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Factors Influencing Australian SMEs Knowledge Sharing Online

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Abstract

The Web offers a powerful tool for knowledge-sharing among small and medium sized enterprises (SMEs). Such online initiatives have, however, frequently been unsuccessful. This paper examines factors motivating SMEs to share knowledge online. It reports data from a telephone survey of 192 SME members of two successful regional business networks comprising members from diverse industries. Although the majority of SMEs actively used the Web in their daily business operations and most were willing to share knowledge face-to-face, this did not translate into willingness to share online. The most significant factors affecting the willingness to share knowledge online were the how many of networks SMEs were involved in, the number of years an SME had been in business, the geographical scope of their operations, and intensity of their use of the web. These findings challenge the commonly-held view that SMEs will automatically share online if the infrastructure is provided.

Keywords

knowledge sharing, small and medium sized enterprises (SMEs), worldwide web, online knowledge sharing

INTRODUCTION

Small and medium enterprises (SMEs) are an important part of modern economies, providing employment and generating innovation and contributing to the areas in which they operate. In fact, the majority of countries nominate SMEs as crucial for their economic prosperity (Doloreux 2004). The majority of countries in both highly developed and developing countries nominate SMEs as crucial for their economic prosperity (Doloreux & Parto 2005). This has been reported in the UK where SMEs have a greater business turnover than the combined figures of public sector and large organisations, and this situation is common in post industrial economies (Albors et al. 2005; Cooke et al. 2003; Floyd & McManus 2005; Sum et al. 2004). A similar situation exists in Australia where 99.7% are SMEs, which are defined by the Australian Bureau of Statistics (ABS) (Australian Bureau of Statistics 2007). The majority of SMEs are small (96%), which the ABS defines as firms with less than 20 employees. Recognising this, governments and industry bodies have sought ways to support these small firms through a variety of development and assistance mechanisms. Because small businesses naturally have limited resources (financially and in terms of human resources) there has been considerable interest in linking them through a variety of networks and associations to share knowledge and encourage innovation (Balestrin et al. 2008; Butler et al. 2007; Martin & Matlay 2001; Mohannak 2007; Timonen & Ylitalo 2007).

There has been considerable optimism about using information and communication technologies (ICTs), in particular the Web, to facilitate communication and the exchange of knowledge and to generate innovation through SME networks using web technology (Ho et al. 2003; Mustafa & Beaumont 2004; Pigni et al. 2005; Romano et al. 2001). The outcomes of these initiatives have often been disappointing to their sponsors and champions (Beckinsale et al. 2006; Fisher & Craig 2005; Gengatharen et al. 2005; Hearn et al. 2004), thus a

much clearer understanding of this complex social and technical situation is required. This paper provides insight into the possible reasons behind the disappointing results of these ICT initiatives by reporting on the findings of a structured telephone survey (which was part of a larger project) of SMEs from diverse industries which revealed a number of factors which were associated with SMEs' willingness to share knowledge online.

This paper commences by outlining key themes in current SME knowledge sharing literature, and identifies a number of factors which had the potential to influence SMEs' willingness to share knowledge online. It describes the approach and methodology used to obtain and analyse the data. Identification of the key findings is used as a foundation for the discussion on the factors influencing knowledge sharing among SMEs from diverse industries.

LITERATURE REVIEW

There is a large and growing body of research into knowledge sharing and ICT systems to support knowledge sharing. However, the focus has been mainly confined to large organisations, particularly relating to world-class firms including multinational corporations (Cegarra Navarro & Dewhurst 2006; McAdam & Reid 2001; Nunes et al. 2006). The applicability of that research to the SME context has been questioned because SMEs differ from larger firms not only in their size, but also in scope, scale and operational requirements (for example, Desouza & Awazu 2006; for example, Wong & Aspinwall 2004). Furthermore, there has been minimal research into SMEs' inter-firm knowledge sharing practices (Chen et al. 2006; Nunes et al. 2006; Wong & Aspinwall 2004).

Chen et al (2006) conducted one of the few studies on inter-firm knowledge sharing by SMEs, and showed that rhetoric about the importance of knowledge sharing online is not accompanied by action. They found that only one third of the UK SMEs asserting that ICT-based networks were important were actually using ICT-based communication mechanisms such as online forums. SMEs preferred to share knowledge face-to-face even when technological infrastructure was good. This study implies that ICT solutions must be designed specifically for SME requirements. It also shows that there is a lack of understanding about how ICT can support SME knowledge sharing. Research is therefore needed to explore how SME knowledge sharing can be facilitated by ICT and how SMEs can be encouraged to use these technologies to generate value. This requires an understanding of the factors associated with the willingness of SMEs to share knowledge, both in conventional face-to-face contexts and online.

The existing literature relating to SME use of eBusiness would imply that one factor influencing their willingness to share knowledge online would be SMEs' extent of eBusiness use. It is generally agreed that the Web provides a low cost means for SMEs to conduct eBusiness (Galloway & Mochrie 2005; Johnston et al. 2007; Trauth 2000). However, SMEs' use of eBusiness is low (see for example, Chen et al. 2006; Fisher & Craig 2005; Mullins et al. 2001) relative to their large organisational counterparts (Galloway & Mochrie 2005; MacGregor & Vrazalic 2005), despite evidence that web business solutions can improve SME performance (Johnston et al. 2007). SMEs are only making rudimentary use of the capabilities that broadband offers and using it for basic communication and searching for information rather than eBusiness (Spurge & Roberts 2005). A prerequisite for eBusiness is having access to strategic business knowledge of customers, suppliers, competitors, government regulations, business processes and procedures which is then used to provide competitive advantage (Cegarra-Navarro et al. 2007). In this study we therefore investigated whether SMEs' *intensity of web usage* (in terms of the frequency of online applications used and the extent of knowledge obtained via the web about customers, suppliers, government regulations, etc) influenced the willingness of SMEs to share knowledge online.

We expected that factors relating to the degree of SME entrepreneurship would influence their willingness to share knowledge, including online. Because SMEs lack internal resources, external knowledge is very important to their success (Bozbura 2007; Fuller-Love & Thomas 2004). Such sources include customers, suppliers, and competitors. Researchers have demonstrated that knowledge sharing by SMEs is problematic (Bennett & Smith 2002; Chen et al. 2006; Corso et al. 2003; Simmie 2002; Van Laere & Heene 2003). Frequently, SME owners do not recognise that sharing knowledge can be a strategic asset which is essential for their survival, and that it is capable of providing value to their organisation and differentiating them from their competitors (Bozbura 2007; Wong & Aspinwall 2004). SMEs can have difficulty in retaining knowledge once it has been acquired, and often fail to capitalise on their in-house knowledge (Nunes et al. 2006; Wong & Radcliffe 2000). The picture that emerges is of SMEs with considerable knowledge potential which they do not recognise. We therefore anticipated that entrepreneurial SMEs would be more likely to recognise the value of knowledge sharing.

One factor relating to entrepreneurship is business projection. Previous studies of SMEs' business projection on their growth indicates that SMEs are not optimistic (Cassar & Gibson 2007). However, strategically proactive, growth-oriented SMEs have far better absorptive capacity because they are able to acquire and assimilate

knowledge and then exploit it (Liao et al. 2003). This internal capacity geared towards an explicit growth business strategy enables successful participation globally (Maranto-Vargas & Rangel 2007). This suggests that although few SMEs have been able to maximise the potential offered by knowledge sharing, entrepreneurial SMEs are taking advantage of this opportunity. In this study we therefore examined whether SMEs *business projection* influenced their willingness to share knowledge online.

Another factor that influences the entrepreneurship of SMEs is the *age of the business*. Young small firms are more willing to take risks than their larger counterparts (Floyd & McManus 2005), and they have higher growth and are more innovative (Salojärvi et al. 2005). Also, recently established businesses stand to gain more from knowledge sharing at their early stage of business development because they are unlikely to have adequate internal resources (Chen et al. 2006; Wong & Radcliffe 2000). In this study we therefore examined whether the *age of the business* influenced whether SMEs were more willing to share knowledge online.

It is vital that SMEs recognise that managing and diffusing knowledge can overcome their lack of internal resources (Corso et al. 2003; Desouza & Awazu 2006; McAdam & Reid 2001). Most of the information SMEs gain from external sources is obtained in informal situations where knowledge is shared in face-to-face interactions, such as in social networks (Chen et al. 2006; Wong & Radcliffe 2000). Knowledge sharing plays an instrumental role in SME networks. The small size of SMEs usually limits their operations to a single location, consequently, social networks are most important for obtaining knowledge (Bartholomew & Smith 2006; Van Laere & Heene 2003; Whittaker et al. 2003). Sharing of tacit knowledge in networks becomes a social activity and is epitomised by Wenger et al's (2002) communities of practice (CoPs) and their online counterparts, *virtual communities of practice* (VCoPs) (Mason et al. 2006). However, tacit knowledge is difficult to share other than in face-to-face interactions (Nan 2008) and is most effectively shared through social networks (Bosua & Scheepers 2007; Caravajal et al. 2008; Coakes & Smith 2007).

Nahapiet and Ghoshal (2002) argue that the true value of knowledge is found in intellectual capital, which they describe as "... *the knowledge and knowing capability of a social collectivity...*" (p. 45). However, they argue that this value is only accessible when a member has privileged access to knowledge within the network. We therefore anticipated that factors relating to SMEs' level of involvement and embeddedness in networks would influence their willingness to share knowledge online. This was most evident in the dense socio-economic networks of the industrial districts of Third Italy and Silicon Valley, where vibrant internal knowledge sharing stimulated innovation and made possible access to external global knowledge (essential to innovation) (Boschma & Lambooy 2002; Lawson & Lorenz 1999). In this study we therefore examined whether SMEs' level of *networking activity* (inactive through to active) and the *number of networks* they were involved with influenced their willingness to share knowledge online.

The preceding discussion illustrates that the full benefit of knowledge sharing occurs when external information becomes accessible to firms within a region, because it can stimulate innovation. This is most evident in high-technology clusters such as Silicon Valley where value is obtained not merely from developing high-technology products, but to a much largely extent through managing the multitude of relations involved in innovation networks (Capello 1999; Spence 2004). We therefore looked at whether SMEs' *geographic focus* (or the extent to which their trade was internal or external to the region) influenced their willingness to share knowledge both interpersonally and online, because we anticipated that SMEs with an external geographic focus would gain value from knowledge sharing to capitalise on the external information obtained from other network members. In this paper we examine whether these factors influence the willingness of SMEs to share knowledge online.

METHOD

The findings reported in this paper emerged from a larger project seeking to establish how ICT can be used to facilitate knowledge sharing and innovation in regional areas. This project entailed three-stage case studies in two Australian regions (referred to as 'Boonaburra' and 'Camrooka'). The regions were selected because they did not have a predominant industry, were reasonably sized (more than 50,000 residents), and were economically successful with a reputation for active business networking. Potential regions were located by investigating business, academic and government publications, discussions with those involved in regional affairs, and attendance at regional seminars and an international regional conference.

This paper reports the findings of the second stage of the case studies, in which ten-minute telephone surveys were conducted with SMEs in both regions to obtain first-hand views on research issues. Telephone surveys offered significant advantages as they reduce time and costs associated with face-to-face interviews. However they have similar participation rates as interviews, which are considerably higher than either email or postal surveys (Gregor 2002). Typical of structured telephone surveys, participants were asked the same closed questions in the same order and the responses were coded into pre-designated categories (Fontana & Frey 2000). The survey questions established the participant's business practices, involvement in business networks and Web usage. No value was obtainable from treating each region as a separate case because coding for region

enabled ready regional comparisons, so the second stage was analysed as a single case. The same format for questions about networking and the Web enabled easier comparisons from resulting data that was analysed using SPSS. The Chi-Square test for independence was incorporated to test the statistical significance of the relationship between variables identified from the literature review against SMEs' to share knowledge online. This method was considered the most appropriate as the majority of variables involved nominal data. It also enabled us to compare the variables influencing interpersonal knowledge sharing against those influencing online sharing.

Thousands of SMEs existed in each region. To limit the research sample, participants were by identified using purposive sampling (Neuman 2003). This required identifying a non-industry aligned business network in both regions with the capacity to manage ICT based knowledge sharing, and with clear value and support to SMEs. A suitable business network in each region was identified during the first stage of the case studies, in which regional informants were interviewed (see Mason et al. 2006 for the results of this stage). These networks were eager to be involved and assisted in identifying SMEs with 50 employees or less. This employee size criterion used for the delimiting factor was guided by stage one participants' assertion that businesses above 50 staff were considered large in these regions. To obtain 100 usable telephone surveys in each region required us to approach 200 SMEs. However, Camrooka's network only had 133 SMEs and Boonaburra's network had considerably more than 200 within the target range. Consequently their selection was randomised (Neuman 2003). Of the 333 SME owners approached to participate, 192 interviews were completed (a response rate of 58%).

This method enabled us to examine which factors influence SMEs' willingness to share knowledge online.

FACTORS INFLUENCING KNOWLEDGE SHARING

The participants were asked if they were willing to share business knowledge in their respective business networks. A majority (63%) indicated their willingness to share knowledge face-to-face in their networks. However, less than half (46%) were willing to share knowledge online. There was a significant relationship between willingness to share in networks and willingness to share online (Table 1) but 38% of those who were willing to share knowledge face-to-face were unwilling to share in the online context.

Table 1. Willingness to share online by willingness to share in networks

Share Knowledge Online		Share Knowledge in Networks	
		Not Willing	Willing
Not Willing	<i>n</i> (%)	59 (80%)	45 (38%)
Willing	<i>n</i> (%)	15 (20%)	73 (62%)
Total	<i>n</i> (%)	74 (100%)	118 (100%)

$X^2 = 31.693^b$, $df = 1$, $p < .000$

Our literature review suggested that willingness to share online might be attributable to the level of web usage. Participants were therefore asked about how they used the web in their businesses. Almost all (97%) were connected to the internet and regularly used email in their business, but there were a variety of ICT uses. We therefore combined these uses into a measure of the intensity of web use which included a count of respondents' declared: (1) use of the web for obtaining explicit knowledge on government requirements, basic business processes, customers, suppliers, industry and competitors, benchmarking and best practice, to identify opportunities; and (2) use of the online communication mechanisms of email and VOIP. The findings in Table 2 show a significant association between intensity of web use and willingness to share knowledge online. More surprisingly, even among those with a high intensity of web use, nearly half (49%) indicated that they were not willing to share business knowledge online.

Table 2. Willingness to share online by web use intensity

Share Knowledge Online		Web Use Intensity		
		None	Low	High
Not Willing	<i>n</i> (%)	6 (100%)	26 (65%)	72 (49%)
Willing	<i>n</i> (%)	0 (0%)	16 (35%)	72 (51%)
Total	<i>n</i> (%)	6 (100%)	40 (100%)	146 (100%)

$X^2 = 8.352^a$, $df = 2$, $p < .015$

The literature discussed above implied that greater involvement with other members of a network would be likely to increase the willingness to share knowledge because such participants are more familiar with and trust their fellow members. To assess SMEs' 'network activity', interviewees were asked to indicate how actively involved they were in their regional business network (aside from their membership). Only 28% described themselves as 'active' in the network with nearly as many saying they were 'not active' and the remainder only 'occasionally involved'. Table 3 shows that the level of activity was positively associated with their willingness

to share knowledge. However, *network activity* was not found to be related to willingness to share knowledge online.

Table 3. Willingness to share knowledge by level of activity in network

Share Knowledge		Networking Activity		
		Not Active	Occasionally Involved	Active
Not Willing	<i>n (%)</i>	24 (53%)	35 (37%)	15 (27%)
Willing	<i>n (%)</i>	21 (47%)	58 (62%)	39(72%)
Total	<i>n (%)</i>	45 (100%)	93 (100%)	54 (100%)

$X^2 = 6.830^a$, $df = 2$, $p < .033$

The most active network participants were only marginally more willing to share knowledge in this way (56% as opposed to 43% of the occasionally involved and 40% of those not active) and this difference was not significant.

The networks through which the participants were contacted were not the only ones in which they participated. The majority (59%) of participants reported that they were involved with at least three networks through which they accessed business knowledge. Those involved in three or more networks were significantly more willing to share knowledge online than those involved in only one or two networks (Table 4). This high degree of involvement mirrors the example of the types of activity that led to the success of regions such as Third Italy and Silicon Valley.

Table 4. Willingness to share online by total network involvement

Share Knowledge		Total Number of Networks	
		1-2	3+
Not Willing	<i>n (%)</i>	51 (65%)	53 (47%)
Willing	<i>n (%)</i>	28 (35%)	60 (53%)
Total	<i>n (%)</i>	79 (100%)	113 (100%)

$X^2 = 5.837^b$, $df = 1$, $p < .016$

The small businesses surveyed varied in the length of time they had been operating. Consistent with the findings of previous researchers mentioned earlier, new businesses were more willing (72%) to share knowledge than established businesses 55% of (Table 5). This trend was reflected in willingness to share online, although all SMEs were far less willing to share online the majority of newer businesses (57%) indicated willingness to share knowledge online whereas only 32% of established businesses were (Table 6).

Table 5. Willingness to share knowledge by age of the business

Share Knowledge		Years in Business	
		Newer	Established
Not Willing	<i>n (%)</i>	21 (28%)	53 (45%)
Willing	<i>n (%)</i>	53 (72%)	65 (55%)
Total	<i>n (%)</i>	74 (100%)	118 (100%)

$X^2 = 5.251^a$, $df = 1$, $p < .022$

Table 6. Willingness to share online by age of business

Share Knowledge Online		Years in Business	
		Newer	Established
Not Willing	<i>n (%)</i>	32 (43%)	72 (61%)
Willing	<i>n (%)</i>	42 (57%)	46 (39%)
Total	<i>n (%)</i>	74 (100%)	118 (100%)

$X^2 = 5.787^a$, $df = 1$, $p < .016$

To some extent we would expect this association (between the age of the business and willingness to share knowledge) to reflect the expectations of business growth so this was tested separately. Tables 7 and 8, however, indicate that willingness to share knowledge (either in the network generally or online) was not significantly associated with expectations of business growth. This is consistent with the view of researchers that the majority of SMEs are not optimistic about their future.

Table 7. Willingness to share knowledge by business projection

Share Knowledge		Business Projection		
		No Growth	Grow Steadily	Grow Rapidly
Not Willing	<i>n (%)</i>	17 (53%)	42 (36%)	15 (34%)
Willing	<i>n (%)</i>	15 (47%)	74 (64%)	29 (62%)
Total	<i>n (%)</i>	32 (100%)	116 (100%)	44 (100%)

$X^2 = 3.508^a$, $df = 2$, $p < .173$

Table 8. Willingness to share online by business projection

Share Knowledge Online		Business Projection		
		No Growth	Grow Steadily	Grow Rapidly
Not Willing	<i>n</i> (%)	18 (56%)	69 (60%)	17 (39%)
Willing	<i>n</i> (%)	14 (44%)	47 (41%)	27 (61%)
Total	<i>n</i> (%)	32 (100%)	116 (100%)	44 (100%)

$X^2 = 5.651^a$, $df = 2$, $p < .059$

It could also be expected that the geographical scope of a business might affect the value that it put on sharing knowledge within the region. Given that about half of respondents (52%) were conducting at least three quarters of their business within the region we decided to analyse the impact that this may have on the various matters under investigation. Thus a new variable was created Geographic Focus where those conducting 75 % or more of their business within the region were defined as having a business focus ‘Within Region’ while those remaining were categorised as having a focus ‘Outside Region’. There was no difference between these two groups’ in the degree of knowledge sharing occurring in networks. This is consistent with the networks of Third Italy and Silicon Valley where social reasons drove network participation and all SMEs benefited equally from this. In Table 9, those with a business focus outside the region were significantly more willing to share knowledge online. The low numbers of SMEs involved appears consistent with an entrepreneurial orientation described in the research above, probably indicating their greater use of the web for communication with those with whom they could not easily meet in person. Still, even among those with an external focus, only slightly over half (53%) were willing to share knowledge online.

Table 9. Willingness to share online by location of business operation

Share Knowledge Online		Geographic Focus	
		Outside Region	Within Region
Not Willing	<i>n</i> (%)	43 (47%)	61 (61%)
Willing	<i>n</i> (%)	49 (53%)	39 (39%)
Total	<i>n</i> (%)	92 (100%)	100 (100%)

$X^2 = 3.925^b$, $df = 1$, $p < .048$

Few major differences were found between participants from the two regions. On average, the businesses in Boonaburra were more established but otherwise SMEs from both regions were similar. They were predominately very small (median of 6 employees), operating in service industries within the region, anticipating steady growth which they were planning for, and actively using the Internet. However, the two business networks were quite different in the way they networked. The Camrooka network was newer and identifiably more active, and was recognised by interview participants in stages one and three of the larger project as being more inclusive and entrepreneurial than the Boonaburra network. This was in harmony with the research discussed earlier that identified an entrepreneurial orientation as a major influence on willingness to share knowledge. Nearly three quarters (72%) of Camrooka participants were willing to share knowledge additionally a majority (57%) were willing to share information online. This contrasts with a scant majority (53%) of Boonaburra participants willing to share knowledge and a minority (37%) willing to share online. as indicated in Tables 10 and 11.

Table 10. Willingness to share knowledge by region

Share Knowledge		Region	
		Camrooka	Boonaburra
Not Willing	<i>n</i> (%)	24 (28%)	50 (47%)
Willing	<i>n</i> (%)	62 (72%)	56 (53%)
Total	<i>n</i> (%)	86 (100%)	106 (100%)

$X^2 = 7.438^a$, $df = 1$, $p < .006$

Table 11. Willingness to share online by region

Share Knowledge Online		Region	
		Camrooka	Boonaburra
Not Willing	<i>n</i> (%)	37 (43%)	67 (63%)
Willing	<i>n</i> (%)	49 (57%)	39 (37%)
Total	<i>n</i> (%)	86 (100%)	106 (100%)

$X^2 = 7.791^b$, $df = 1$, $p < .005$

DISCUSSION

Previous research (Dana et al. 2005; Edwards 2007; Thorpe et al. 2005) has identified that entrepreneurial SMEs are particularly willing to share knowledge. This was confirmed to some extent in our study because newer businesses, which could be assumed to be in a more innovation stage of development, were far more willing to share online than the established businesses. In addition, these younger firms were using the web more intensively. These findings therefore point to the contribution of knowledge sharing in innovation.

The findings reported in this paper suggest that conventional forms of knowledge sharing are far more accepted by the participants than is knowledge sharing online, because for every factor SMEs were less likely to engage in online sharing (despite a high level of internet and email use) when compared with sharing face-to-face. This is consistent with Chen et al's (2006) findings and reinforces the conclusion that the establishment of online forums and enhancing an SME's ICT capability does not mean they will use online facilities for knowledge sharing. What our research findings have shown is that the number of networks SMEs are involved in, the age of the business, the geographical scope of operations, and the intensity of their use of the web are essential in shaping knowledge sharing behaviour and preferences.

It is clear that the social context in which the businesses are brought together into networks is critical in shaping knowledge sharing behaviours and preferences. This is evident in Camrooka where the regional context was positively influencing the knowledge sharing behaviours both interpersonally and online. Members of the Camrooka network indicated that they were more willing to share knowledge both within their network and online. This was an interesting finding given that the ICT infrastructure was far superior in Boonaburra's network. In Camrooka this had a tangible outcome in that SMEs were reportedly attracted to the region because they perceived that its strong networking was supportive of them. It would therefore appear that establishing this strong networking environment was more important for encouraging knowledge sharing (including online) than ICT infrastructure. This was further supported by our stage one and three findings (not reported here) where we found that in Camrooka the website run by their network was so poor that none of the SMEs were actually using it. We can conclude, therefore, that only when strong social connections have been developed do technological factors become important for facilitating online knowledge sharing.

The strong connections between the face-to-face relationships established in networks and the likelihood of members to share knowledge online was evidenced by those most active in networks being far more willing to share online. At least at this stage of development and for these enterprises, the online environment is seen as an extension of the conventional business network. This indicates that development of the conventional business network is an essential pre-requisite and integral part of implementing an online knowledge sharing capacity.

These results can best be interpreted using Nahapiet and Ghoshal's (2002) assertion that the development of shared knowledge of a group of socially connected people precedes the sharing of intellectual capital. This knowledge is shaped by the context in which it is held (Cegarra Navarro & Dewhurst 2006), and is the intangible value inherent in the knowledge of individuals, the knowledge of the network, and in the relationships with those external to the firm, such as customers (Bontis 2002; Saint-Onge 1996; Stewart 1997). In the two regions we studied there was little evidence that SMEs' knowledge sharing had developed to the stage where they were sharing intellectual capital. Networking itself was the greatest value SMEs obtained from their involvement in their business networks, evidenced by the higher levels of network activity and engagement among the SMEs which were most willing to share knowledge. This is highlighted by the fact that there was little difference in knowledge sharing between SMEs trading within the region and those which were trading predominantly externally to the region.

CONCLUSION

This research clearly showed that the presence of good ICT infrastructure was insufficient to encourage online knowledge sharing and indicated that the development of networks based on trusting relationships established in face-to-face situations were a prerequisite for online knowledge sharing among SMEs. These findings indicate that initiatives to develop online knowledge sharing among these firms may need to start by developing the face-to-face networks first and building from that. This will require good management and leadership. Leadership is most likely to come from the firms which are entrepreneurial because they are new and more enthusiastic.

We are well aware of the limitations of these case studies, and the stage 1 telephone survey results reported here in particular. The case studies were both conducted in regional areas which are likely to have local dynamics not characteristic of more urbanised areas. The scope of the research would need to be extended, both in terms of the sampling frame and in terms of the questions asked, before we could say with confidence what factors are the most influential in online knowledge sharing among SMEs beyond the two regions. For example, research with a larger sample may well find a significant association between the expectation of business growth and willingness to share knowledge online (see Table 8). Because neither case study network had a fully-developed online knowledge sharing arrangement, we were not able to investigate this directly. Research on a functioning online knowledge sharing network would reveal a great deal more about the factors that attracted and engaged SMEs.

This research highlights the importance of the social dynamics within an SME network as a precondition of the success of ICT based knowledge sharing initiatives. It also confirms the subsequent importance of the technical quality of the online system as a facilitator of such knowledge sharing. Both of these sets of factors need to be addressed if ICT investments are to be targeted appropriately to achieve maximum benefit for SMEs. There is a

need for further investigation into SMEs' knowledge sharing because they are the major source of employment and economic value in many regions throughout the world, and for this reason they need to be understood and assisted to realise their potential as economic entities and contributors to the social fabric of their regions.

REFERENCES

- Albors, J., Sweeney, E. and Hidalgo, A. (2005), "Transnational technology transfer networks for SMEs. A review of the state-of-the-art and an analysis of the European IRC network", *Production Planning & Control*, Vol. 16, No. 4, pp. 413-423.
- Australian Bureau of Statistics (2007), "Counts of Australian Businesses, including Entries and Exits", Working Paper Catalogue No. 8165.0, Australian Bureau of Statistics, Canberra
- Balestrin, A., Vargas, L.M. and Fayard, P. (2008), "Knowledge creation in small-firm network", *Journal of Knowledge Management*, Vol. 12, No. 2, pp. 94-106.
- Bartholomew, S. and Smith, A.D. (2006), "Improving Survey Response Rates from Chief Executive Officers in Small Firms: The Importance of Social Networks", *Entrepreneurship Theory and Practice*, Vol. 30, No. 1, pp. 83-96.
- Beckinsale, M., Levy, M. and Powell, P. (2006), "Exploring Internet Adoption Drivers in SMEs", *Electronic Markets*, Vol. 16, No. 4, pp. 361-370.
- Bennett, R.J. and Smith, C. (2002), "Competitive conditions, competitive advantage and the location of SMEs", *Journal of Small Business and Enterprise Development*, Vol. 9, No. 1, pp. 73-86.
- Bontis, N. (2002), "Managing Organisational Knowledge by Diagnosing Intellectual Capital", in: C.W. Choo and N. Bontis (Eds) *The Strategic Management of Intellectual Capital and Organisational Knowledge*, Oxford University Press, Oxford, pp. 621-637.
- Boschma, R.A. and Lambooy, J.G. (2002), "Knowledge, Market Structure, and Economic Coordination: Dynamics of Industrial Districts", *Growth & Change*, Vol. 33, No. 13, pp. 291-311.
- Bosua, R. and Scheepers, R. (2007), "Towards a model to explain knowledge sharing in complex organizational environments", *Knowledge Management Research & Practice*, Vol. 5, pp. 93-109.
- Bozbura, F.T. (2007), "Knowledge management practices in Turkish SMEs", *Journal of Enterprise Information Management*, Vol. 20, No. 2, pp. 209-221.
- Butler, A., Reed, M. and Le Grice, P. (2007), "Vocational training: trust, talk and knowledge transfer in small businesses", *Journal of Small Business and Enterprise Development*, Vol. 14, No. 2, pp. 280-293.
- Capello, R. (1999), "Spatial Transfer of Knowledge in High Technology Milieu:" *Regional Studies*, Vol. 33, No. 4, pp. 353-365.
- Caravajal, A., Mayorga, O. and Douthwaite, B. (2008), "Forming a community of practice to strengthen the capacities of learning and knowledge sharing centres in Latin America and the Caribbean: a Dgroup case study", *Knowledge Management for Development Journal*, Vol. 4, No. 1, pp. 71-81.
- Cassar, G. and Gibson, B. (2007), "Forecast Rationality in Small Firms", *Journal of Small Business Management*, Vol. 45, No. 3, pp. 283-302.
- Cegarra-Navarro, J.G., Jiménez Jiménez, D. and Martínez-Conesa, E.A. (2007), "Implementing e-business through organizational learning: An empirical investigation in SMEs", *International Journal of Information Management*, Vol. 27, pp. 173-186.
- Cegarra Navarro, J.G. and Dewhurst, F.W. (2006), "Linked shared organisations context and relational capital through unlearning - An initial empirical investigation in SMEs", *The Learning Organisation*, Vol. 13, No. 1, pp. 49-62.
- Chen, S., Duan, Y., Edwards, J.S. and Lehaney, B. (2006), "Toward understanding inter-organisational knowledge transfer needs in SMEs: insight from a UK investigation", *Journal of Knowledge Management*, Vol. 10, No. 3, pp. 6-23.
- Coakes, E. and Smith, P. (2007), "Developing communities of innovation by identifying innovation champions", *The Learning Organisation*, Vol. 14, No. 1, pp. 74-85.
- Cooke, P., Clifton, N. and Oleaga, M. (2003), "Social Capital, Firm Embeddedness and Regional Development", *Regional Studies*, Vol. 39, No. 8, pp. 1065-1077.

- Corso, M., Marini, A., Paolucci, E. and Pelligrini, L. (2003), "Knowledge management configuration in Italian small-to-medium enterprises", *Integrated Manufacturing Systems*, Vol. 14, No. 1, pp. 46-56.
- Dana, L.-p., Korot, L. and Tovstiga, g. (2005), "A cross-national comparison of knowledge management practices", *International Journal of Manpower*, Vol. 26, No. 1, pp. 10-22.
- Desouza, K.C. and Awazu, Y. (2006), "Knowledge management at SMEs: five peculiarities", *Journal of Knowledge Management*, Vol. 10, No. 1, pp. 32-43.
- Doloreux, D. (2004), "Regional networks of small and medium sized enterprises: evidence from the metropolitan area of Ottawa in Canada", *European Planning Studies*, Vol. 12, No. 2, pp. 173-189.
- Doloreux, D. and Parto, S. (2005), "Regional innovation systems: Current discourse and unresolved issues", *Technology in Society*, Vol. 27, No. 2, pp. 133-153.
- Edwards, T. (2007), "A critical account of knowledge management: agentic orientation and SME innovation", *International Journal of Entrepreneurial Behaviour & Research*, Vol. 13, No. 2, pp. 64-81.
- Fisher, J. and Craig, A. (2005), "Developing Business Community Portals for SMEs - Issues of Design, Development and Sustainability", *Electronic Markets*, Vol. 15, No. 2, pp. 136-145.
- Floyd, D. and McManus, J. (2005), "The role of SMEs in improving the competitive position of the European Union", *European Business Review*, Vol. 17, No. 2, pp. 144-150.
- Fontana, A. and Frey, J.H. (2000), "The Interview - From Structured Questions to Negotiated Text", in: N.K. Denzin and Y.S. Lincoln (Eds) *The Handbook of Qualitative Research*, Second edition, SAGE Publications, Thousand Oaks, USA, pp. 645-672.
- Fuller-Love, N. and Thomas, E. (2004), "Networking in small manufacturing firms", *Journal of Small Business and Enterprise Development*, Vol. 11, No. 2, pp. 244-253.
- Galloway, L. and Mochrie, R. (2005), "The use of ICT in rural firms: a policy-oriented literature review", *INFO*, Vol. 7, No. 3, pp. 33-46.
- Gengatharen, D.E., Standing, C. and Burn, J. (2005), "Government-supported Community Portal Regional e-marketplaces for SMEs: Evidence to Support a Staged Approach", *Electronic Markets*, Vol. 15, No. 4, pp. 405-417.
- Gregor, S. (2002), "A Theory of Theories in Information Systems", in: S. Gregor and D. Hart (Eds) *Information Systems Foundations: Building the Theoretical Base*, Australian National University, Canberra, Australia.
- Hearn, G., Kimber, M. and Lennie, J. (2004), "ICTs and Regional Sustainability: A Critique and a Way Forward", *CIRN Conference and Colloquium, 29 Sept - 1 Oct 2004, Prato, Italy*.
- Ho, D.C.K., Au, K.F. and Newton, E. (2003), "The process and consequences of supply chain virtualisation", *Industrial Management & Data Systems*, Vol. 103, No. 6, pp. 423-433.
- Johnston, D.A., Wade, M. and McClean, R. (2007), "Does e-Business Matter to SMEs? A Comparison of the Financial Impacts of Internet Business Solutions on European and North American SMEs", *Journal of Small Business Management*, Vol. 45, No. 3, pp. 354-361.
- Lawson, C. and Lorenz, E. (1999), "Collective Learning, Tacit Knowledge and Regional Innovative Capacity", *Regional Studies*, Vol. 33, No. 4, pp. 305-317.
- Liao, J., Welsch, H. and Stoica, M. (2003), "Organizational Absorptive Capacity and Responsiveness: An Empirical Investigation of Growth-Oriented SMEs", *Entrepreneurship: Theory & Practice*, Vol. 28, No. 1, pp. 63-85.
- MacGregor, R. and Vrazalic, L. (2005), "The Role of Small Business Clusters in Prioritising Barriers to E-commerce Adoption: A Study of Swedish Regional SMEs", *CRIC Conference 2005Ballarat, Australia*.
- Maranto-Vargas, D. and Rangel, R.G.-T. (2007), "Development of internal resources and capabilities as sources of differentiation of SME under increased global competition: A field study in Mexico", *Technological Forecasting and Social Change*, Vol. 74, No. 2, pp. 90-99.
- Martin, L.M. and 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*, Vol. 11, No. 5, pp. 399-410.

- Mason, C., Castleman, T. and Parker, C. (2006), "Virtual Communities of Practice for Regional Small Businesses: Bringing Informal Networks Online", *19th Bled eConference - eValues, 5 - 7 June 2006, Bled, Slovenia*.
- McAdam, R. and Reid, R. (2001), "SME and large organisation perceptions of knowledge management: comparisons and contrasts", *Journal of Knowledge Management*, Vol. 5, No. 3, pp. 231-241.
- Mohannak, K. (2007), "Innovation networks and capability building in the Australian high-technology SMEs", *European Journal of Innovation Management*, Vol. 10, No. 2, pp. 236-251.
- Mullins, R., Duan, Y. and Hamblin, D. (2001), "A pan-European survey leading to the development of WITS", *Electronic Networking Applications and Policy*, Vol. 11, No. 4, pp. 333-340.
- Mustaffa, S. and Beaumont, N. (2004), "The effect of electronic commerce on small Australian enterprises", *Technovation*, Vol. 24, pp. 85-95.
- Nahapiet, J. and Ghoshal, S. (2002), "Social Capital, Intellectual Capital, and the Organisational Advantage", in: C.W. Choo and N. Bontis (Eds) *The Strategic Management of Intellectual Capital and Organisational Knowledge*, Oxford University Press, Oxford, pp. 673-693.
- Nan, N. (2008), "A principal-agent model for incentive design in knowledge sharing", *Journal of Knowledge Management*, Vol. 12, No. 3, pp. 101-113.
- Neuman, W.L. (2003), *Social Research Methods - Qualitative and Quantitative Approaches*, Fifth edition, Allyn and Bacon, Boston.
- Nunes, M.B., Annansingh, F., Eaglestone, B. and Wakefield, R. (2006), "Knowledge management issues in knowledge-intensive SMEs", *Journal of Documentation*, Vol. 62, No. 1, pp. 101-119.
- Pigni, F., Ravarini, A., Sciuto, D., Zanaboni, C.A. and Burn, J. (2005), "Business Associations as Hubs of Inter-Organisational Information Systems - The 2Cities Portal", in: S.B. Eom (Ed.) *Inter-Organisational Information Systems in the Internet Age*, Idea Group Inc, Hershey, USA, pp. 134-168.
- Romano, A., Passiante, G. and Elia, V. (2001), "New sources of clustering in the digital economy", *Journal of Small Business and Enterprise Development*, Vol. 8, No. 1, pp. 19-27.
- Saint-Onge, H. (1996), "Tacit Knowledge Key to the Strategic Alignment of Intellectual Capital", *Strategy & Leadership*, Vol. 24, No. 2, pp. 10-16.
- Salojärvi, S., Furu, P. and Sveiby, K.-E. (2005), "Knowledge Management and growth in Finnish SMEs", *Journal of Knowledge Management*, Vol. 9, No. 2, pp. 103-122.
- Simmie, J. (2002), "Knowledge Spillovers and Reasons for the Concentration of Innovative SMEs", *Urban Studies*, Vol. 39, No. 5/6, pp. 885-902.
- Spence, M. (2004), "Efficiency and Personalisation as Value Creation in Interorganisationalising High-Technology SMEs", *Canadian Journal of Administrative Sciences*, Vol. 21, No. 1, pp. 65-78.
- Spurge, V. and Roberts, C. (2005), "Broadband Technology - A appraisal of government policy and use by small and medium-sized enterprises", *Journal of Property Investment & Finance*, Vol. 23, No. 6, pp. 516-524.
- Stewart, T.A. (1997), *Intellectual Capital - The New Wealth of Organisations*, Doubleday, New York.
- Sum, C.-C., Kow, L.S.-J. and Chen, C.-S. (2004), "A taxonomy of operations strategies of high performing small and medium enterprises in Singapore", *International Journal of Operations & Production Management*, Vol. 24, No. 3, pp. 321-345.
- Thorpe, R., Holt, R., Macpherson, A. and Pittaway, L. (2005), "Using knowledge within small and medium-sized firms: A systematic review of the evidence", *International Journal of Management Review*, Vol. 7, No. 4, pp. 257-281.
- Timonen, H. and Ylitalo, J. (2007), "Exploration of Knowledge Sharing Challenges in Value Networks: a Case Study in Finnish Grocery Industry", *Electronic Journal of Knowledge Management*, Vol. 5, No. 4, pp. 504-514.
- Trauth, E. (2000), *The Culture of an Information Economy - Influences and Impacts in the Republic of Ireland*, Kluwer Academic Publishes, Dordrecht, Netherlands.
- Van Laere, K. and Heene, A. (2003), "Social networks as a source of competitive advantage for the firm", *Journal of Workplace Learning*, Vol. 15, No. 6, pp. 248-258.

Wenger, E., McDermott, R. and Snyder, W.M. (2002), *Cultivating Communities of Practice - A Guide to Managing Knowledge*, Harvard Business School Press, Boston.

Whittaker, J., Burns, M. and Van Beveren, J. (2003), "Understand and measuring the effects of social capital on knowledge transfer within clusters of small-medium enterprises", Small Enterprise Association of Australia and New Zealand 16th Annual Conference, Australia.

Wong, K.Y. and Aspinwall, E. (2004), "Characterising knowledge management in the small business environment", *Journal of Knowledge Management*, Vol. 8, No. 3, pp. 44-61.

Wong, W. and Radcliffe, D. (2000), "The Tacit Nature of Design Knowledge", *Technology Analysis & Strategic Management*, Vol. 12, No. 4, pp. 493-512.

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