, 2013). In this instance case study selection was based on the criteria of the firm having to be an SME as defined by the Australian Bureau of Statistics (ABS, 2002), and within one of a selected industry sector. The process of data collection took place over a period of 11 years with cases selected and interviewed as part of the UWA MBA course mentioned above, and also via the enrolment of small business owner-managers into a specialised outreach program. Case study selection was therefore purposive and followed a theoretical rather than a random sampling method, with a specific focus on finding "typical" small firms within the selected industry sectors.

Between 2003 and 2014 a total of 289 small businesses were interviewed from across 30 industry sectors. As the MBA course was run in Perth and Singapore during this time, a total of 50 companies (17%) were from Singapore and the balance from Australia. Table 1 outlines the industry sectors from where the firms were selected, along with the number of cases interviewed, their location and dates of interview.

It should be noted that most of the firms were service businesses which reflects the overall structure of the small business sector in the two locations where the interviews were conducted, plus the decisions over which industry sectors to choose. As can be seen, 10.7 per

cent of the firms were retail pharmacies. This is due to the MBA course having been run within the UWA Master of Pharmacy program for several years. In this case students undertook their interviews within their chosen industry sector as a learning activity. All students engaged in the data collection process were required to adhere to the Australian national guidelines for research involving humans and governed by the university's Human Research Ethics Committee. Detailed briefings were provided to the students prior to the interviews and confidentiality agreements and consent forms were obtained from the participants.

Table 1: Case studies selected by industry sector, location and year of interview

Sector	Firms	Location	Year
Aviation	10	Perth	2004
Beauty Therapy	10	Perth	2004
Bridal Industry	8	Singapore	2010
Cafe restaurants	8	Perth	2004
Childcare	8	Singapore	2010
Florists	6	Perth	2010
Furniture makers	8	Perth	2004
Graphic designers	10	Perth	2003
Hairdressers	6	Perth	2010
Health Spas	8	Singapore	2010
Hosted Accommodation "Bed and Breakfast"	10	Perth	2003
Independent Builders	4	Perth	2010
Independent consultants	10	Perth	2014
Independent Food Brokers	8	Perth	2003
Independent Liquor Stores	8	Perth	2014
Independent Supermarkets	8	Perth	2004
IT firms	10	Perth	2003
Language Education Colleges	10	Perth	2010
Newsagents	8	Perth	2004
Pharmacies	31	Perth	2010
Plant Nurseries	8	Perth	2003
Real Estate Agencies	20	Perth	2004/2014
Recruitment Agencies	8	Perth	2003
Retail Clothing Stores	10	Perth	2004
Retail fashion	10	Singapore	2010
Service firms (PR, Designers)	8	Singapore	2010
Small Bars	10	Perth	2014
Travel Agencies	10	Perth	2010
Wholesale & Retail	8	Singapore	2010
Young entrepreneurs	8	Singapore	2010
Total (30 industry sectors)	**289**		

Crafting the instruments and protocols

The decision to employ a case study methodology was driven by the need to use the data collection process as a teaching tool for experiential learning within the MBA program, and also to enable an appropriate method for investigating the research questions. As Yin (2014) suggests:

> "Doing case study research is the preferred method, compared to others, in situations when: (1) the main research questions are 'how' or 'why' questions; (2) the researcher has little or no control over behavioural events; and (3) the focus of study is a contemporary (as opposed to entirely historical) phenomenon." (p. 10)

In this study all three conditions applied and it was considered the most appropriate approach to take. Further, a multiple case study method was selected as it was able to offer enhanced

insights into the small business sector that this study was seeking. As Miles, Huberman and Saldaña (2014) explain:

> "We suggest that multiple cases offer the researcher an even deeper understanding of the processes and outcomes of cases, the chance to test (not just develop) hypotheses, and a good picture of locally grounded causation." (p.29)

The case study protocol was built on the approach taken by Hankinson et al. (1997) and Hankinson (2000) in their survey of small business owner-managers in the UK and Europe. This examined the key units of analysis specific to the owner-manager (e.g. behaviour and lifestyle, skills and capabilities, management methods, motivation, relationships with outsiders and future outlook). These units of analysis were supplemented with a diagnostic survey tool developed by the authors (Mazzarol, Reboud and Olivares, 2006; Mazzarol, Reboud and Tye, 2006; Mazzarol, 2014). This comprised 124 questions grouped into 12 categories that examined a wide range of units of analysis at the level of the firm. These covered marketing and sales, financial management, strategy, operations, innovation, quality, product development and performance benchmarking. For the purposes of this chapter our focus is on the firms' use of ICTs.

The questionnaire used to collect the diagnostic information contained a simple three-point scale for the various items coded 'Yes', 'Partially' or 'No' to each item, which asked specific questions about the owner-manager's operation of the business. It also collected data on owner-manager's past use of and attitudes towards outside assistance (e.g. sources of advice, use of consultants, mentors, business round tables and networking). In addition it gathered financial information on the business and examined the firm's gross profitability and break-even. The purpose for developing this diagnostic tool was to assist businesses, small or large to quickly determine areas of their business which were not performing to expectation, or needed to be improved. Using these tools will enable a business to develop a well-constructed management operating system (Fassoula and Rogerson 2003).

Data collection

Data collection involved having MBA students use the case study protocol and diagnostic survey tool to interview two small business owner-managers from selected industry sectors. The diagnostic tool was set up within an EXCEL spreadsheet with macros to produce a questionnaire that could generate a diagnostic report for the small business owner. Students conducted in-depth interviews typically lasting over an hour with the owner-managers. They then provided the owner-manager with a copy of their diagnostic report as a reward for the interview. The students were then placed into groups and prepared an industry benchmarking report focusing on the industry sector from which the cases were drawn, and aggregating the findings from the individual cases.

Data Analysis

The total amount of data collected for this project was substantial. It included interview reports with the owner-managers, diagnostic reports and industry benchmarking reports numbering in the hundreds of which each were between 20 and 50 pages in length. These documents were analysed using both Leximancer text mining software (Leximancer, 2011) and NVivo qualitative data analysis software (Hoover, 2011; Bazeley and Jackson, 2013). Although we collected a wide range of data relating to these firms and their owner-managers, our focus here is on the use by these SMEs of ICTs for e-commerce, e-business and e-marketing. For this chapter we only examine the issues relevant to our three research questions on ICTs. As suggested by Miles, Huberman and Saldaña (2014) if the research questions and conceptual framework are clear, the identification of the cases is relatively straightforward.

Case identification and coding

Bazeley and Jackson (2013) suggest that cases can be created at any time during an NVivo analysis and that a case is a 'core structural element in NVivo' that unites all the different components of qualitative and quantitative data. The initial analysis with the source data entered into NVivo broadly organised it into 'industry', 'firm' and 'owner-manager' 'parent nodes' that relate to a conceptual framework originally proposed by D'Amboise and Muldowney (1988). Each case was the firm and its owner-manager, with separate examination of some industries where the use or impact of ICT was found to be significant.

The coding process generated 'child nodes' that addressed the SMEs engagement with ICTs for e-commerce, e-business and e-marketing. Coding continued with a process of removing any redundant nodes or nesting nodes within tree nodes to reduce the total number of overall themes to a reasonable level. This is suggested to be around 5-7 main themes interconnected via layering (Rovai, Baker and Ponton, 2013). This process generated a final list of five 'child nodes' that comprised the original three (e.g. e-commerce, e-business and e-marketing) plus 'social media' and 'accounting systems'.

Data was of two kinds, 'emic' or that derived from the owner-managers as direct comments during the interviews and from the diagnostic survey tool, and 'etic', which comprised the analysis from the MBA students who had undertaken the interviews and produced the industry benchmark reports. Both types of data are important in order to provide a comprehensive view of the phenomena being examined (Rovai, Baker and Ponton, 2013). In the reporting below 'emic' data is shown as quotes from owner-managers and 'etic' data as field notes from the industry studies.

Leximancer Analysis

The second phase of the analysis used the Leximancer software to examine and map the 'emic' and 'etic' data collected from the SME owner-managers and the MBA field research teams. The Leximancer software examines text in a grounded fashion, identifying the main concepts in a corpus and how they relate to each other. It provides both conceptual (thematic) analysis and relational (semantic) analysis, identifying concepts in the corpus and how they interrelate. In identifying concepts and showing how they interrelate, Leximancer uses word frequency and co-occurrence counts as its basic data (Smith and Humphreys, 2006). Leximancer not only identifies how frequently words occur, but it also tags them as containing a 'concept' if sufficient accumulated evidence is found to suggest that they represent a distinct concept. Terms found in the text are weighted so that the presence of each word in a sentence contributes to the body of evidence to support the existence of a concept.

The Leximancer analysis generates a concept map (see Figure 1) that provides a visual representation of the data and the relationships between key concepts and themes located therein. A 'concept' is a collection of words that are associated within the text with each other. Leximancer identifies the frequency of these words and whether they represent distinct concepts. The bubbles are *themes* that contain concepts, with themes overlapping and clustering around concepts that are associated with each other in the same sequences of text.

As shown in Figure 1 the Leximancer analysis generated at least 10 major themes. The most important of these is *systems*, which includes the concepts of 'computer systems', and 'management software' such as accounting programs. This links to the second most significant theme of *technology*, which comprises the concepts of ICT and related digital technologies used by different industries to deliver services and generate value for the customer and the business. In many respects these two themes were associated with the SMEs engagement in e-business activities.

Closely related are the themes *Internet* and *needs*. Of these the theme *Internet* is more significant and contains the concepts associated with the Internet, its importance, and the impact that it is having on companies' abilities to engage with customers and undertake

marketing. The theme *needs* is associated with the specific needs each firm has for the Internet and associated technologies. What this reflects is that some industries are more heavily impacted by digital technologies and the Internet than others, which we examine in more detail later.

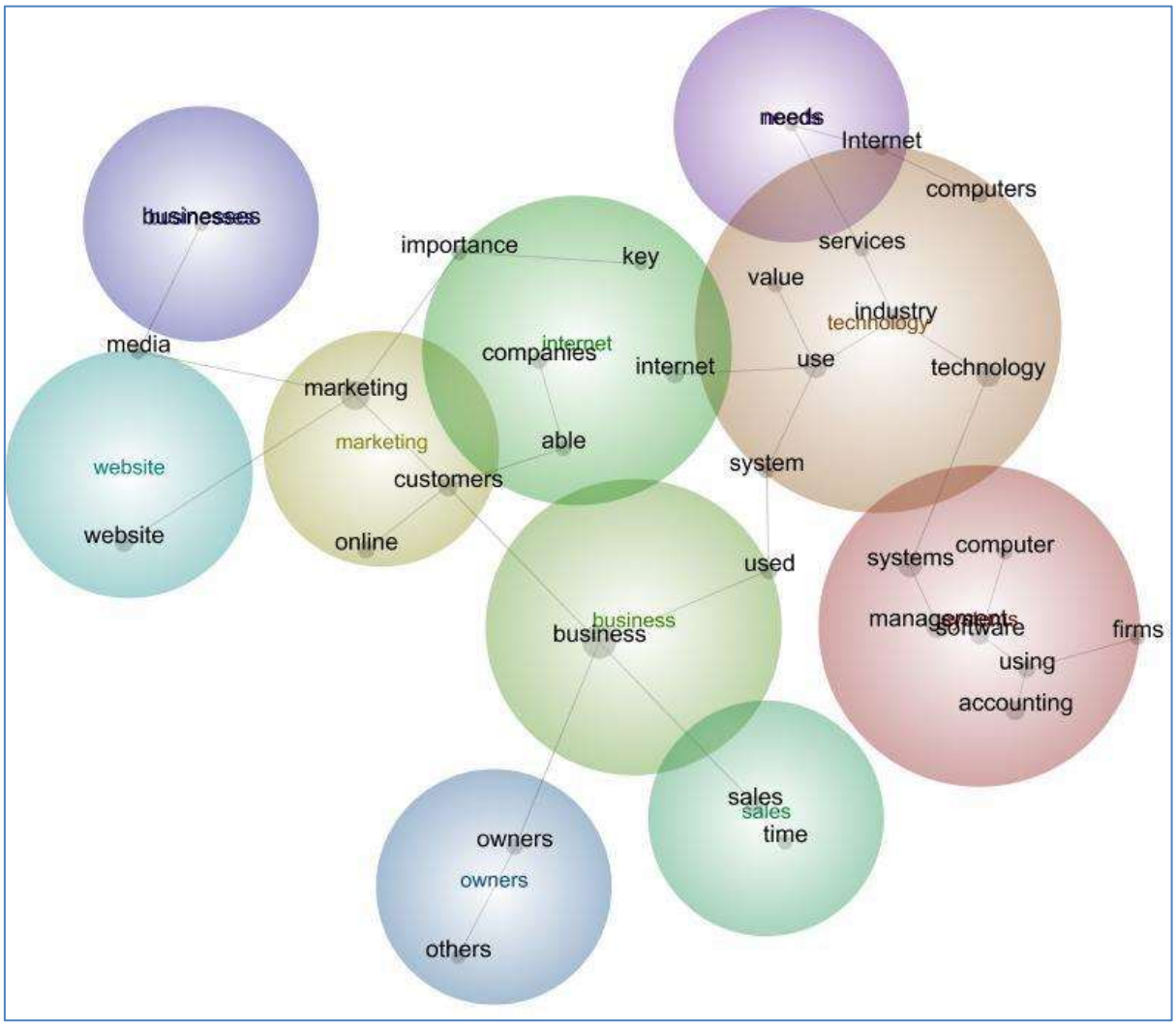


Figure 1: Leximancer concept map of SME use of ICT

Related to the theme *Internet* are the themes *marketing* and *business*. The first of these deals with the use by firms and customers of the Internet for purchasing, while the second deals with issues of how the business is being impacted by online marketing. Related to *business* are the themes *sales* and *owners*. Of these *sales* contains the concepts 'sales' and 'time'. The first of these addresses the impact of digital technology on sales, both positive and negative. The second relates to the time it is taking the owner-managers to learn about and implement ICT systems. By contrast the theme *owners* contains the concepts 'owners' and 'others'. The first of these themes deals with the owner-managers' engagement with ICT systems, and the second with their engagement with others (e.g. customers, suppliers, competitors). In general terms these themes were associated with e-commerce and e-marketing activities.

The final two themes *website* and *businesses* are outliers. The first of these is linked to *marketing* and contains the concepts 'website' and 'media'. These deal respectively with the firm's use of websites for e-marketing and e-commerce, while the second deals with the use of social media (e.g. Facebook, LinkedIn, Twitter). The theme *businesses* contains the concept 'businesses' that relates to the use by businesses representing all the cases and industry sectors and how digital technology is impacting on them.

Our analysis identified three major areas engagement and use by the SMEs of ICT. The first of these is the use of ICT for e-business, specifically accounting systems and operations. The second is the use of ICT for e-commerce, e-marketing and social media, essentially the generation of customers and sales. The third is the impact of ICT on the firms and their industry sectors. In the following sections we examine each of these in depth.

Use of ICT for e-business

The effective use of ICT by SMEs to enhance operations, customer relationships management (CRM), human resources management (HRM), plus the accounting and financial management systems has been recognised for decades (Bridge and Peel, 1999). The increased use of online digital transactions within supply chains, for accessing finances with banks and other businesses, suggests that SMEs should recognise the value of e-business and its ability to deliver greater productivity and profitability if employed correctly (Chang, Chang, Ho, Yen and Chiang, 2011). It is also becoming increasingly important for SMEs that operate within B2B supply chains (Caldwell, Harland, Powell and Zheng, 2013). Further, many countries are moving towards e-government business interactions for regulatory and compliance issues (e.g. taxation, registrations), which typically require SMEs to adopt ICT for administration and reporting systems (UNESA, 2010; Van der Wee, Verbrugge, Sadowski, Driesse and Pickavet, 2015).

For the firms in our study the main e-business engagement was in the form of accounting software programs and financial management systems such as electronic funds transfer point of sale (EFTPOS), automatic teller machines (ATM) and software for CRM and other point of sale (POS) activities. This was particularly the case for retailers and those engaged in personal services such as hairdressing as the following field notes and owner-manager comments show:

> The majority of the salons quoted "short cuts" as the software program used to run the business. Short cuts have the ability to track trends in customers purchase patterns, sales, stock and more. However none of the salon owners were using the software to its full potential in tracking trends or for forecasting the future. (Field note, Hairdressers)

> In the areas of financial and inventory control and systems, computer software is now available to assist the hotel operator in areas such as wages and salaries control, inventory control, cash control, menu preparation and costing and general accounting. Programmable cash registers are in use, which allows for the inputting of prices for products (to minimise errors by bar attendants) as well as for changes to prices and product sales according to the time of the day (to allow for the increased costs associated with entertainment or late-night trading). (Field note, Small Bars)

> Next, the implementation of the MYOB program for businesses is an example of a good practice, as it allows the owner-manager to closely monitor and control the business condition. In addition to that, trends and purchasing patterns can also be observed from the data. Thirdly, having engaged a number of suppliers will ensure that the business will always be able to cater to market demand, which includes last-minute reservations of business opportunity. (Field note, Florists)

> "I have established that the business has a cost tracking problem within our MYOB accounting system. This is important, as there cannot be a comparison between the actual costs and the quoted/tendered sale price." (Owner-manager, Independent Consultant)

External drivers of e-business adoption

In many cases the owner-managers had adopted ICT systems as a result of external pressures. This was particularly noted in the interviews as a result of the introduction of the goods and services tax (GST) in 2000. However, despite this major change enabling tax compliance and the benefits of having ICT-based accounting systems to help the owner-managers keep track of their payments, many SMEs continued to run with paper-based systems:

> The introduction of GST forced most newsagent owners to computerise their financial records for the purpose of processing their regular ATO business statements. During our interviews it was quite surprising to learn that some owners were still recording their books manually. Only three of the eight owners interviewed had a 'point of sales system installed'. The owners are reluctant to adopt technology to assist them in managing or monitoring their performance. Similarly, suppliers are finding a high degree of resistance from the owners in taking on their stock controlling and sale recording technology. (Field note, Newsagencies)

The comments from the Newsagencies field note also suggest that this reluctance to adopt appropriate e-business systems was causing problems for key suppliers. Most of these being larger firms that prefer to work with their SME clients via online digital systems (Caldwell, Harland, Powell and Zheng, 2013).

However, for the many owner-managers the key obstacles to getting e-business systems implemented is a lack of management knowledge and skills to enable them to fully understand the importance and overall value of such technologies. This was evidenced in the review of small firms in the general aviation sector:

> Very few firms demonstrated evidence of management accounting systems. One firm did not appear to be aware of their break even and a number of firms only reviewed their financial position on a yearly basis with their accountant. (Field note, Aviation sector)

It was also found in retailing, such as the review of independent liquor stores, where some firms had introduced EFPOS/POS systems, while others complained of the cost. This was particularly found amongst micro-businesses that lacked time and resources:

> Another consistent theme in terms of marketing effectiveness was the importance of modern 'point of sale' technology – those companies that have it found it extremely useful for informing their marketing efforts – though a good POS is costly, and questions were also raised about cost-effectiveness. Those companies that did not have an up-to-date system still recognized their value, but cost was again cited as a driver as to why they did not implement new systems. A general correlation could be seen between the size of the business and the capacity to implement a state-of-the-art point of sale system. **(**Field note, Independent Liquor Stores)

Key findings from our assessment of the engagement of SMEs in e-business was that the most common drivers for adoption were external pressures such as suppliers, customers or government regulation requiring online or digital transactions. However, the main barriers to such adoption were the attitudes of the owner-managers and their relative lack of knowledge of the benefits of adopting such systems. The following comments illustrate this:

> The owner-manager is of the opinion that there is a strong push by all of the major suppliers for newsagents towards computerisation. He believes that this will create a high overhead for the agents, with little to gain in turnover and profitability. (Field note, Newsagencies)

> The majority of owner-managers interviewed showed a weakness with respect to financial management skills. Despite the fact that they generally were making a profit, few recognised that by having systems or better systems in place could potentially increase their profits substantially. **(**Field note, Graphic Design Industry)

This is a finding consistent with other research where the adoption of e-business technologies is contingent on or can be facilitated by increasing the owner-managers' knowledge and awareness of the benefits of such systems (Chong, Ooi, Bao and Lin, 2014). The following observation from the review of the independent food brokers industry encapsulates these issues, while also highlighting the importance of being part of a major supply chain in which the SME is using e-business technologies in order to work more efficiently with its key suppliers. However, there is also the risk to SMEs that their suppliers, or customers, as larger firms often do, will seek to use e-business technologies to disintermediate the supply chain:

> There was clear differentiation between the firms surveyed regarding their attitude towards, and use of technology, both for internal administrative services and forming part of their value chain. The owner's enthusiasm for technology or their past experience was clearly linked with their use of technology in the business. Some businesses have invested a great deal of money over many years in bespoke technology, and they cited it as a major source of efficiency, business process management and innovation, and of client business. These bespoke systems are generally derived from investments by alliances of companies, being on the whole too expensive for development alone; hence nearly all companies who had significant investments in technology also were members of strong national alliances. Apart from administrative technology (e.g. MYOB accounting software, etc.) technology is mainly used to manage customer business (field sales automation). Field representatives enter information from the retail store level into the system, and this is captured and used for management reports. The better systems give access to their customers for querying and reporting purposes – making the operations of the broker/merchandiser totally transparent to the manufacturer. There is some concern in the industry about new technology proposed by the retail stores that may supersede the broker's own technology, and which merchandisers/brokers may be mandated to use. (Field note, Independent Food Brokers)

Other research has supported these findings. For example, Caldwell et al. (2013) found that SMEs in the UK were getting benefit from being part of large e-business supply chains, but many also held concerns over being at arm's length of their customers and suppliers, plus the fear of being too dependent on such impersonal relationships, with many supply chains defaulting to the use of 'e-auctions' where the information asymmetries between the SME and the larger firm were high. Another UK based study found most SME owner-managers, particularly those in micro-firms, held ICT adoption as an "essential resource". Yet many also needed to see more immediate benefits from the technology and most used it primarily for operational rather than strategic purposes (Jones, Packham, Beynon-Davies and Pickernell, 2014). In New Zealand, a survey of home-based enterprises found that ICTs were enabling these micro firms to conduct business activities well beyond their local area and increasing their geographic reach in spite of their limited scale and resources (Clark and Douglas, 2011).

In some cases the adoption of technology was undertaken less for its direct benefits to the firm and more for the opportunities it potentially had for facilitating customer flow to the business. This is illustrated by one of the newsagency cases where the owner-manager agreed to install an ATM on his premises not for any direct benefit, but in the expectation that it would help to boost customer traffic:

> Ross installed an ATM put on the premises recently. He was approached by card choice, the largest provider of non-bank ATM's in Australia. Due to the number of people who would ask where the nearest ATM is he felt it would be a good traffic generator. It is not an income generator in itself. (Field note, Newsagencies)

This case demonstrates a strategic approach to the adoption of technology where the ATM was not a direct cost to the SME, but a form of alliance between the firm and the larger supplier that offered a mutually beneficial symbiotic relationship.

Use of ICT e-business systems to enhance productivity

The use of ICT within e-business models is also very important to the ability of SMEs to increase their overall productivity in planning, organisation and control, plus strategy (Cragg, Mills and Suraweera, 2013). This is important in manufacturing industries where it can be of value to innovation and new product development (Tang and Ghobakhloo, 2013), and also in service industries where the investment in ICT can significantly enhance employee productivity and customer experience (Alonso-almeida and Llach, 2013). However, it is important for any ICT implementation to be accompanied by appropriate training of the firm's employees (Eikebrokk and Olsen, 2009). This was observed in our review of real estate agencies:

> Up-to-date production technology, including fully supported IT systems and Internet capability shows a positive correlation with gross profit margins. Formal processes that ensure there is sufficient capacity to support planned services are integral to optimal performance of this technology. (Field note, Real Estate Agencies)

As the following field note from our review of small recruitment agents shows, the level of adoption of ICT was significant and required this integration of employee skills building and technology roll out:

> The rate of technology change appears to be medium with the main areas of use being in the area of office equipment (computers, printers, photocopiers etc.) and communication technology, including mobile communications. The Internet listing of vacancies has increased in importance as has been the use of the Internet to lodge CV's. Web sites offer not just advertisements for an organisation but they now offer advice on resume format and content, career advice and automatic notification of jobs. A computerised data base of potential employees is vital to service client needs quickly and efficiently. Where large volumes of data are used, costs can be reduced substantially by using new technology and this was noted by one of the interviewees. Whilst most employees in the industry are now computer literate it appears there is still some way to go as only 41% of respondents to the survey had an Information Technology Disaster Plan. (Field note, Recruitment Agencies)

Adoption and impact of e-commerce

The adoption of e-commerce grew significantly during the 1990s along with the development of the Internet and broadband technologies (Baker, 1999). Among the key advantages of the adoption of e-commerce is the ability of the firm to reach target markets and customers not easily accessible via conventional offline channels (Amabile and Gadille, 2006). It can also significantly reduce the cost of transactions with customers and remove the need for expensive physical retail shopfronts, or intermediaries that erode the margins earned per sale (Mahadevan, 2000). For some SMEs the use of e-commerce has enabled them to rapidly move from start-up to a globally focused business in a time frame not previously possible (Mathews and Healy, 2008).

Despite these advantages many SMEs are still not making sufficient use of e-commerce. For example, in 2014 only 54 per cent of Australian SMEs were selling online, only 26 per cent were selling online to international customers, and only 29 per cent were using e-commerce to generate most of their sales (Sensis, 2014). This is a pattern found in many other countries, in particular developing economies such as Indonesia (Astuti and Nasution, 2014) and Ghana (Nyame, Boateng, Gymafi and Asabere, 2013). Across the OECD developed economies the proportion of SMEs with Internet connections is around 94 per cent, however, only 35 per cent are using this for online purchasing and only 18 per cent for online sales (OECD, 2012). However, this is not the case for many countries in the developed world such as Sweden; where SMEs are making strong use of e-commerce (Torsten Eriksson, Hultman and Naldi, 2008).

Adopting e-commerce whether you like it or not

A major theme that emerged from our cases was that most SME owner-managers were being forced to embrace e-commerce whether they liked it or not. There was a realisation that their customers and industry were beginning to shift into online engagement and any business that did not have a website through which customers could access information and make bookings was likely to be in difficulty. For example, in the reviews of the small bars sector, bridal industry and personnel recruitment agencies it was clear that e-commerce was becoming an important part of business for SMEs in retailing and personal and professional services:

> E-commerce the use of Internet marketing has become more and more apparent, since the inception of the small bar industry in Perth began. Many owner-managers are constantly updating web pages to stay current and inform customers of upcoming

> events. During our investigation it became apparent that the bars that were not located in high traffic areas relied on Internet marketing, such as Urbanspoon, much more than others who relied on passing foot traffic. This leads us to the conclusion that small bars in more remote areas are much more in touch with their customer reviews. (Field note, Small Bars sector)

> The survey indicated that 100% of all respondents now have Internet access and use e-mail which has increased by 9% (e-mail) and 23% (Internet access) since 2000. 91% had a website compared to 76% in 2000 52% used an intranet system. All the interviewees used e-mail as a means of receiving resumes and communicating and half had an e-commerce strategy. There was a general feeling that there had been a loss of the personal touch as a consequence however the increasing use of technology was irreversible and would grow. One interviewee saw the increasing use of technology as critical to the growth and development of their business. (Field note, Recruitment Agencies)

However, this adoption of e-commerce was strong in some industries (e.g. wedding and bridal industry), but fairly patchy in others such as furniture manufacturing:

> All respondents have decided to adopt B2C in their wedding service business. Majority of the owner-managers have also decided to create a website for marketing, promotion or some other purposes such as appointment fixing, photos viewing and others. (Field note, Bridal industry)

> The companies we interviewed have a mixed web presence. Some have incomplete sites under construction, others have basic informative sites, and still others have none at all. (Field note, Furniture Industry)

E-commerce the good the bad and the scary

The cost-benefit of investing in e-commerce and related e-marketing activities was an issue for some owner-managers while others were enthusiastic about the technology (Pelletier and Moreau, 2008). For example this comment from an owner-manager of a travel agency suggested that the Internet was a valuable tool for a small business and opened up new frontiers and market segments:

> "The Internet is making it possible for small companies to sell products and services all over the world. It is allowing small start-ups to take on the brick-and-mortar giants of a particular industry. The boom of selling on the Internet is at least in part due to the desire of consumer to get what they want now (such as the Y generation consumers). Also many consumers are becoming more time-poor, and others are wanting to easily compare prices and products in order to get a better buy." (Owner-manager, Travel Agency)

However, for some industries, such as newsagencies, pharmacies, travel agencies and real estate agencies the impact of digital online technology and the trend towards customers seeking to search and buy online was significant. In some cases, such as the newsagents and pharmacies this pressure was driven by key suppliers:

> The business owner is concerned about the direction that Lotteries West may take in relation to allowing customers to purchase using the Internet. She believes that 'on-line' distribution will attract a different clientele (the addictive gambler) that those who buy through newsagents and kiosk. She believes that it will devalue the product and could create a bad image for Lotteries West, and would not be politically correct for the community. Overall it will have a devastating effect on the goodwill factor of newsagencies. (Field note, Newsagencies)

> The issue of Electronic prescribing (eRx) has created been met with agreeability in some but resistance in others. The eRx system is an Australia wide platform allowing medical practitioners to prescribe medications, with the ability of having them dispensed in 99% of pharmacies through Australia. In many ways this has revolutionised prescribing but for those pharmacies which do not have the infrastructure to accompany the use of such an implementation will either need to find funding for an upgrade or be succumb to the perils of unsustainability if this system becomes the norm. (Field note, Pharmacies)

This rapid diffusion of online trading was impacting negatively on many of the SMEs who we interviewed. Although some believed that they could continue to survive with good customer service and the maintenance of their personal networks others were actively engaged in adopting e-commerce:

> The owner-manager believes that the Internet is giving the ability to customers to pay on line, which reduces their needs to visit his business. However, he is still optimistic that 'the personal service' being offered by small business owners is still what the customers are looking for. (Field note, Newsagencies)

> She was boasting as to how they were innovators in the use of Internet marketing and Internet based proprietary systems. She claims that they aren't going through any challenges within the company as they had solved all of these already. She also explained how far ahead they are above everyone else. (Field note, Travel Agencies)

> Firm JT has embraced the online world, with its website where customers can get quotes and book flights. Firm FW has not gone down this road yet as the owner does not see the benefits online marketing as he feels it goes against his business model. (Field note, Travel Agencies)

For those SMEs engaged in industries where there was significant impact from e-commerce there were indications of pressure being placed on their sales and profit margins due to customers being able to rapidly secure comparative pricing and many competitors running business models that did not involve the expensive 'bricks and mortar' shop fronts that they had to maintain. This pattern was particularly pronounced in the travel agencies sector where the rise of online travel booking firms such as Webjet was having a significant impact:

> One of the key themes from my discussions with the owner-managers was that online competitors such as Webjet were having a big impact on their sales. A constant recurring theme during the interviews was that both businesses were looking for unique products/packages that companies like Webjet could not provide. This seems to be an industry-wide trend, the Internet means that customers are able to compare prices relatively easily online, 24 hours a day (which in itself is an advantage in Perth with limited trading hours). These online sales (which these businesses have little part in) are eroding previous revenue streams, and is also meaning that customers are comparing prices online, and expecting the travel agent to be able to match it. (Field note, Travel Agencies)

As the following field note from our review of the travel agencies shows, the financial impact of the consumer's move from traditional channels of exchange to online purchase was significant:

> Turnover for both businesses was relatively high. Business A currently has a turnover of $27 million annually, whereas Business B has around $10-15 million in turnover annually. These figures have changed dramatically in the last few years. The owner of Business A described the last few years of business's sales by a boom two years ago, then as the GFC hit, so were his business's sales. The owner of Business B described the recent sales history of his business as a gradual decline, from $15-20 million three years ago to $10-15 million. Both owners believe the Internet have had a negative impact on their business turnover, with more customers booking online with companies like Webjet. (Field note, Travel Agencies)

The disruptive influence of e-commerce

This disruptive impact of e-commerce on traditional sectors such as travel and real estate has been recognised for some time as consumers gain power through online systems that allow rapid information searches, comparative pricing and discount purchasing (Edwards, 1999). This has seen a segmentation of consumer markets in the travel industry into those customers that seek to transact everything online without the help of travel agents, and those who prefer to use traditional channels such as the telephone and face-to-face meetings. Not surprisingly the first type of consumer is usually young and well-educated, while the latter is older, less educated or requiring help with a complex travel requirement (Castillo-Manzano and Lopez-

Valpuesta, 2010). As shown in the following field note of the travel agency sector the impact of online technologies has had a negative effect on their traditional sales channels, but this can be managed with careful customer and market segmentation strategies:

> So in terms of travel business model, Business A, and to a certain degree Business B, seem to be typical of the kind of business in the travel agency industry prior to the Internet - located in a shopping centre or somewhere with high amounts of traffic (people). Now the traffic is coming in the form of Internet traffic – the store fronts online are becoming more important than an actual physical store front. As Business B also does a great deal of business to business travel sales, it seems to be almost in a different category of travel agency. It still has some retail sales, but some in corporate sales. As a result, Business B seems as though it is being affected less by travel websites (with turnover about the same as it was three years ago), however it probably is playing at least some role on the retail side. **(**Field note, Travel Agencies)

The disruptive change of e-commerce on the travel industry has been equalled by the real estate sector which has seen a massive trend towards online transactions over the past two decades. For example, the launch of www.realestate.com.au in 2000 saw a rise in visitors from 700,000 per month in its first year to 5.27 million an month by 2009 (Nielsen, 2010). The Internet is now the primary source of information for customers seeking to sell, buy or rent real estate it has also radically changed the way that consumers search for and select property (Cayley, 2006). Yet the impact of the Internet can be addressed by real estate agents who are willing to adapt and apply innovative approaches to the way they deliver their service (Bristow, Bulati, Mooney and Dou, 2004). Our review of the real estate agents sector found similar evidence as the following field note illustrates:

> The interviews demonstrate how quickly technology is changing and both interviewees list this as a major challenge and fear that disruptive technology such real estate portals may look to transact with what has traditionally being their clients. This would in effect lessen the role of agents and represents a real fear among the industry. The interviews also clearly show that much time is needed in the day to day running of the business as in both cases the owners are the top performing sales people. This means an exit strategy can be hard to achieve if they fail to develop others. It is apparent that both agencies perform above average and reasons such as common agreement that marketing is a key focus with both participants acknowledging its importance and performing above average in this area. Both have extensive networks through community engagement and networks outside of real estate. **(**Field note, Real Estate Agencies)

Factors influencing the adoption of e-commerce by SMEs

Without doubt the trend towards e-commerce and its impact on many traditional industry sectors is substantial and only likely to increase. Our findings in relation to e-commerce adoption and use by SMEs are consistent with earlier research. Many owner-managers may ignore or even resist adopting e-commerce strategies on the grounds that they don't feel it is of any strategic importance to their business (Bharadwaj and Soni, 2007). However, when SMEs do adopt e-commerce strategies they often do so by building on their existing 'bricks and mortar' business and using this to secure or maintain market competitiveness, which if implemented appropriately can enhance profitability (Karagozoglu and Lindell, 2004).

Karajaluoto and Huhtamaki (2010) suggest that the adoption of e-commerce strategies by SME owner-managers is influenced by both firm-specific and manager-specific factors. These include the industry in which the business is operating and whether this is being impacted by digital technologies, and the owner-manager's knowledge of and attitude towards ICT. The impact of environmental factors (e.g. industry change, customer or supplier pressure to adopt e-commerce) is balanced against the firm's resources and the owner-manager's capacity to adopt and effectively use these technologies. Much may ultimately depend on the owner's desire to use e-commerce in order to follow a high growth "Gazelle" strategy, or simply to use it to protect their existing market share and avoid loss of revenue (Tan, Sharma and Theng, 2009). So there is likely to be a relationship between the owner's strategic intent and their level

of engagement with e-commerce, although that relationship might be difficult to find (Kearns, 2005).

Websites, e-marketing and social media use

As outlined earlier, the Leximancer analysis identified strong themes around the Internet, its use for e-marketing and the role of websites. With the rise of online consumers it is no surprise that investment by SMEs into e-marketing is likely to help generate new business and higher profits (Eid and El-Gohary, 2013). The complementary partner to e-commerce is e-marketing and SMEs that wish to engage in one need to invest in the other. This requires close attention to the design of the firm's website and not only what content is contained there (d'Iribarne and Tchobanian, 2003), but how it appears, the quality of any visual images of products, the speed with which consumers can locate things and whether it allows customer feedback (Lahuerta Otero, Muñoz Gallego and Pratt, 2014).

Related to e-marketing is the use by businesses of social media, which is the application of Web 2.0 technologies that allow for consumer generated content, peer to peer communication and information sharing (Riegner, 2007). As the number of Web 2.0 media services has proliferated, the costs of such systems come down. SMEs that wish to enhance their e-marketing efforts can do so with social media such as LinkedIn, Facebook, Google+, Twitter, YouTube and numerous other systems. They can also add to their websites podcasts, blogs, tagging, wikis, social bookmarking, mobile Apps and a range of other online services. These relatively low cost online technologies can provide SMEs with a cost-effective e-CRM system if appropriately configured and supported (Harrigan and Miles, 2014).

According to the Sensis (2014) e-business report around 66 per cent of Australian SMEs have a website. However, only 39 per cent of these SMEs were actively engaged with using social media and only 31 per cent use paid advertising on social media networks. Of those firms that use social media for marketing 57 per cent claim to have experienced a positive impact on their business. The use of social media was predominately via Facebook (91%), followed by LinkedIn and Twitter (27% each) and then Google+ (8%), YouTube (6%), Pinterest (6%) and blogs (2%).

Use of websites for e-marketing

Consistent with the literature (Gadille and d'Iribarne, 2004), our study found widespread use of websites amongst the SMEs many of which included social media or Web 2.0 technologies. For example in the independent builders sector there was a general agreement that the Internet was now an essential tool for doing business:

> The interviewed respondents agreed that the advances in information technology had impacted on the way the business was conducted. The usage of the Internet to distribute information had become an essential part of the business. New technologies had to be adapted as technology advances and the need for an IT consultant eventually would be required for the business. (Field note, Independent Builders)

This was a trend also found in the hairdressing industry where most firms used websites and social media to attract and retain customers, although there seemed to be less evidence of any clearly defined online strategy for these systems:

> 83%of salons analysed had a website and 67% had a Facebook page. Salon owners who had a website or Facebook seemed very proud of them but failed to explain the purpose or strategy behind them. All the salons had some type of online presence either a website or a listing in online directories such as hotfrog or Google places. (Field note, Hairdressers)

Often firms that had websites did not keep them updated and lacked the knowledge or skills to get this infrastructure developed and implemented. There was a general lack of knowledge

and understanding of how websites should be built and how they might be used within the firm's overall marketing communications strategy.

Many firms found that even with their websites and use of social media, it was customers' word-of-mouth referrals that continued to drive most business to their stores. This is illustrated in the case of one small business in the hairdressing industry:

> Anita has a website and a Facebook page but says most of her business comes from word of mouth. (Field note, Hairdressers)
>
> "Despite how nice my website looks the best marketing tool are our customers. Word of mouth is the best way of marketing the service. Most of my business is repeat customers and their references." (Owner-manager, Hairdresser)

In the independent consulting sector the possession of websites was almost universal and there was evidence of active use of social media and e-marketing:

> We found that all interviewees had their own company website. Some said the online offers were on the rise through development of digital marketing. Most of the business owners had a LinkedIn account, Twitter account and personal blogs for the purpose of networking and business promotion. Two of our samples were in the business of providing digital marketing solutions. In summary, the massive use of digital marketing would be the inevitable trend in small business; especially in the consulting industry because the broader and more efficient exposure would help the clients find the suitable services with special needs and expectations. The increasing value of digital marketing would be recognized gradually. (Field note, Independent Consultants)

However, as the following comment from an owner-manager from a small independent consulting firm indicates, although she had invested strongly in ICT she was not really feeling that it had provided her with the benefits she had expected:

> "Our website has recently been redesigned and rolled out along with new advertising brochures. I am disappointed with the result however with no single enquiries through the website. I also run Google analytics with a high ranking in Google search, however no enquiries. I write an online blog once per month and send out a monthly newsletter to my client database of 8,000. Yet from this only 200 open their email that connects to the blog with only 20 actually connecting to the links." (Owner-manager, Independent consultant)

Nevertheless, the use of e-marketing in preference to many traditional forms of promotion was found to be a trend in some industries such as the personnel recruitment agency sector:

> The use of online ads in preference to 'traditional' newspaper ads is becoming the industry norm, and shows no signs of becoming a 'fad', but rather a developing trend. Over the last two of years the Internet has replaced newspapers as the primary source of candidates. Oliver [owner-manager] notes that "Advertising in newspapers is more a discretionary branding exercise for most recruiters these days". This would appear largely due to the uptake of computers in Australia and the 'lower cost per hire' possible from Internet advertisements in comparison to newspaper advertisements. Candidates from the IT, telecommunications and accounting industries have been prominent targets of online recruitment although online job postings have emerged across most mainstream industries. (Field note, Recruitment Agencies)

Social media use and abuse

Boyles (2011) suggests that Web 2.0 social media offers SMEs a unique opportunity due to the convergence of open-source structured information, peer to peer collaboration and service oriented architecture in most online technologies. In essence social media offers SMEs low cost of entry, access to a global market place and the ability to tap into a significant flow of information. Even the use of relatively low cost blogs has assisted many start-up firms to succeed in the face of larger incumbent firms (Laurell and Sandstrom, 2014). Where an SME can make effective use of Web 2.0 social media is associated with superior performance, yet it remains unclear just how best to employ this technology (Kim, Lee and Less, 2013).

Our data found similar patterns of activity with e-marketing and Web 2.0 social media use closely integrated by the SMEs. This is illustrated in the following field notes from the small independent consulting firm's sector:

> During the interviews, both owner-managers mentioned the importance of E-marketing. They indicated that E-marketing tools, especially LinkedIn, helped their businesses to expose to more professional customers, because LinkedIn was an electronic media which provided a common forum for professional communication and knowledge exchange. Therefore, customers with the same background and professions in LinkedIn might find the consulting services were more valuable for them. (Field note, Independent Consulting)

> His business is highly technological based. Therefore the development of technology would definitely impact his business. He said the changing or uncertain economic times were always a part of his business. The uncertainty always brings challenges and business opportunities. Larry's business has a website. He also uses electronic media, like LinkedIn, Facebook, Twitter and personal Blog, to do marketing. He mentioned that LinkedIn was the best electronic media for marketing. (Field note, Independent Consulting)

A similar pattern was found in the case of independent liquor stores where social media and e-marketing were actively employed along with more conventional promotional strategies:

> In terms of the broader discussion with firms about specific marketing modalities, leaflet drops and print advertising were found to be ineffective by one proprietor, but effective by several others, which may suggest location-specific drivers are relevant here. One company had switched from an initial focus on TV and radio to mail-outs and newspaper advertising. Finally, most companies are moving increasingly towards digital marketing: email lists, websites, Facebook pages etc. were generally found to be useful marketing channels by most businesses. While some proprietors admitted not being personally adept at social media marketing, they did recognise its importance and had team members able to drive this work. (Field note, Independent Liquor Stores)

However, not all firms had positive experiences of launching websites:

> "The business has recently rolled out a new website and marketing brochures in an attempt of rebuilding its market and image presence. It has received negative feedback on its website, a wrong use of colours." (Owner-Manager, Consulting Industry)

While some owner-managers from the same industry sector made use of online and more traditional marketing media:

> Websites and newspapers are the most used media by Mr. P while Mr. K uses radio and press more often. (Field note, Independent Consulting)

Nevertheless, Web 2.0 social media can be valuable as an e-marketing tool so long as the owner-manager is willing to develop a coherent strategy and spend time working on their blogs, Facebook and LinkedIn sites, and engaging in the use of other tools such as Twitter in systematic manner. They must offer value in these engagements for the followers they seek to attract and retain (Lacho and Marinello, 2010). SME owner-managers must not abuse their social media by seeking to just sell product or services via its channels. It is about fostering a relationship with customers and the wider community who may wish to use these products or services in the future.

What is important is for the owner-manager to develop what Simmons, Armstrong and Durkin (2011) describe as an "e-Vision". This is where the owner-manager is willing to commit to the pursuit of e-marketing and social media use, to gain insights that will allow them to understand their customer's needs and make a strong online value proposition. What is important is the customer's sense of trust in the firm's website and associated social media content. This is a pattern of behaviour illustrated in the following field note about one of the independent consultants surveyed for this study:

> His business is highly technological based. Therefore the development of technology would definitely impact his business. He said the changing or uncertain economic times were always a part of his business. The uncertainty always brings challenges and business opportunities. Larry's business has a website. He also uses electronic media, like LinkedIn, Facebook, Twitter and personal Blog, to do marketing. He mentioned that LinkedIn was the best electronic media for marketing. (Field note, Independent Consultants)

Owner-manager engagement with technology

Another important finding from our cases was the time and cost requirements that the SME owner-managers had to make in order to get their knowledge of ICT and their firm's ICT systems fully up and running. This was particularly noticeable in industries where ICT was a major part of their daily operations. While this is not surprising, the time this imposed was illustrative of the situation facing owner-managers in other less technology intensive sectors who decided to embark on major ICT adoption and implementation projects. For example, in the case of small IT firms the time spent by owner-managers in learning about and dealing with technology was significant:

> About 58% of the respondents indicated that they spent time either reading about, or playing with technology, to keep themselves up to date in a rapidly changing environment. This was cited as an important issue because the technology is changing so quickly, and their businesses have to remain close to the leading-edge to be competitive. Most importantly, even the non-technical managers were involved in this process, because they felt that knowledge of the technology will help with their decision making. (Field note, small IT firms)

However, similar patterns of activity were found in other industry sectors. Our review of the graphic design industry found technology a major area of focus with both time and money as ongoing investment requirements:

> "…Upgrading of our computers is essentially an ongoing process, whereby we have a suggested hire purchase arrangement cycle of three years. Nevertheless, computers have excess capacity and we usually replace them every five years to maximise our usage and minimise our expenses." (Owner-manager, Graphic Designer)

> "To start up in this industry, the latest graphic design equipment is required. Essentially this is a computer system featuring a large 17 inch screen, with the associated software and Internet connection to enable the designer to work to their capacity. It is estimated that the cost of a start-up package with decent equipment, licensed software, printer and Internet connection is around $15,000. Leasing is an attractive option as the computers can be upgraded regularly, any technical problems that arise are someone else's problem and are covered by service clauses." [Owner-manager, Graphic Designer]

Nevertheless, it was not considered essential by all firms to be in the forefront of technology so long as the business maintained its competitiveness by responding fairly quickly to any new technological developments:

> Technology can also involve higher costs with respect to maintaining up-to-date software and hardware. Through hire purchase arrangements these costs can be potentially reduced with regards to hardware. Generally, a firm needs to consider whether it wants to position itself as a leader in technology or a follower. By being a leader in promoting technology may not always be the most efficient strategy, as costs are significantly increased in an industry that is highly fluctuating. Firms that have adopted to be followers can still be highly successful. (Field note, Graphic Designers)

> "…We adapt to change quickly and effectively. With respect to technology, we sat back at first to see what happened and then followed accordingly." (Owner-manager, Graphic Design)

Our findings also suggest that investment in technology alone is not sufficient to guarantee success. Of more importance was for the owner-manager to focus on successful operation of the business:

> Only about 17% of the owner-managers cited technical issues as core tasks. This clearly shows that most of the owner-managers felt that their involvement with technical issues was less important than running the business. It is perhaps noteworthy that the business, which was least successful, was the business where the owner-manager cited technical issues as being the most important. (Field note, small IT firms)

Conclusions and implications

In this chapter we have reported from a qualitative study of 289 SMEs across 30 industry sectors in Australia and Singapore which examined their use of ICTs. Findings from three inter-related research questions on the use of ICTs, the factors influencing their adoption, and their main benefits for SMEs have been outlined and discussed. Using narrative from SME owner-managers we have demonstrated the issues associated with ICTs from their perspective. Given the scale of SMEs in economies around the globe, understanding these issues is important to improve SME policies and practices.

The proliferation of digital online media is now a reality and the adoption rate of mobile online devices such as laptops, smartphones, tablets and related technologies is transforming the way consumers engage with business (Accenture, 2014). At a global level ICT systems in particular broadband technology, cloud storage and computer processing power have grown in capability while their relative cost has fallen (WEF-Deloitte, 2012). Internet speeds are also rising rapidly with many governments pushing for greater online engagement by businesses and the community in a push for e-government solutions to 'red tape' and compliance costs (UNESA, 2010; Van der Wee et al., 2015). For example, in 2011 there were around 667 million wireless broadband connections across the OECD group of advanced economies, with about 70 per cent of all households connected to the Internet via high-speed broadband (OECD, 2012). These trends in technology will allow even the most geographically isolated consumer or SME the opportunity to connect globally and engage in downloading and file sharing of images, video, 3D models, as well as conducting online video conferencing and the sale or purchase of goods and services (Skouby, Falch, Henten and Tadayoni, 2014).

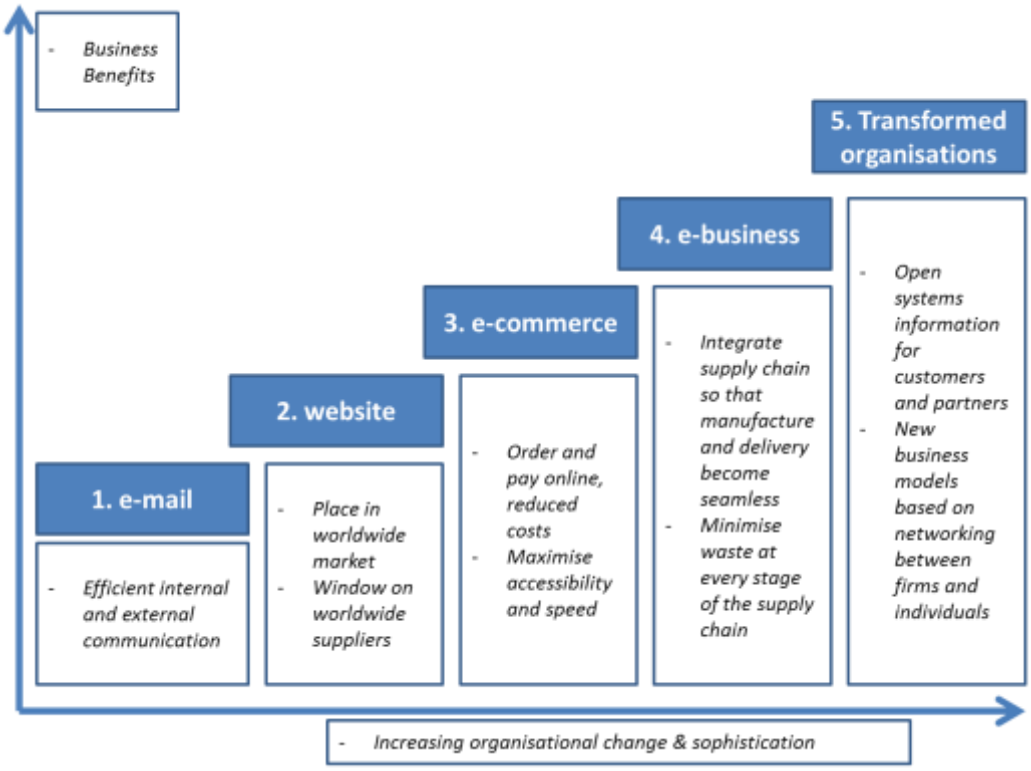
As our study shows the impact of this digital revolution on SMEs is profound and while some appear to be trying to ignore it, the majority are seeking to implement strategies to take advantage of the opportunities, or mitigate its threats. While it is important to get SMEs actively engaged with the digital economy the success of any such engagement will depend on how well the adoption of any ICT is configured into the firm's overall business strategy. This was highlighted by Mahadevan (2000) who identified the need for owner-managers to first determine what their firm's business model was and what this implied for their adoption of e-business, e-commerce and e-marketing strategies. It can be seen from our findings that the way in which ICTs are used by SMEs is dependent on the nature of their industry, the product or service they are offering, their supply-chain relationships and the overall strategic intent that the owner-manager has for their business.

Adoption of e-commerce, e-business or e-marketing and associated social media strategies will require SME owner-managers to invest significant time and money into systems, and then the training and learning required by them and their employees to use these technologies properly. There is also the risk of cyber-crime, viruses and worms, denial of service attacks, Malware and Trojan horse threats plus credit card fraud and data security requirements. These threats are real and require the owner-manager to invest in training themselves and their staff, as well as seeking outside support where required to implement appropriate protections (Grant, Edgar, Sukumar and Meyer, 2014). Although these are serious concerns they can be addressed if SMEs adopt e-commerce security standards such as ISO 17799 and maintains documented security policies. These can include usernames, passwords, protocols

for authentication, swipe cards and even biometrics (Rahman and Lackey, 2013). Although once again this adds to the cost and complexity of operating the business and places even more burden on what are already very busy owner-managers.

A further and more strategic consideration for SME owner-managers is to avoid what Steinfield (2002) refers to as "channel conflict", which is where the adoption of an e-commerce strategy cannibalises the firm's existing 'bricks and mortar' business operations. To avoid channel conflict owner-managers must look for synergies between their online and offline business operations. This can include common branding across all physical and virtual platforms, use of common sales catalogues with reference to the firm's website and physical addresses, and a careful segmentation of their market to make sure that they are making best use of the two channels to service their customers' specific needs.

In line with prior research, our findings show that when SMEs adopt e-commerce strategies they are mostly building upon their existing 'bricks and mortar' business and seeking to secure or maintain market competitiveness, and enhance profitability. The adoption of e-commerce strategies by SME owner-managers is influenced by a range of both firm-specific and manager-specific factors. Further, our study highlights the time and cost requirements that the owner-managers perceive they need to make in order to improve their own knowledge of ICTs.



Source: Martin and Matlay (2001); Taylor and Murphy (2004)

Figure 2: DTI ICT Adoption Ladder for SMEs

Our study found that the ICT adoption ladder for SMEs proposed by the UK Government's Department of Trade and Industry (DTI) is a useful framework for examining these issues (see Figure 2). This model commences with basic technologies such as the use of e-mail, then moves to the firm setting up a website, then engaging in e-commerce, then e-business and finally a digital and online business model with substantial networks (Martin and Matlay, 2001; Taylor and Murphy, 2004). This adoption framework applies equally well to the firms we observed in our study. As outlined above, few had begun to move into stage 5 but most were beyond stages 1 and 2. SME owner-managers adoption of e-commerce and e-business

strategies was driven by a combination of external pressures (e.g. customer, supplier, government, industry change), and a decision by the owner-manager to try to gain a competitive advantage through the use of ICT.

Is the cost and risk of adopting e-commerce or e-business strategies worthwhile or SMEs? According to a study by Mustaffa and Beaumont (2004) of 75 Australian SMEs the answer is yes, with evidence of enhanced sales and reduced costs of marketing and new business generation. However, while these benefits accrue to SMEs in one country they also apply to competitor firms overseas thereby placing the business into the global market place. What this means is that the owner-manager must make a conscious and strategic decision to grow their business online and ensure that they invest sufficient time and resources into it as they would a 'bricks and mortar' enterprise (Tan, Sharma and Theng, 2009).

Implications for policy and practice

Government agencies and policy makers who wish to see more active engagement by SMEs in e-commerce and e-business strategies must recognise that they will need to address this on several levels. First, there must be reliable, high-speed broadband services at a reasonable cost. This must be supported by telecommunications and banking systems that are user friendly for SMEs and don't require unnecessary compliance costs. Broadband coverage and the cost of Internet services and associated ICT equipment (most of which is imported into countries like Australia and New Zealand), are critical issues for how well a national economy and its SME sector can embrace the digital revolution.

A second requirement for fostering enhanced adoption of e-commerce and e-business strategies by SMEs is to provide information, education and support services for owner-managers. This is likely to be particularly important for micro-enterprises, which comprise the vast majority of SMEs, but also lack the resources to engage in online business activity. The owner-managers of such firms are often the most likely to avoid e-commerce or e-business strategies on the grounds that it is too difficult, or that they don't need it because they have close 'face-to-face' contact with their existing customers (MacGregor and Vrazalic, 2008). Many of these firms are located in rural and regional areas, as research suggests that SMEs from urban centres tend to be more active in e-commerce than their rural counterparts (Bharadwaj and Soni, 2007).

For owner-managers of SMEs this research highlights the importance of taking an active interest in moving their business along the DTI ICT adoption ladder and developing strategies for e-commerce, e-business and e-marketing that will support their existing business operations, but also take advantage of the opportunities emerging in the digital economy. While some industries are being impacted more than others by the digital revolution few will remain immune. Owner-managers must seek outside advice and support, educate themselves and review their business models with a view to developing an "e-Vision" (Simmons et al., 2011).

Limitations and directions for future research

Finally, this study has some limitations. One limitation is that the study was undertaken in only two countries (Australia and Singapore), with most firms drawn from Australia. It was also undertaken over a period of a decade, although it was not designed as a longitudinal study. Thus there is the potential that some of the cases collected in the early years may have changed in their adoption and use of ICT due to the rapid pace of change in how digital technologies are employed within industries.

Future research into SME use of ICT needs to focus on the integration of digital technologies as a mechanism for small firms to cost-effectively secure productivity enhancements, better control over financial management and reporting systems, CRM and new business generation, plus knowledge management. The rapid development of digital technologies has meant that even the largest firms are struggling to determine the best strategy for e-commerce, e-business

and e-marketing, particularly social media. Our review of the extant literature suggests that the corpus of knowledge on how SMEs might best engage in the use of digital technologies is a rich frontier for future research.

References

ABS (2002) *Small Business in Australia 2001*, Canberra, Australian Bureau of Statistics, Cat. 1321.0, Commonwealth of Australia.

Accenture (2014) *Racing toward a complete digital lifestyle: Digital consumers crave more*. Accenture Digital Consumer Tech Survey 2014, Accenture.

Acs, Z. J. & L. Preston (1997) "Small and Medium-Sized Enterprises, Technology, and Globalization: Introduction to a Special Issue on Small and Medium-Sized Enterprises in the Global Economy," *Small Business Economics, 9*(1): 1-6.

Alonso-almeida, M. D. M., & Llach, J. (2013) "Adoption and use of technology in small business environments," *The Service Industries Journal, 33*(15/16): 1456-1472.

Amabile, S., & Gadille, M. (2006) "Les usages d'Internet: facteurs de compétitivité de la «PME réseau»", *Finance Contrôle Stratégie*, *9*(1): 35-57.

Astuti, N. C., & Nasution, R.A. (2014) "Technology readiness and e-commerce adoption among entrepreneurs of SMEs in Bandung City, Indonesia," *Gadjah Mada International Journal of Business, 16*(1): 69-88.

Baker, S. (1999) "Global E-Commerce, Local Problems," *Journal of Business Strategy, 20*(4): 32-38.

Bazeley, P., & Jackson, K. (2013) *Qualitative Data Analysis with NVIVO*, 2nd Edition, Los Angeles, London, New Delhi, Singapore, Washington DC., Sage.

Bharadwaj, P. N., & Soni, R. (2007) "E-commerce usage and perception of e-commerce issues among small firms: results and implications from an empirical study," *Journal of Small Business Management, 45*(4): 501-521.

Bridge, J., & Peel, M.J. (1999) "Research note: A study of computer usage and strategic planning in the SME sector," *International Small Business Journal, 17*(4): 82-87.

Boyles, T. (2011) "Small business and Web 2.0: hope or hype?" *Entrepreneurial Executive, 16:* 81-96.

Bristow, D., Bulati, R., Mooney, S. & Dou, W. (2004) "The impact of internet savvy and innovativeness on real estate agents' internet utilization and sales performance", *The Marketing Management Journal, 14*(1), 103-116.

Caldwell, N., Harland, C., Powell, P., & Zheng, J. (2013) "Impact of e-business on perceived supply chain risks," *Journal of Small Business and Enterprise Development, 20*(4): 688-715.

Caldwell, N., Harland, C., Powell, P., and Zheng, J. (2013) "Impact of e-business on perceived supply chain risks," *Journal of Small Business and Enterprise Development, 20*(4): 688-715.

Castillo-Manzano, J. and Lopez-Valpuesta, L. (2010) "The decline of the traditional travel agent model", *Transportation Research Part E*, *46*(1), 639-649.

Cayley, M. (2006) "How the internet has impacted the buying and selling of real estate in Australia", *In-House Realty*, May [available online] www.inhouserealestate.com.au

Chang, L.-M., Chang, S-I., Ho, C-T., Yen, D.C., & Chiang, M-C. (2011) "Effects of IS characteristics on e-business success factors of small- and medium-sized enterprises," *Computers in Human Behavior 27*(6): 2129-2140.

Chong, A. Y.-L., Ooi, K-B., Bao, H., & Lin, B. (2014) "Can e-business adoption be influenced by knowledge management? An empirical analysis of Malaysian SMEs," *Journal of Knowledge Management, 18*(1): 121-136.

Corley, J., Jourdan, Z.., and Ingram, W. (2013) "Internet marketing: a content analysis of the research," *Electronic Markets, 23*(3): 177-204.

Clark, D.N., & Douglas, H. (2011) "Information and communication technology adoption and diffusion in micro-enterprises: The case of techno-savvy home-based businesses." *International Journal of Entrepreneurship and Small Business*, 14(3), 349-368.

Cragg, P., Mills, A., & Suraweera, T. (2013) "The Influence of IT Management Sophistication and IT Support on IT Success in Small and Medium Sized Enterprises," *Journal of Small Business Management, 51*(4): 617-636.

D'Amboise, G., & Muldowney, M. (1988), "Management Theory for Small Business: Attempts and Requirements," *Academy of Management Review, 13*(2), 226-240.

Daniel, E., Wilson, H., and Myers, A. (2002) "Adoption of E-Commerce by SMEs in the UK: Towards a Stage Model," *International Small Business Journal, 20*(3): 253-270.

DIISR (2011) *Key Statistics: Australian Small Business*, AGPS Canberra, Department of Innovation, Industry, Science and Research.

d'Iribarne, A., & Tchobanian, R. (2003) *PME et TIC : Quels sites web pour quelles PME ?* Cachan, France: Lavoisier.

Edwards, W.E. (1999) "Redefining the Home Business", *Mortgage Banking*, October, 42-54.

Eid, R., E., & El-Gohary, H. (2013) "The impact of E-marketing use on small business enterprises' marketing success," *The Service Industries Journal, 33*(1): 31-50.

Eikebrokk, T. R., & Olsen, D.H. (2009) "Training, competence, and business performance: evidence from e-business in European small and medium-sized enterprises", *International Journal of E-Business Research, 5*(1): 92-119.

Eisenhardt, K. (1989) "Building Theory from Case Study Research", *Academy of Management Review, 14*(4), 532-550.

Fassoula, E. D., & Rogerson, J.H. (2003) "Management Tools for SMEs", *Total Quality Management, 14*(10), 1114-1119.

Gadille, M., & d'Iribarne, A. (2004) "L'appropriation des NTIC par les PME ordinaires: une dynamique diversifiée", in C. Divry, & P. Trouvé (Eds.), *PME et innovations,* Paris: La Documentation Française.

Garson, G.D. (2013) Case Study Research, Statistical Associates Blue Book Series, www.statisticalassociates.com

Grant, K., Edgar, D., Sukumar, A., & Meyer, M. (2014) "'Risky business': Perceptions of e-business risk by UK small and medium sized enterprises (SMEs)," *International Journal of Information Management, 34*(2): 99-122.

Hankinson, A. (2000) "The Key Factors in the Profiles of Small Firm Owner-Managers that Influence Business Performance. The South Coast Small Firms Survey, 1997-2000," Industrial and Commercial Training, 32(3), 94-98.

Hankinson, A., Bartlett, D., & Duchenaut, B. (1997), "The Key Factors in the Small Profiles of Small-Medium Enterprise Owner-Managers that Influence Business Performance," International Journal of Entrepreneurial Behaviour & Research, 3(4), 168-175.

Harrigan, P. & Miles, M.P. (2014) "From e-CRM to s-CRM. Critical factors underpinning the social CRM activities of SMEs," *Small Enterprise Research: The Journal of SEAANZ*, *21*(1): 99-116.

Holsapple, C. W., and Singh, M. (2000) "Toward a unified view of electronic commerce, electronic business, and collaborative commerce: a knowledge management approach," *Knowledge and Process Management 7*(3): 151-164.

Hoover, R. S., & Koerber, A.L. (2011) "Using NVivo to Answer the Challenges of Qualitative Research in Professional Communication: Benefits and Best Practices," *IEEE Transactions of Professional Communication 54*(1): 68-82.

Iansiti, M., and Lakhani, K. (2014) "Digital Ubiquity: How Connections, Sensors, and Data Are Revolutionizing Business," *Harvard Business Review* 92(11): 90-99.

Jones, P., Simmons, G., Packham, G., Beynon-Davies, P., & Pickernell, D. (2014) "An exploration of the attitudes and strategic responses of sole-proprietor micro-enterprises in adopting information and communication technology," *International Small Business Journal, 32*(3): 285-306.

Karagozoglu, N., & Lindell, M. (2004) "Electronic commerce, strategy, operations and performance in small and medium-sized enterprises," *Journal of Small Business and Enterprise Development, 11*(3): 290-301.

Karjaluoto, H., & Huhtamaki, M. (2010) "The role of electronic channels in micro-sized brick-and-mortar firms," *Journal of Small Business and Entrepreneurship, 23*(1): 17.

Kearns, G. S. (2005) "An electronic commerce strategic typology: insights from case studies," *Information & Management, 42*(7): 1023-1036.

Kim, H. D., Lee, I., & Lee, C.K. (2013) "Building Web 2.0 enterprises: A study of small and medium enterprises in the United States." *International Small Business Journal, 31*(2): 156-174.

Lacho, K. J., & Marinello, C. (2010) "How small business owners can use social networking to promote their business," *Entrepreneurial Executive, 15*(1): 127-133.

Laurell, C., & Sandström, C. (2014) "Disruption and social media - Entrant firms as institutional entrepreneurs," *International Journal of Innovation Management, 18*(3): 1440006.

Lahuerta Otero, E., Muñoz Gallego. P.A. & Pratt, R.M.E. (2014) "Click-and-Mortar SMEs: Attracting customers to your website," *Business Horizons, 57*(6): 729-736.

Leximancer (2011) *Leximancer Manual Version 4*, [available online] www.leximancer.com

MacGregor, R., & Vrazalic, L. (2008) "A Profile of Australian Regional SME Non-adopters," *Small Enterprise Research: The Journal of SEAANZ, 16*(1): 27-46.

Mahadevan, B. (2000) "Business models for Internet-based e-commerce: an anatomy," *California Management Review, 42*(4): 55.

Martin, L. & Matlay, H. (2001) "'Blanket' approaches to promoting ICT in small firms: some lessons from the DTI ladder adoption model in the UK", *Internet Research: Electronic Networking Applications and Policy*, *11*(5), 399-410.

Mathews, S., & Healy, M. (2008) "From garage to global': the internet and international market growth, an SME perspective," *International Journal of Internet Marketing and Advertising, 4*(2/3): 179-198.

Mazzarol, T. (2014) Small business diagnostic: what does it tell us about SMEs? CEMI Discussion Paper Series DP1402, [available online] www.cemi.com.au Centre for Entrepreneurial Management and Innovation.

Mazzarol, T., Reboud, S. & Tye, M. (2006) "The Outsiders Role in the Strategic Development of the Small Firm: A Study of Mentoring with Small Business Owner-Managers in Australia", Reaching New Heights: Administrative Sciences Association of Canada Annual Conference, Banff, Canada, 4-7 June, University of Lethbridge.

Mazzarol, T., Reboud, S., and Olivares, C. (2006) "Bridging the Gap: A Study of Strategic Change and Thinking within Small Firms", ICSB World Conference 2006, Melbourne, 19-21 June.

MBIE (2013) *Small Businesses in New Zealand: How do they compare with larger firms?* Ministry of Business, Innovation and Employment, Government of New Zealand.

Mele, N. (2013) "The end of big business: being big used to be a competitive advantage, but the proliferation of digital technology means small businesses will be the champions of tomorrow," *Billboard* 125(21): 17.

Miles, M.B., Huberman, A.M., & Saldaña, J. (2014) Qualitative Data Analysis: A Methods Sourcebook, 3rd Edition, Los Angeles, London, New Delhi and Singapore, Sage Publications Inc.

Mustaffa, S., & Beaumont, N. (2004) "The effect of electronic commerce on small Australian enterprises," *Technovation, 24*(2): 85-95.

Neilsen (2010) [available online] www.neilsen-online.com

Nyame, G., Boateng, F.O., Gyamfi, N.K., & Asabere, N.Y. (2013) "ICTs and Supply Chain: The Competitiveness of Small and Medium Scale Enterprises," *International Journal of Innovative Technology and Exploring Engineering, 3*(2): 203-209.

OECD (2010) *SMEs, Entrepreneurship and Innovation*, Paris, Organisation for Economic Co-operation and Development.

OECD (2012) *OECD Internet Economy Outlook 2012*, Paris, Organisation for Economic Co-operation and Development.

Pelletier, C., & Moreau, É. M.-F. (2008) L'appropriation des technologies de l'Internet et ses facteurs critiques de succès: Un défi de plus pour les PME? *Revue internationale PME, 21*(2): 75-117.

Rahman, S. M., & Lackey, R. (2013) "E-Commerce Systems Security for Small Businesses," *International Journal of Network Security & Its Applications, 5*(2): 193-210.

Riegner, C. (2007) "Word of Mouth on the Web: The Impact of Web 2.0 on Consumer Purchase Decisions," *Journal of Advertising Research, 47*(December): 436-447.

Rovai, A.P., Baker, J.D., & Ponton, M.K. (2013) *Social Science Research Design and Statistics: A Practioner's Guide to Research Methods and SPSS Analysis*, 1st Edition, Chesapeake, Watertree Press.

Sensis (2014) *Sensis e-business report 2014: The online experience of small to medium enterprises* [available online] www.sensis.com.au, Telstra Sensis.

Simmons, G., Armstrong, G.A., & Durkin, M.G. (2011) "An exploration of small business Website optimization: enablers, influences and an assessment approach," *International Small Business Journal, 29*(5): 534-561.

Smith, A. E., & Humphreys, M. S (2006) "Evaluation of unsupervised semantic mapping of natural language with Leximancer concept mapping," *Behavior Research Methods 38*(2): 262-279.

Skouby, K. E., Falch, M., Henten, A., & Tadayoni, R. (2014) "Need for Broadband Infrastructure in a 2020 Perspective," *Wireless Personal Communications, 76*(2): 271-289.

Steinfield, C. (2002). "Understanding Click and Mortar E-Commerce Approaches: A Conceptual Framework and Research Agenda." Journal of Interactive Advertising **2**(2): http://www.jiad.org/article19.

Tan, P. J. S., Sharma, R.S. & Theng, Y-L (2009) "Effective E-Commerce Strategies for Small Online Retailers," *International Journal of Electronic Business, 7*(5): 445-472.

Tang, S-H., & Ghobakhloo, M. (2013) "IT investments and product development effectiveness: Iranian SBs," *Industrial Management & Data Systems, 113*(2): 265-293.

Taylor, M., & Murphy, A. (2004) "SMEs and e-business," *Journal of Small Business and Enterprise Development, 11*(3): 280-289.

Torsten Eriksson, L., Hultman, J., & Naldi, L. (2008) "Small business e-commerce development in Sweden – an empirical survey," *Journal of Small Business and Enterprise Development, 15*(3): 555-570.

UNESA (2010) *United Nations E-Government Survey 2010: Leveraging e-government at a time of financial and economic crisis*, New York, United Nations Department of Economic and Social Affairs.

Van der Wee, M., Verbrugge, S., Sadowski, B., Driesse, M., & Pickavet, M. (2015) "Identifying and quantifying the indirect benefits of broadband networks for e-government and e-business: A bottom-up approach," *Telecommunications Policy* [In press and available online from 5 February 2014].

WEF-Deloitte (2012) *The Future of Manufacturing: Opportunities to drive economic growth*, Geneva, World Economic Forum in collaboration with Deloitte Touche Tohmatsu Ltd.

Yin, R.K. (2014) *Case Study Research: Design and Methods*, 5th Edition, Los Angeles, London, New Delhi, Singapore, Washington DC., Sage.