
**DIGITAL KNOWLEDGE NETWORKS:
LINKING COMMUNITIES OF PRACTICE WITH INNOVATION**

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Abstract

With embedded knowledge flows and innovation linked to communities of practice as well as technology, Australian small and medium size enterprises (SMEs) have the potential to both collaborate and compete by taking advantage of knowledge platforms founded on digital technologies and new relationships. A conceptual model is introduced that maps access to knowledge flows against limitations such as size and lack of interaction. It is suggested that fostering a culture of connectivity and trust amongst SMEs to initiate knowledge exchange may offer a potential solution to the possible loss of competitive advantage for SMEs in the digital economy.

Introduction

Today, with an economy enabled and driven by connectivity, a fundamental shift in business models is occurring whereby information, knowledge and relationships underpin competitive advantage. In order to compete in what some refer to as the New Economy, companies must use technology-mediated channels, create internal and external value, formulate technology convergent strategies, and organise resources around knowledge and relationships (Rayport & Jaworski 2001). The dominant strategic management literature also orbits resource-based theory, focusing on integrated architecture through improved knowledge management systems (Alavi & Leidner 2001; Kay 2000; Maholtra 2000; Chisholm 1998; Davenport & Prusak 1998; Teece 1998; Brown & Duguid 1998; Stewart 1997; Nanoka & Takeuchi 1995).

The rise of information technology (IT) and electronic information networks has led firms of all sizes to implement more technology driven solutions for improved productivity and information flow. Malhotra (2000) identifies three general information management (IM) developments that have revolutionized company information processes over the last forty years. The first phase, the automation phase, increased company efficiency of operations. The second phase, the rationalization phase, streamlined those procedures by eliminating bottlenecks made apparent by the automation. The third phase, the business reengineering phase, radically redesigned information management processes through technology-intensive implementation of procedures in workflows and work processes (Malhotra 2000). Now we have reached a fourth phase, the

knowledge management (KM) phase that, if possible, is even closer associated with technology than business process reengineering. Whereas technology may play an enabling part in KM activities, the notion that it is seamlessly entwined with technology or that its success depends on it is, however, misguided (Hildebrand 1999: online).

Information Management vs. Knowledge Management

The extant of technology gave rise to huge investments in information management systems, as they were considered a critical company resource. While many companies have implemented more technology driven solutions for improved productivity, research indicates that implementation of expensive information technology processes has not always yielded the desired results. Strassman (1997) was unable to establish a relationship between company performance and computer expenditure. Parc Xerox director John Seely Brown (Brown & Guguid 1991) observed that levels of efficiency and effectiveness of knowledge workers in US industry were little improved despite investments in technology of over \$1 trillion. Initial managerial confusion between IM and KM appears to have generated much inappropriate investment in business process reengineering while over time technology solutions such as data warehousing proved too restrictive in terms of agility and flexibility (Malhotra 2000).

The prevailing view that network externalities such as the Internet and new e-commerce technologies are necessary to transform business capabilities from a parochial to a global level, is leading the drive to modify initial enterprise resource networks and customer relations management systems (Goolsbee 2000; Murray & Trefts 2000; Davenport, Jarvenpaa & Beers 1996). By facilitating horizontal and vertical trading via automated e-commerce engines, the latest IT solutions are being touted as collaborative e-commerce solutions or c-commerce in which strategic industry alliances are key. Companies such as SAP promote global focus solutions through customised supply chain interfaces in which 'customers, employees, suppliers and business partners work together in one virtual business environment as if they were all one company' (SAP 2000:16). Many such solution providers are targeting large enterprises. In Australia, where small and medium size enterprises (SMEs) make up 96 per cent of all Australian enterprises in the private non-agricultural sector, integrated technology solutions providers are breaking out of the corporate straightjacket by also appealing to SMEs and start-ups to tap into intranet-based business tools (Hayes 2001).

In an attempt to implement new KM strategies, many enterprises have initiated electronic KM solutions such as a company intranet to encourage knowledge flow and collectively preserve, renew and augment their knowledge platforms (Davenport & Prusak 1998; Zack 1999). A great deal of hope is vested in these KM systems, but it is inaccurate to assume that information technology can overcome any knowledge flow barriers (Brown & Duguid 1998). Although

computer-based environments for companies and their knowledge workers are rapidly graduating from research prototypes to commercially available products, implementation of electronic knowledge systems 'does not automatically induce a willingness to share information and build a new intellectual capital' (Gottschalk 2000:117). To support the nature of today's work environment KM systems need to not only facilitate the construction of new knowledge, but manage information and learning by serving as a collective community memory platform within constantly evolving collaborative contexts (Lechner, Stanoevska-Slabeva & Tan 2000; Stahl 2000).

Communities of Practice

Once the domain of special business units and cross-functional teams to perpetuate ideas and embed core competencies, a new form of collective community building is emerging through a spontaneous new knowledge exchange trend known as 'communities of practice'. What are communities of practice? Burk (2000) simply calls them expansions of one-on-one knowledge sharing. Theorists Wenger and Snyder (2000) describe them as informal groups of people who regularly share their expertise and experiences; are not formulated or controlled by management; set their own leadership; and follow their own agenda.

One of the central benefits of these self-constituting communities is that they sidestep the "ossifying tendencies of large companies and develop rich, fluid non-canonical worldviews to bridge the gap between their organisation's static canonical view and the challenge of changing practice" (Brown & Duguid 1991:50). This spontaneous think-tank mode of team building through face to face meetings, email, knowledge sharing networks, intranets and technology-mediated conferencing is an inherently innovative process and is proving to be a crucial aspect of organisational learning and KM. In many ways communities of practice are the Western adoption of the holistic Japanese approach outlined by Nonaka and Takeuchi (1995) in acknowledging the importance of tacit company knowledge and transforming it into explicit company assets.

Most communities of practice are internal company networking groups. A recent study highlights a number of Fortune 500 companies fostering shared learning groups and collaborative knowledge communities to encourage team-based incentives that directly influence company profits (Best Practices LLC 2000). Communities of practice can, however, also flourish with members from different companies, as exemplified by the CEOs of different US companies who make up the Business Roundtable (Wenger & Snyder 2000). Other inter-organisational examples are Internet-based companies such as Amazon.com and e-Toys who have successfully redefined the value of knowledge assets or intellectual capital by achieving valuation through information flows between organisations and industries (Malholtra 2000). It should be noted that there are

many different forms of socio-cultural communities of practice proliferating in the virtual environment with objectives other than competitive advantage, discussion of which falls outside the scope of this paper.

Complementary relationships with the networked firm have been the subject of considerable empirical research in large enterprises (e.g., Pfeffer & Sutton 2000; Evans & Wurster 2000, 1999; Davenport & Prusak 1998), yet studies on their role vis-à-vis SMEs are less abundant. Networking is a recurring theme in European studies on SME positioning in the new economy (Cooke & Wills 1999; Fariselli, Oughton, Picory & Sugden 1999). While these studies associate social capital building with enhanced business, knowledge and innovation performance, SME networking appears contingent on favourable economic climates, e.g. government-sponsored external networks, with such institutional factors affecting the relationships amongst different economic actors (Cooke & Wills 1999; Fariselli et al. 1999). Similarly, a recent Asian study which provides empirical evidence of successful cross-border SME collaboration between Singapore and Malaysia points to the importance of national and international innovation networks that provide SMEs with the resources to become global players (Konstadakopoulos 2000). Building on the principle that successful SME global positioning needs to be supported by innovation networks and/or favourable government policies, this paper explores the potential of a timely synergy between connectivity and collaborative KM business models vs. barriers faced by Australian SMEs in embracing knowledge community practices.

Australian SMEs

In line with the growing awareness that connectivity is unequivocally altering competitive advantage, Australian federal and regional innovation policies are increasingly focused on building strategies and initiatives towards connectivity, the expansion of regional and rural business, technology-enabled capabilities and e-commerce. The emergence of networks and the development of regional economic communities are particularly favoured, whereby policy makers concerned with the performance of regional economies are seeking to foster a networked community culture (NOIE 2000). To that end, government is supporting both IT infrastructure and industry initiatives (TeleCentre Network Connection 1999; Western Region 1999), while private network solutions as discussed above are also proliferating (Hayes 2001). Enhanced telecommunications infrastructure is integral to competitive advantage for Australian SMEs and may prove to be a valuable resource in terms of building SME connectivity, provided that SMEs are adopting the technology.

Adoption of networked technologies by SMEs is directly related to the size and nature of SMEs and largely depends on their perception of affordability and opportunities for their business (OECD 2000). Research indicates that SMEs in Australia still hesitate to invest their time and money in a rapidly changing economy and fear

isolation, competitor use of the Internet, alienating intermediaries, uncontrolled growth, lack of technology skills and lack of a strategic sense of how to move forward as significant barriers. They also perceive innovation policies as pertaining to large firms and are hence suspicious of e-commerce regulations (NOIE 2000). These barriers tend to foster an element of inertia among Australian SMEs in embracing networked solutions and may hence lead to possible loss of competitive advantage for the region and the Australian economy as a whole (Australian Electronic Business Network 1998). While embracing connectivity through public or private initiatives is essential in reducing isolation of SMEs and facilitating the electronic linking to one another for potential business-to-business (B2B) and/or business-to-consumer (B2C) resource and information sharing, there is another critical factor to consider in terms of potential knowledge exchange between Australian SMEs and that factor is trust.

The relationship between connectivity and companies should be seen as reciprocal because "telecommunications technologies and services not only have a significant impact on how inter-organisational relationships are developed but the structure and culture of an existing network of organisations itself also seems to have considerable predictive power for the way in which the telecommunications network is developed, implemented and used" (Nouwens & Bouwman 1995: online). Hence knowledge flows between firms is contingent not on suitable technology alone but on informal social contexts as well (Brown & Duguid 1998). In the Asian example of SME collaboration, information sharing and learning is in fact taking place based on prior existence of trust and in an atmosphere of continued trust building between stakeholders (Konstadakopoulos 2000).

There is a considerable body of literature on inter-firm trust. SME fear of opportunistic behaviour from competitors has alliance literature scholars (Gulati 1995; Zaheer, McEvily & Perrone 1998) stress the importance of trust and personal interaction in inter-firm alliances. The trust may be historical and already exist between individuals of different firms, as illustrated above, or it can be built during the relational exchange (Gulati 1995; Ring & Van de Ven 1992). Others argue that alliances do not necessarily have to be based on trust as long as systemic mechanisms are in place which allow stakeholders to have confidence that alliance partners will exhibit cooperative rather than opportunistic behaviour and not take competitive advantage of knowledge-based exchanges (Beamish 1987, Das & Teng 1997).

In the past, Australian SMEs have not been known for their collaborative approach to business (Australian Bureau of Industry Economics 1995). However, a relatively recent study of 2500 Australian SMEs on their involvement in business networks noted a significant level of interest in networking or formulating networks in the future, indicating that networking is likely to be important in the business future of Australian SMEs (Dean & Holmes 1997). Two types of business networks, formal and informal networks, were identified whereby

formal networks constituted formal arrangements between companies to consolidate resources and informal networks were seen as loose arrangements facilitating information exchange. Service companies were notably more likely to be involved in formal and informal networking than manufacturing companies. Lack of suitable partners and lack of financial assistance were cited as inhibiting factors for collaboration (Dean & Scott 1997).

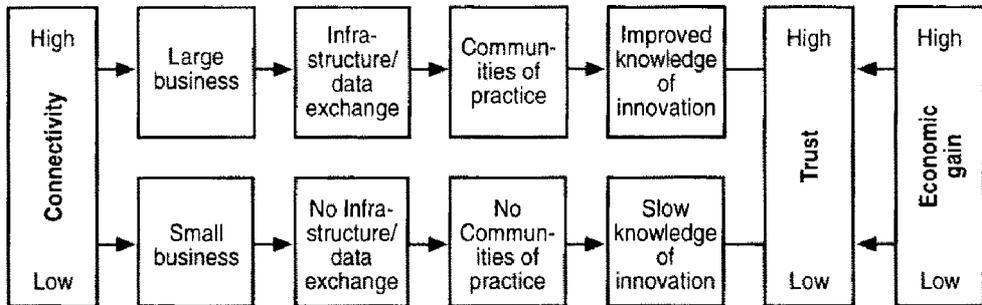
Towards future SME viability

There are obvious differences between large and small firms both in terms of availability of resources for connectivity and in terms of community of practice membership. Network-wise, large firms with deep pockets have the ability to build their own integrated architecture, while SMEs have to rely on external funding. For Australian SMEs access to a networked infrastructure can now be achieved by relying on the public purse, but while these networks are potentially exciting and sound e-business structures for SMEs, joining the global market as a sole trader, let alone becoming an inter-firm network stakeholder will entail an enormous conceptual leap into the future for many Australian SME managers. Network novices will hence need substantial encouragement and support to make them willing to take the e-business plunge.

While social capital is an individual asset, company members join a community of practice for networking or learning purposes in their field of interest or expertise. As noted by Coleman (1990) and Nahapiet and Ghoshal (in Leana 1999) the resulting organisational social capital becomes a jointly owned asset and includes the perspectives and interests of the organisation (Leana 1999). Given the latter, it may be assumed that communities of common interest trust other company members in the exchange of explicit and tacit company knowledge for the 'public good' aspect and building of company assets. Australian SMEs do not have a history of networking and knowledge sharing for the 'common good' and would more likely be looking to not only collaborate but also compete in a knowledge exchange milieu. A collaborative culture will hence need to be fostered and should be linked to tangible rewards for participating SMEs and/or clear mutual benefits. Once trust is formed through participation in horizontal networks of association (Putnam 1993) and organisational social capital is realised through cooperative individual and collective goal orientation (Leana 1999), participation in a community of practice is likely to perpetuate trust amongst Australian SMEs, which in turn will produce know-how and economically beneficial outcomes for a region or industry.

Introducing a conceptual model, the author maps access to knowledge flows against limitations such as size and lack of interaction (Figure 1) and suggests that fostering a culture of connectivity, cooperation and trust building amongst SMEs, to initiate and encourage community of practice type knowledge diffusion, may offer a potential solution to possible loss of competitive advantage.

Figure 1
Knowledge Flow Model



The top of the knowledge flow model shows how a large company with high connectivity and an integrated infrastructure for information and knowledge exchange via communities of practice can lead to a high level of trust and subsequent innovation and competitive advantage. The bottom part of the knowledge flow model shows how an SME with low access to a networked infrastructure and a low level of knowledge exchange leads to a low level of trust in industry or alliance partnering, which in turn can lead to isolation and loss of competitive advantage in the new economy.

Although exact emulation of a large company community of practice may not be feasible or even desirable, a variety of models of tight and loose coupling can be examined to identify appropriate inter-firm alliances for SMEs and approximate desired community of practice results. In case of Australian SMEs, trust building will require prolonged socialization and externalisation to assure stakeholder sincerity (Nonaka & Takeuchi 1995). Trust between partners is said to reduce fear of opportunistic behaviour and improve collective learning (Gulati 1995). Von Hippel (1988) and Dyer and Singh (1998) also advocate close personal interaction and strong relational or social cooperation between firms to learn critical information and know-how from alliance partners.

Australian SMEs need to establish a high level of horizontal and vertical inter-firm cross-fertilisation of ideas, technical know-how exchange and collaborative learning through informal processes such as attending seminars, local association meetings or socializing with other firm managers. The latter can be accomplished in the form of a collaborative effort or 'innovation partnership' between government, academia and SME stakeholders with a focus on formulating appropriate economic frameworks for SMEs, creating awareness of networked opportunities and providing educational processes such as inter-firm relationship building and developing skills in using networked technologies.

Cooperative relationships are becoming one of the most important determinants of commercial viability and business success. With embedded knowledge flows and innovation linked to communities of practice as well as through linkages using technology, Australian SMEs have the potential to both collabo-

rate and compete by taking advantage of e-commerce based connectivity and new relationships founded on the exchange and sharing of embedded knowledge. Overcoming potential loss of competitive advantage for Australian SMEs in the digital economy will require strategic SME community building with connectivity, trust and relational capital as pivotal building components.

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