Three-dozen knowledge-sharing barriers managers must consider

Andreas Riege

Andreas (Andi) Riege is currently a lecturer at Griffith University in Brisbane, Australia. He has attained the degree of Diplom-Kaufmann from the Friedrich-Alexander University of Nuremberg and received his PhD in strategic marketing from the Queensland University of Technology of Brisbane. He has worked for more than ten years in advertising and retail marketing in Germany and Australia, and has published his research in a number of internationally refereed academic and practitioner journals. His current research agenda concentrates on knowledge-sharing barriers in SMEs and MNCs, the interface of HRM and KM, and direct marketing.

Abstract

Purpose – *Knowledge sharing is the corner-stone of many organisations' knowledge-management (KM) strategy. Despite the growing significance of knowledge sharing's practices for organisations' competitiveness and market performance, several barriers make it difficult for KM to achieve the goals and deliver a positive return on investment. This paper provides a detailed review of current KM and related literatures on a large number of possible knowledge-sharing barriers with the purpose of offering a more comprehensive and structured starting-point for senior managers when auditing their organisation's current knowledge base and knowledge-sharing requirements.*

Design/methodology/approach – *This article reviews and discusses over three dozen potential knowledge-sharing barriers, categorising them into three main domains of recently published works: individual/personal, organisational, and technological barriers.*

Findings – *The extensive list of knowledge sharing barriers provides a helpful starting point and guideline for senior managers auditing their existing practices with a view to identifying any bottle-necks and improving on the overall effectiveness of knowledge-sharing activities.*

Practical implications – *Managers need to realise, however, that a particular knowledge sharing strategy or specific managerial actions will not suit all companies and that there are differences to be expected between MNCs and SMEs, private, public sector, and not-for-profit organisations. As such, the implementation of knowledge-sharing goals and strategies into an organisation's strategic planning and thinking will vary greatly.*

Originality/value – *The main discussion of this paper brings together a large range of knowledge-sharing barriers in an attempt to indicate the complexity of knowledge sharing as a value-creating organisational activity.*

Keywords *Knowledge management, Management strategy*

Paper type *Literature review*

Introduction

Best practices in knowledge sharing have been gaining increased attention amongst researchers and business managers in recent years. That is, because the commercial success and competitive advantage of companies seems to lay increasingly in the application of knowledge and location of those parts of the organisation where knowledge sharing practices can assist in optimising business goals. Knowledge sharing practices and initiatives often form a key component of knowledge management programs, in terms of organisational and individual learning (e.g. Alavi and Leidner, 2001; Earl, 2001; Nahapiet and Ghoshal, 1998; Nonaka, 1994; Sveiby, 1997). The principle equation is: better and purposeful sharing of useful knowledge translates into accelerated individual and organisational learning and innovation through the development of better products that are brought faster to a target market, thus enhancing market performance. Still, knowledge sharing goals and strategies are all to often merely mentioned in a business strategy; maybe because the effectiveness of sharing practices is difficult to measure and sharing barriers are not sufficiently identified.

In a knowledge-driven economy, organisations' intangible assets are increasingly becoming a differentiating competitive factor, particularly in services industries. Indeed, intangible assets such as trademarks and companies' reputation, and skills pertaining to employees' know-how and the corporate culture, are both recognised as the quintessence of competitive advantage (Nahapiet and Ghoshal, 1998; Senge, 1990; Teece, 1998). However, whilst intangible assets are developed over time and owned by organisations, there is no direct ownership over employees' knowledge that can quickly become outdated without the acquisition of new knowledge and employees' skills can quickly disappear when they leave their employer. Marketing products or branding, for instance, requires in-depth knowledge of customers, suppliers, distributors, competitors, laws and regulations, and so on, who often present important knowledge sources but can also change quickly. Despite the growing awareness of the benefits of knowledge sharing, the accessibility of knowledge is still limited because most knowledge resides in the head of people (commonly referred to as tacit knowledge) or in documents or repositories (sources of explicit knowledge) not readily accessible to others. That is one of the main reasons why an increasing number of companies recognise that it is particularly the tacit knowledge accumulated by their employees that represents invaluable organisational capital. Indeed, sharing ''tacit knowledge among multiple individuals with different backgrounds, perspectives, and motivations becomes a critical step for organisational knowledge creation to take place'' (Nonaka and Takeuchi, 1995, p. 85).

Understanding knowledge sharing's potential benefits then poses the key question of how companies best develop a knowledge-based business view and place greater emphasis on creating and incubating knowledge-sharing cultures that are integrated and supported by a company's employees, its systems and processes, and technology to maintain the competitiveness and profitability of its business. Before answering this question, however, it is necessary to establish what sharing knowledge really means. McDermott (1999) provided a good explanation by noting that sharing someone's knowledge involves a person guiding someone else through their thinking or using their insights to help others see their own situation better. Furthermore, the person who shares and distributes knowledge ideally is, or should be, aware of the knowledge purpose, use, needs or gaps of the person receiving the knowledge. This implies that not all employees need to share knowledge, because it would not be re-used or applied.

Involving the entire organisation in knowledge sharing activities, particularly within large organisations and MNCs – the widely discussed cases of Buckman Labs, Dow Chemical, Ernst & Young, Hewlett Packard, Monsanto, and Xerox provide some good examples – seems useful only if all employees need to work with and apply at least most of the knowledge they receive. At Buckman Labs, for instance, everyone has access to the knowledge base of the company (Buckman, 1998). This is also the case at Accenture and IBM. Whilst some companies impose no restrictions whatsoever on who can access what knowledge and information, others protect specific parts of their knowledge and information, restricting access to selected people and groups only, such as BMW, ChevronTexaco, DaimlerChrysler, Microsoft, PriceWaterhouseCoopers, SvenskaKullagerFabriken AB, and Telstra.

There are also some examples of how knowledge sharing occurs at various organisational levels, within and between business functions, in formal and informal approaches, and in two main delivery methods: tacit and explicit. Michailova and Husted (2003), for instance, investigated the business environments and cultures of six Russian firms and their hostility towards knowledge sharing. Similarly, Sivula *et al.* (2001) showed how the improvement of knowledge flows – through active external relationships between employees, shareholders, intermediaries, and customers – could assist in the development of strategic direction and approaches. In particular, customer knowledge could assist companies in several ways such as gaining a better understanding of customer wants, developing deeper knowledge-enabled relationships, and identifying new business opportunities (Lesser *et al.*, 2000; Schotte, 2003; Skyrme, 2000).

> **"Better and purposeful sharing of useful knowledge translates into accelerated individual and organizational learning and innovation."**

This article concentrates on the management and particularly KM literature and does not examine disciplines such as individual, organisational and social psychology, organisational behaviour, or sociology in its review of knowledge sharing barriers. The main purpose was to identify and briefly review a wide range of knowledge sharing barriers that are central to effective KM. This review is structured into three key domains of knowledge sharing barriers that are linked to individual employees, companies' systems and processes, and integrated technologies.

Different perspectives and types of knowledge-sharing practices

There are numerous examples where knowledge-sharing practices have not accomplished their objectives to manage companies' knowledge assets and skills, which is mainly due to the large diversity of potential sharing barriers. Recent discussions on knowledge sharing barriers primarily focused on organisational culture (e.g. Chase, 1998; De Long and Fahey, 2000; Gurteen, 1999; McDermott and O'Dell, 2001) and national culture (e.g. Ford and Chan, 2003; Husted and Michailova, 2002; Michailova and Husted, 2003; Moeller and Svahn, 2004). Other studies discussed notions of organisational or collective knowing that are closely linked to the term organisational culture. Such studies are concerned with the nature of companies as social communities (Kogut and Zander, 1996), or the importance of social capital and social interaction in facilitating the creation and sharing of knowledge (Argote *et al.*, 1990; Ingram and Baum, 1997; Nahapiet and Ghoshal, 1998). There also are researchers who centred their analyses around the issue of trust amongst employees (e.g. von Krogh and Roos, 1996; Tschannen-Moran, 2001; Urch-Druskat and Wolff, 2001) and the overall level of collaboration within companies concentrating on employees attitudes, age, level of education and experience, supervisor and team support (e.g. De Long and Fahey, 2000; Michailova and Husted, 2003; Sveiby and Simons, 2002). Other authors have concluded that sharing of existing knowledge contributed to the performance of organisations (e.g. Epple *et al.*, 1996), although the effectiveness of sharing activities goals and strategies is difficult to measure and differs between companies (Argote *et al.*, 1990; Argote and Ingram, 2000). Such differences may be due to individual people (e.g. lack of interpersonal skills); structures, processes and systems in the organisation (e.g. deep-layered hierarchical structure); or technology (e.g. shortage of appropriate software tools).

Further, there are several debates about whether KM in general but also sharing practices should be people-driven or technology-driven. Authors of the management discipline usually argue that knowledge sharing is mostly about people and adaptations to the social dynamics of the workplace rather than technology (Cross and Baird, 2000; Davenport, 1997; Hickins, 1999). Take, for instance, 3M, Boeing, BP Amoco, Chevron, or Hewlett Packard, whose KM strategies centre around the development of a knowledge-sharing culture (Sveiby, 2002). However, IS/IT systems play an important support function without which most sharing practices would be less effective and applications less timely.

There are numerous works that clearly differentiated between the terms of data, information, and explicit and tacit knowledge, therefore no discussion and further clarification is provided here. It has been widely acknowledged and agreed that the main challenge of companies' sharing practices is to protect and maximise the value derived from tacit knowledge held by employees, customers and external stakeholders. Several authors supported the view that individual creativity contributes to the growth of collective knowledge, arguing that the

effectiveness of knowledge-driven work is directly related to the creation of new knowledge and the sharing of useful existing knowledge through the interaction between tacit and explicit knowledge (Nonaka and Takeuchi, 1995; Spender, 1996; Sveiby, 1997). Organisational knowledge is the knowledge shared by individuals and is best highlighted by four different modes of knowledge conversion (Nonaka and Takeuchi, 1995; Sveiby, 1997). Firstly, the socialisation mode begins with sharing skills and experiences through observations and imitations, thereby creating tacit knowledge from tacit knowledge. Secondly, the externalisation mode converts tacit knowledge into explicit knowledge using metaphors, analogies, models, and concepts through books or manuals. Thirdly, the combination mode transfers existing explicit concepts by analysing and re-organising information within the organisation from one area to another (e.g. assisted by computer networks and databases). Fourthly, internalisation is the transfer of explicit knowledge into tacit knowledge that refers to a hands-on approach using actual experience or simulation models.

Building on Nonaka and Takeuchi's work, Spender (1996, p. 52) combined the dimension of explicit and tacit knowledge with the dimension of individual and social knowledge by creating a matrix highlighting four types of an organisation's knowledge. Those four types collectively represent a mixture of an organisation's knowledge, comprised in its intangible assets and skills. The first type is individual explicit knowledge (Spender called this conscious knowledge), which is storable and retrievable from personal records or memory. The second type is individual tacit knowledge (Spender labelled this automatic knowledge) based on people's theoretical and practical experience and learning. The third type refers to an organisation's social explicit knowledge (Spender termed this objectified knowledge), which embodies registered patents and designs or information stored on databases. The fourth type, social tacit knowledge (Spender called this collective knowledge), represents all knowledge embedded in social and institutional practices, systems, workflows and culture. Spender (1996, p. 52) argued that social tacit knowledge is the ''most secure and strategically significant kind of organisational knowledge''. Nonetheless, most organisations, in particular Western ones (Nonaka and Takeuchi, 1995), seem to value individualism and want their employees to make decisions and solve problems on their own. Organisations, however, also assign equal importance to an employee's willingness to co-operate and work in a team. Hence, for an organisation to achieve the desired level of collaboration and knowledge sharing, it needs to communicate to its employees how the generation, sharing and then application of knowledge is valued at the individual level, while also recognising group or team-based performances and collective accomplishments.

Dixon (2000) emphasised that the selection of the appropriate knowledge sharing process within an organisation depends on the type of knowledge (explicit or tacit), the routine and frequency of the sharing process, and the knowledge receiver (individual, group or the whole organisation). Dixon (2000, pp. 144-5) has identified five different ways of sharing knowledge effectively, which build on Spender's (1996) objectified and collective knowledge types, but categorise them in more detail: ''serial transfer'' (where tacit or explicit team knowledge is shared within the team to a different setting at a later time); ''near transfer'' (i.e. the replication of explicit team knowledge in other teams undertaking similar tasks); ''far transfer'' (i.e. the replication of tacit team knowledge in other teams doing similar tasks); organisational know-how, either in tacit and explicit form (needed to complete a strategic task that occurs infrequently within the organisation); and ''expert transfer'' (e.g. a team requires and seeks explicit expertise from others in the organisation to accomplish a task. The focus of this article is on sharing processes, rather than knowledge transfer methods, that are discussed extensively in Schlegelmilch and Chini (2003) who provide an extensive overview of theoretical and empirical studies concerning knowledge transfer. The following sections combine some of the approaches discussed above and look at both individual and organisational barriers to knowledge sharing as well as technological ones.

Differences in sharing barriers: SMEs versus large companies

There are only few studies in the KM literature that differentiate between KM initiatives in large companies and small and medium-sized enterprises (SMEs) (e.g. McAdam and Reid,

2001; Beijerse, 2000). However, there seems no specific and conclusive empirical evidence that clearly compares and contrasts diverse knowledge-sharing barriers in large companies and SMEs, as well as commercial, not-for-profit, and public sector organisations. Nor is there any evidence on which barriers are more prominent than others in these business environments. The reason for this is that most published research in the field of KM to date concentrated on large, commercially orientated companies. Most of the literature examined for this research also confirms this orientation. Still, SMEs tend to provide an environment that is conducive to generating knowledge, mainly due to their size, often single site location, and closer social relationships of employees, resulting in good communication flows and knowledge sharing. Once a SME moves to multiple sites and usually multiple groups within the same department, the ability to communicate and share knowledge seems to decrease rapidly (Chase, 2004). SMEs also tend to be supported and fostered by their cooperation and relationship-building with mostly local customers, often flatter and less bureaucratic structure, and innovative culture – often based on the attitude and business orientation of the owner – than in large firms which by and large seems to support better collaboration across teams and functional areas, as well as more efficient, free, and informal communication flows.

On the flip side, there are suggestions that most SMEs perform poorly in terms of knowledge exploitation, integrating existing knowledge into a wider strategic perspective, and thus obtaining sustainable competitive advantage from organisational learning and innovation. Why? Many SMEs appear to lack strategic focus due to their being preoccupied with day-to-day viability. In particular, SMEs seem to lack absorptive capacity as they tend to be less effective in recognising the value of their explicit knowledge and are short of adequate resources, infrastructures, and technology to disseminate and apply existing and new knowledge (Levy *et al.*, 2003, pp. 4, 7). Similarly, Beijerse (2000) concluded that SMEs are knowledge generators but often do not have a systematic strategic approach to developing, capturing, disseminating, sharing, or applying knowledge. In general, there seem to be little explicit plans or guidelines on an operation level on how to retain knowledge, utilise flat structures and make the mostly informal cultures motivating to encourage more effective collaboration.

Building on Beijerse's (2000) work, McAdam and Reid (2001), investigated differences in perceptions of knowledge management between large companies and SMEs and provided more detailed results in relation to knowledge construction, embodiment/capture, dissemination, application. In particular, knowledge construction in large companies seemed to rely more on social interaction than in SMEs that applied a very mechanistic approach to it. Knowledge embodiment and capture in large companies seemed to depend more on interactions between employees than SMEs. Knowledge dissemination in SMEs and large companies tend to be unsystematic with technology facilitating little sharing and dialogue, even though large firms offered many sophisticated methods. Sharing was mainly people-related and facilitated by workshops, discussion forums, training, and mentoring (McAdam and Reid, 2001). The application or use of KM showed that SMEs concentrated on market orientation and planning compared to business efficiency planning in larger companies.

The triad of knowledge-sharing barriers

The identification and recognition of knowledge sharing barriers, may it be a natural part of an organisation's culture or not, plays an important role in the success of a KM strategy. Knowledge sharing practices often seem to fail because companies attempt to adjust their organisational culture to fit their KM or knowledge sharing goals and strategy, instead of

" Knowledge sharing goals and strategies are all too often merely mentioned in a business strategy. "

implementing them so that they fit their culture. McDermott and O'Dell (2001), for example, noted a number of companies, such as PriceWaterhouseCoopers, Ford, and IBM, all of which have integrated knowledge-sharing activities successfully into their corporate culture. The main reason, however, why most companies do not reach their knowledge sharing goals seems to be due to the lack of a clear connection between the KM strategy and overall company goals, possibly because knowledge sharing time and again is perceived as a separate activity.

At an individual or employee level, knowledge -sharing barriers are often related to factors such as lacking communication skills and social networks, differences in national culture, overemphasis of position statuses, and a lack of time and trust. At an organisational level, barriers tend to be linked to, for instance, the economic viability, lack of infrastructure and resources, the accessibility of formal and informal meeting spaces, and the physical environment. At a technology level, barriers seem to correlate with factors such as the unwillingness to use applications due to a mismatch with need requirements, unrealistic expectations of IS/IT systems, and difficulties in building, integrating and modifying technology-based systems. There are various reasons why people hoard their knowledge and the contexts are often multi-dimensional. The following discussion presents an extensive overview of over three-dozen potential sharing barriers (categorised in individual, organisational and technology barriers). Note that the sequence of barriers examined provides no clues as to their relative impact or effectiveness on knowledge sharing practices.

Potential individual barriers

Just about every book written on KM comments on the distribution of the right knowledge from the right people to the right people at the right time being one of the biggest challenges in knowledge sharing. Barriers originating from individual behaviour or people's perceptions and actions can relate to either individuals or groups within or between business functions. At the individual level, barriers are manifold and this review has identified the importance of well over a dozen barriers to sharing knowledge, shown below:

1. general lack of time to share knowledge, and time to identify colleagues in need of specific knowledge;

2. apprehension of fear that sharing may reduce or jeopardise people's job security;

3. low awareness and realisation of the value and benefit of possessed knowledge to others;

4. dominance in sharing explicit over tacit knowledge such as know-how and experience that requires hands-on learning, observation, dialogue and interactive problem solving;

5. use of strong hierarchy, position-based status, and formal power (''pull rank'');

6. insufficient capture, evaluation, feedback, communication, and tolerance of past mistakes that would enhance individual and organisational learning effects;

7. differences in experience levels;

8. lack of contact time and interaction between knowledge sources and recipients;

9. poor verbal/written communication and interpersonal skills;

10. age differences;

11. gender differences;

12. lack of social network;

13. differences in education levels;

14. taking ownership of intellectual property due to fear of not receiving just recognition and accreditation from managers and colleagues;

15. lack of trust in people because they may misuse knowledge or take unjust credit for it;

16. lack of trust in the accuracy and credibility of knowledge due to the source; and

17. differences in national culture or ethnic background; and values and beliefs associated with it (language is part of this).

Note that barriers are discussed separately, although many barriers are intertwined. That is, it is most likely that different combinations of knowledge-sharing barriers would be found in organisations.

Numerous researchers and practitioners noted that the ability of employees to share knowledge depends first and foremost on their communication skills. Effective communication, both verbal (the most common vehicle of sharing tacit knowledge), and written, is fundamental to effective knowledge sharing (e.g. Davenport and Prusak, 1998; Hendriks, 1999; Meyer, 2002). There also have been several prominent studies on social network issues (e.g. Argote et al., 1990; Baron and Markman, 2000; Ingram and Baum, 1997; Nahapiet and Ghoshal, 1998) that highlighted, for example, a clear correlation between employees' social networks, their direct personal contacts within and outside a company, their personalities (introverted vs extroverted), and their ability to interact with others.

Another potential barrier is employees' national culture, commonly recognised as an interrelated set of values, practices and symbols, that are learned and shared by individuals and whose meanings provide orientation to members of an organisation. While several studies outlined cross-cultural sharing barriers based on organisational culture (e.g. Ives et al., 2000; Chow et al., 2000; McDermott and O'Dell, 2001), there are few empirical studies that investigated the impact of national cultures on knowledge-sharing practices (some conclusions are offered by Ford and Chan, 2003; Husted and Michailova, 2002; Michailova and Husted, 2003; Moeller and Svahn, 2004; and Straub et al., 2002). Further, Terpstra and David (1991) argued that the large diversity of cultures and especially spoken languages in the world economy could restrict business operations. Other authors focused further on the role of verbal language in knowledge transfers (e.g. Fai and Marschan-Piekkari, 2003; Feely and Harzing, 2003; Marschan et al., 1997). Obstacles related to national culture and language barriers have little relevance on a domestic scale but are certainly a factor that cannot be ignored by companies that rely on sharing practices between international subsidiaries, irrespective of their size.

Information or knowledge power, inequalities in status, and perceived lack of job security can also be potential barriers. In the old school of thinking where profitability was reflected by an organisation's output, knowledge hoarding rather than sharing was believed to benefit career advancement. Sharing of knowledge often was regarded as weakening an employee's corporate position, power or status within the company (e.g. Probst et al., 2000; Tiwana, 2002). Even today, there often is a fear amongst employees that sharing knowledge reduces job security because people are uncertain about the sharing objectives and intent of their senior management (Lelic, 2001). Also, lower and middle level employees often hoard their knowledge intentionally, expecting that their superiors may not promote them if they appeared to be more knowledgeable than them. Michailova and Husted (2003), for example, concluded that Russian managers are often resistant to, and dissatisfied about, working with people from hierarchically lower levels and even more so learning from them. The lack of contacts and interactions between knowledge sources and recipients, both of which often do not work side by side or in the same team, is another possible barrier to knowledge sharing. Further, some employees like to take ownership of their work to receive accreditation and/or recognition from colleagues and peers (Jarvenpaa and Staples, 2001; Murray, 2002; Rowley, 2002). As well, many employees only seem to share their knowledge voluntarily, if they perceive the process to be important to their work, if they feel encouraged to share and learn, or if they wish to support a certain colleague (Wheatley, 2000).

O'Dell and Grayson (1998) highlighted the lack of time as a common sharing barrier, concluding that even though managers are aware of the benefits of knowledge sharing, they often struggle to implement it due to time constraints. Time restrictions are also a reason why people may potentially hoard their knowledge rather than spend time to share knowledge

with others. Instead people naturally focus on those tasks that are more beneficial to them (Michailova and Husted, 2003). As such the time to share knowledge can be seen as a cost factor, either in transferring it from one person to the next or from a tacit into an explicit format (Grant, 1996). Consequently, it is important that work processes offer enough space to allow people to take time to generate and share knowledge and then also identify those who may be interested in sharing it. A deficiency of formal and informal spaces where employees can interact often creates barriers (Gold *et al.*, 2001). Several authors noted that formal and informal environments enhance employees' opportunities to share their knowledge and capture new knowledge but all too often are a rare commodity in companies, because there still is a perception amongst many managers that if people are not constantly ''busy doing something'', they are not be working productively (Probst *et al.*, 2000; Skyrme, 2000).

It also is impossible to discuss knowledge sharing without mentioning the word trust. Most people are unlikely to share their knowledge without a feeling of trust: trust that people do not misuse their knowledge, or trust that knowledge is accurate and credible due to the information source. A detailed assessment of the quality of external tacit or explicit knowledge is often impossible due to source and time constraints. It is mostly in informal networks that people trust each other, voluntarily share knowledge and insights with each other, and collaborate actively and willingly. Sharing activities can neither be supervised nor forced out of people (Stauffer, 1999), but the level of trust between a company, its sub-units, and its employees seems to have a direct influence on the communication flow and thus the amount of knowledge sharing within and between business functions or subsidiaries (De Long and Fahey, 2000; McAllister, 1995).

Another potential barrier is managers' tolerance towards employees making mistakes and learning from them. De Long and Fahey (2000, p. 122) concluded that capturing, evaluating, and learning lessons from past mistakes affects best practices in the future. However, rather than recognising and correcting mistakes, they all too often are covered up, blamed on others, explained away, punished or ignored. It seems that the national culture can be a limiting factor in learning from actions, for instance, whilst many Russians do not talk about problems and mistakes outside their workplace, some Asian and Western cultures believe that positive reflection on mistakes assists individual and organisational learning and development (Michailova and Husted, 2003; Nonaka and Takeuchi, 1995; Spender, 1996). As well, some employees seem to experience a level of uncertainty over the value of their possessed knowledge to others. That is, neither the knowledge source nor the recipient is too concerned with who requires knowledge or who possesses knowledge. Szulanski (noted in O'Dell and Grayson, 1998) argued that this ''ignorance on both ends'' is one of the biggest sharing barriers in most companies.

Another potential barrier is the dominance in sharing explicit knowledge over tacit knowledge. Several researchers suggested that companies need to emphasise core reasons for sharing, particularly tacit knowledge (e.g. know-how, experience, and intuition that require hands-on learning, observation, dialogue and interactive problem solving), and at the same time increase awareness that tacit knowledge cannot be transferred easily (e.g. Nonaka and Takeuchi, 1995; O'Dell and Grayson, 1998). Finally, there are some other possible impediments such as employee age and gender, and well as their level of education and experience that may affect effective knowledge sharing (Sveiby and Simons, 2002; Sveiby, 2003).

Potential organisational barriers

One of the key issues of sharing knowledge in an organisational context is related to the right corporate environment and conditions. The introductory discussion suggested that there are various ways of sharing individual and social or organisational knowledge effectively. Thus far, the literature outlined at least a dozen organisation-based barriers to knowledge sharing, illustrated below, which the following discussion outlines in brief:

1. integration of km strategy and sharing initiatives into the company's goals and strategic approach is missing or unclear;

2. lack of leadership and managerial direction in terms of clearly communicating the benefits and values of knowledge sharing practices;

3. shortage of formal and informal spaces to share, reflect and generate (new) knowledge;

4. lack of a transparent rewards and recognition systems that would motivate people to share more of their knowledge;

5. existing corporate culture does not provide sufficient support for sharing practices;

6. knowledge retention of highly skilled and experienced staff is not a high priority;

7. shortage of appropriate infrastructure supporting sharing practices;

8. deficiency of company resources that would provide adequate sharing opportunities;

9. external competitiveness within business units or functional areas and between subsidiaries can be high (e.g. not invented here syndrome);

10. communication and knowledge flows are restricted into certain directions (e.g. top-down);

11. physical work environment and layout of work areas restrict effective sharing practices;

12. internal competitiveness within business units, functional areas, and subsidiaries can be high;

13. hierarchical organisation structure inhibits or slows down most sharing practices; and

14. size of business units often is not small enough and unmanageable to enhance contact and facilitate ease of sharing.

Note again that barriers are discussed separately, although it is most likely that combinations of barriers are found in most firms.

The misallocation of human or process-oriented resources such as skilled personnel, finance, and information and communication technology, can impact on creating an effective knowledge-sharing environment. Providing an appropriate infrastructure and sufficient resources to facilitate sharing practices within and between functional areas is the basis of a successful KM program (Coleman, 1999; Schlegelmilch and Chini, 2003), but sharing practices are often doomed to fail before they begin due to the absence of basic infrastructure and sharing capabilities (Gold et al., 2001). Organisations also grow and evolve with time and as a result some processes and structures that were integrated successfully to serve a certain purpose in the past become obsolete due to their inefficiencies. Davenport (1997) emphasised the importance of financial commitment to KM practices, which in many cases can be expensive. Hence, adequate resources to support knowledge flows and collaboration need to be allocated. Further, the success or failure of a knowledge sharing strategy is dependent on its integration into the goals and strategy of the organisation (Doz and Schlegelmilch, 1999; Hansen et al., 1999). Master (1999, p. 21) emphasised the importance of this integration noting that ''regardless of how a knowledge-sharing program begins or what structure it takes, the most successful programs are those that are inextricably tied to the business and its strategic objectives''. It is the responsibility of senior management to communicate those goals and strategies to all employees in a transparent fashion to obtain support. However, all too often, this communication and managerial directions are either too vague or detailed with neither providing a clear picture and guideline to employees.

There are numerous studies on the benefits and pitfalls of diverse organisation structures, and it is not the objective of this discussion to suggest which particular organisational structure would best support knowledge sharing practices. Some studies, however, have argued that an open and flexible organisational structure supports the sharing of knowledge best (e.g. De Long and Fahey, 2000; Nonaka and Takeuchi, 1995; Probst et al., 2000) and that organisational structure was more important for effective knowledge sharing than organisational culture and IT (Zhou and Fink, 2003). In contrast, a strong focus on

hierarchies and internal regulations creates a business environment and workplace climate where employees are expected to rigorously perform according to organisational rules and procedures, thereby constraining effective knowledge sharing practices by, for instance, punishing mistakes and failures (Michailova and Husted, 2003).

In addition, Gold *et al.* (2001, p. 187) argued that a high degree of knowledge sharing in one functional area could many times enhance the sharing of knowledge between functions and beyond. Furthermore, Probst *et al.* (2000) stressed an organisation's need to constantly adapt to external changes, which in turn may result in changes of the organisational structure. Consider for instance changes through internal growth, mergers or acquisitions, all of which can pose a threat to effective sharing of individual and organisational knowledge. Irrespective of a company's formal structure, knowledge sharing seems less likely to occur in highly structured, multi-layered, and hierarchical organisations and the usually corresponding top-down communication flow. Whereas in relatively flat organisations, with communication flows that are not restricted in one direction (usually centring around small functional areas, business units or project teams), knowledge sharing is more likely to occur (Ives *et al.*, 2000; O'Dell and Grayson, 1998).

Another organisational barrier could be the lack of formal and informal mechanisms that typically provide continuous support to, and improvement of, diverse sharing activities. Whilst formal groups tend to be limited in size and focus on selected topics that a company considers important, informal groups are unlimited in size, concentrate on special topics of interest and can be established and steered by anyone. A combination of human networks often is the key to knowledge sharing, hence one of the first steps to knowledge sharing is to support and leverage knowledge in those networks that already exist and that already share knowledge about certain topics (McDermott, 1999; McDermott and O'Dell, 2001). In reality, a knowledge sharing strategy may not necessarily need any formal mechanisms to perform well, because many people collaborate, share information and teach one another naturally in informal situations, not because managers tell them or forces them to do so but because internal business environments have become more competitive and faster moving and people increasingly depend on each others knowledge to complete their jobs (e.g. marketing teams) or complete them faster (e.g. new product development teams).

Some studies also suggested that the size of organisations and functional areas influences the effectiveness of knowledge-sharing activities in and between business functions (e.g. Connelly and Kelloway, 2003; Sveiby and Simons, 2002). Recommended sizes for formal knowledge-sharing groups can range from firm to firm, for example at Asea Brown Boveri, an independent business unit averages 50 employees. No supported suggestions are made here because it seems impossible to provide a solution that will work for every company. In addition, Ellis (2001) suggested that, rather than have people contribute individually, managers may wish to assign people to small groups, get them to meet regularly, and give them collective responsibility for knowledge sharing.

Another core barrier emphasised in numerous studies is the culture of an organisation. Sveiby (1997) compared corporate culture to a company's ''spirit'' reflected in its goal orientation and dominated by, for instance, financial figures, innovations based on R&D, or a strong marketing culture with a strong customer focus. Often it is put simply as the way things are done in a company. Moreover, corporate culture determines the degree of interaction used to accomplish work, on a vertical and horizontal level. McDermott and O'Dell (2001) emphasised the importance of integrating knowledge sharing into existing values and the overall style of an organisation to reach a high interaction on both levels, rather than changing the corporate culture to suit knowledge sharing. De Long and Fahey (2000) discussed the influence of subcultures upon organisations, concluding that subcultures often lead members to define and value knowledge differently compared to other groups in the organisation, which may result in miscommunication and conflict between groups or teams.

Furthermore, a lack of managerial direction and leadership can limit knowledge sharing practices. Since knowledge sharing is effectively voluntary and conscious sharing is a new

> **"Knowledge sharing practices often seem to fail because companies attempt to adjust their organizational culture to fit their KM, instead of implementing them so that they fit their culture."**

behaviour to learn for some people that may require training and ongoing support, clear guidelines seem to be an obvious prerequisite for effective sharing on all organisational levels (Ives *et al.*, 2000). The challenge to managers is to create an environment in which people both want to share what they know and make use of what others know. People cannot always be expected to share their knowledge and insights simply because it is the right thing to do. Managers need to reassure employees that they should not sit on ideas or concepts for fear of their intellectual property being stolen. The solution is to develop that idea or concept in collaboration with other people (Gurteen, 1999). Hence, the emphasis of managers' expectations, long-term commitment and supportive role are fundamental to creating a knowledge-centric sharing culture (McDermott and O'Dell, 2001; O'Dell and Grayson, 1998).

Stemming from the competitive instincts of human nature, incentives are one method of optimising employee performance and corporate results. Whilst the ultimate driver of most companies is the prospect of making a profit, for employees it is the remuneration package, incentives and just recognition. For several years, there has been a debate about the effectiveness of both reward and recognition systems to motivate people to share knowledge. Several authors argued that the introduction of a reward system or changes in compensation incentive policies rarely have an effect on the corporate culture, nor does it enhance long-term knowledge sharing because the process needs to be natural (e.g. Ellis, 2001; Finerty, 1997; McDermott, 1999; O'Dell and Grayson, 1998). In addition, Michailova and Husted (2003) argued that the use of encouragement, stimulation or incentives is inadequate in hostile sharing environments, suggesting that any kind of rewards evaporate quickly and do not increase motivation for knowledge sharing. Hence, managers many have to force people to transform their organisation into knowledge-embracing cultures. No matter which reward and recognition system is chosen, if any, it seems to be one way to emphasise the significance of knowledge sharing.

Another way to recognise efforts and contributions to knowledge sharing is to introduce it as a criterion of performance evaluations. Some companies like BP, Ernst & Young, KPMG, and Hewlett Packard increasingly introduce formal performance reviews stipulating that employees are expected to capture valuable knowledge, archive it, share it, and use others' knowledge when they become aware of it themselves (Master, 1999). It even may be appropriate for peers and immediate supervisors of those actively involved in knowledge sharing to exert pressure to share (McDermott and O'Dell, 2001). Another barrier surfaces whenever individuals, groups, or subsidiaries within the same company have developed high degrees of external competitiveness led by conflicting goals and competing interests. The ''not-invented-here'' syndrome, for instance, restricts knowledge sharing of individuals or a group rejecting new ideas or innovations from outsiders resulting in a resistance or lack of cross-functional and inter-organisational sharing across subsidiaries (Katz and Allen, 1982; O'Dell and Grayson, 1998; Michailova and Husted, 2003).

Another barrier that is often overlooked relates to company floor layout or spatial arrangements of work areas that commonly do not favour knowledge-sharing activities. Traditionally, offices and even departments tend to be arranged along hierarchies or management seniority rather than focusing on who needs to work together regularly and identifying which person benefits the most from the exchange of knowledge (Probst *et al.*,

2000). In particular, for large companies with entities in distant geographical locations, there are real knowledge sharing obstacles because basic communication becomes more difficult and the creation of trust-based relationships is harder without face-to-face contact. The challenge is intensified further if cross-functional teams need to be formed and functional areas are located in different regions. As outlined later, IT systems such as groupware applications can enhance the convenience and effectiveness of sharing between spaces. Accenture, for instance, demonstrates how ad hoc virtual teams can be built globally on a need-to-share basis (Ives *et al.*, 2000).

Finally, an often-noted barrier for any knowledge-seeking and learning organisation is the retention of high quality staff. Given that when an employee is absent for longer periods of time or leaves an organisation, the individual and organisational knowledge they contain and impart leaves the organisation with them. Indeed, ''given that knowledge people use their minds, which means they own their means of production, when they leave, they take this means of production with them'' (Stauffer, 1999, p. 20). Also, in today's global and dynamic business world, more and more skilled workers are highly mobile and aware of their value in the marketplace. Hence, for organisations to improve their KM approach, knowledge retention strategies need to be higher on the priority list of knowledge or human resource professionals.

Potential technology barriers

Knowledge sharing is as much a people and organisational issue as it is a technology challenge. The term ''hybrid solutions'' refers to necessary interactions between people and technology to facilitate sharing practices (Davenport, 1996). Similarly, Ruddy (2000, p. 38) argued that improving knowledge sharing in a meaningful way requires a ''delicate marriage of technology with a keen sense of cultural or behavioral awareness''. Most companies find it challenging to create an environment in which people both want to share what they know and make use of what others know. Technology has the ability to offer instant access to large amounts of data and information and to enable long distance collaboration that facilitates a team approach, both in and between business functions and subsidiaries. For example, 79 percent of 150 *Fortune* 1,000 executives surveyed believed that self-managed teams would enhance a company's productivity (*TMA Journal*, 1999). Riege and O'Keeffe (2003) supported the significance of self-managed R&D teams to increase knowledge-sharing practices in international new product development processes.

There is little doubt that technology can act as a facilitator to encourage and support knowledge sharing processes by making knowledge sharing easier and more effective. The key issue, however, is to choose and implement a suitable technology that provides a close fit between people and organisations. Technology that works effectively in some organisations may fail in others. The list below is of potential technology barriers to knowledge sharing:

1. lack of integration of IT systems and processes impedes on the way people do things;

2. lack of technical support (internal or external) and immediate maintenance of integrated IT systems obstructs work routines and communication flows;

3. unrealistic expectations of employees as to what technology can do and cannot do;

4. lack of compatibility between diverse IT systems and processes ;

5. mismatch between individuals' need requirements and integrated IT systems and processes restricts sharing practices;

6. reluctance to use IT systems due to lack of familiarity and experience with them;

7. lack of training regarding employee familiarisation of new IT systems and processes; and

8. lack of communication and demonstration of all advantages of any new systems over existing ones.

Irrespective of the size of a firm, many formal knowledge-sharing practices depend on an IT infrastructure that includes some kind of shareware from one of the many providers such as Fuji-Xerox, IBM, or Microsoft. There are numerous infrastructures available, offering support in data acquisition, organisation, storage, retrieval, search, presentation, distribution and reproduction. Hence, it is not necessarily a case of merely building a KM and sharing strategy based on a comprehensive database or sophisticated e-mail system (Sarvary, 1999). Hendriks (1999) recommended the use of new systems, arguing that the use of new sharing technology may enhance people's motivation for knowledge sharing, as it often removes temporal, physical and social distance barriers, by improving the process and locating knowledge carriers and seekers.

Even if technology is rarely the ultimate solution to, or driver of, a knowledge sharing strategy, the integration of the right technology is important. There is little doubt that numerous technologies such as the Internet and Intranet, e-mail systems, or inclusive groupware software assist greatly in reducing formal communication barriers. Technology is multi-faceted; hence it is necessary for an organisation to integrate an infrastructure that supports various types of communication. There are several technological dimensions, such as business intelligence technologies to assess competitive and economic environments, collaboration and distributed learning technologies to overcome structural and geographical hurdles, knowledge discovery technologies to find new internal and external knowledge, knowledge mapping technologies to track sources of knowledge about employees suppliers, distributors, subcontractors and customers, and security technologies (Gold *et al.*, 2001).

Mismatches with employees' need requirements can also cause barriers. Software systems should support work-related processes of individuals, who decide which information to access and store, or forward to other people. Existing and new technologies are often quite capable of supporting effective knowledge sharing processes, however, unless there is a close fit between employees' need requirements, technology in itself can become a barrier. Not because of technical problems but because actual problem solutions do not match people's need requirements (O'Dell and Grayson, 1998). Another potential barrier to developing or maintaining the right IT infrastructure is the compatibility of technology, the integration of existing and new systems. This issue arises when existing hardware and software components suited for one purpose need to be used in conjunction with another new system or a different system in another location. It appears that the selection of a system that suits all functional areas within global organisations is almost impossible.

Technology now is a main driver in most companies and industry sectors that most day-to-day activities highly depend on. Therefore more complex technology is called upon to play a greater role in streamlining business processes whilst maximising outputs. Companies and employees need to take on the challenge of this greater complexity in the workplace, which in some cases may result in a reluctance to use modified or newly introduced systems. Whilst most people are not reluctant to use technology, the familiarity or unfamiliarity of IS/IT systems can be a potential sharing barrier. Some people also exaggerate or misstate the role of technology, which can cause confusion about what technology should do, can do, or cannot do. Furthermore, unrealistic expectations often tend to be placed on technology, which could result in a reluctance to use a system. Therefore, it seems necessary to involve users in designing or choosing new and modifying existing systems.

Finally, a trouble-free application and operation of technology to fulfil their daily work routines and communicate with others is another key issue for many operators. No hardware or software package seems to come without its problems, and crashing systems can be just as frustrating as they are time-consuming and expensive. Hence, an ongoing and immediate technical support function, internal or external to the organisation, not only needs to support timely solutions for any kind of problem but also needs to anticipate potential problems and pitfalls. There is an expanding market for outsourced software services and remote maintenance, which nevertheless needs to ensure that technical problems are dealt with quickly and resolved effectively, thereby not creating sharing barriers based on malfunctioning or not functioning technology.

Implications of knowledge-sharing practices

Companies wishing to make their KM strategy and integrated knowledge sharing strategy a success need to pay attention to a large number of potential knowledge-sharing barriers. When auditing a company's knowledge, managers' need to look further than the organisation's culture and its core values, its infrastructure, resources, and IS/IT systems. The attention given to knowledge sharing barriers needs to be much more far-reaching than this is the case in most organisations. Having identified over three-dozen knowledge sharing barriers, this review offers the first wide-ranging compilation of potential employee, organisational and technology-related bottlenecks. Managers need to realise, however, that a particular knowledge sharing strategy or specific managerial actions will not suit all companies and that there are differences to be expected between MNCs and SMEs, private, public sector, and not-for-profit organisations. As such, the implementation of knowledge sharing goals and strategies into an organisation's strategic planning and thinking will vary greatly.

The list of barriers presented herein offers a more comprehensive and structured starting point to senior managers when auditing their organisation's current knowledge base, knowledge requirements, and existing communication and knowledge flows. More empirical research is required to assess the impact of various barriers on diverse organisational levels, business functions, organisations (SMEs and MNCs alike), industry sectors, and cultures. Most importantly, there is little guidance for managers on how to overcome diverse barriers or the benchmarking of the effectiveness of diverse actions put in place to tackle sharing barriers. There have been a few empirical studies that attempted to provide some answers to these issues (e.g. Husted and Michailova, 2002; Michailova and Husted, 2003; Riege, 2004), however, much more empirical research need to be conducted to address these issues more comprehensively to better assist managers in overcoming knowledge sharing barriers to eventually increase the effectiveness of knowledge sharing practices, and thus companies' competitiveness.

For companies to achieve continuous growth in their business, knowledge-sharing practices need to become an integral part of the day-to-day conversation. This discussion demonstrated that the creation of a knowledge embracing sharing culture is by no means an effortless and trouble-free undertaking. All companies face a number of knowledge sharing barriers that need to be dealt with to share knowledge more effectively to enhance companies' overall market competitiveness and profitability. Ultimately, successful sharing goals and strategies must centre around a knowledge-sharing culture and depend on the synergy of three main factors:

1. motivation, encouragement, and stimulation of individual employees to purposefully capture, disseminate, transfer, and apply existing and newly generated useful knowledge, especially tacit knowledge;

2. flat and open organisational structures that facilitate transparent knowledge flows, processes and resources that provide a continuous learning organisational culture, clear communication of company goals and strategy linking knowledge sharing practices and benefits to them, and leaders who lead by example and provide clear directions and feedback processes; and

3. modern technology that purposefully integrates mechanisms and systems thereby providing a suitable sharing platform accessible to all those in need of knowledge from diverse internal and external sources.

"**Even today, there often is a fear among employees that sharing knowledge reduces job security.**"

In brief, knowledge sharing has no real value to individuals and organisations unless those people who are in need of useful knowledge receive it, accept it, and also (re-)apply it. One of the difficulties of theorising the practical results of most KM studies is that there is no general formula for a KM strategy that will work best for all companies, and there is no shortcut to introducing a to-do list of knowledge-sharing practices that will ensure success. All organisations need to take an equally hard look to ensure that the right knowledge is getting to the right people at the right time. The creation of a new or more effective sharing and learning environment does not necessarily mean an investment of large amounts of money. Formal and informal sharing networks already exist in most companies, and often it is a matter of building and expanding on those existing networks. Once up and running, effective knowledge-sharing practices have the potential to give a company a sustainable competitive advantage that is difficult to imitate for their competitors. The first step to success is the identification of a knowledge sharing barriers and the gap between the ideal and current state of sharing practices and values that are theoretically in place and actually practised.

References

Alavi, M. and Leidner, D.E. (2001), ''Review: Knowledge management and knowledge management systems: conceptual foundations and research issues'', *MIS Quarterly*, Vol. 25 No. 1, pp. 107-32.

Argote, L. and Ingram, P. (2000), ''Knowledge transfer: a basis for competitive advantage in firms'', *Organizational Behavior and Human Decision Processes*, Vol. 82 No. 1, pp. 150-69.

Argote, L., Beckman, S.L. and Epple, D. (1990), ''The persistence and transfer of learning in industrial settings'', *Management Science*, Vol. 36 No. 2, pp. 140-54.

Baron, R.A. and Markman, G.D. (2000), ''Beyond social capital: how social skills can enhance entrepreneurs'', *The Academy of Management Executive*, Vol. 14 No. 1, pp. 106-16.

Beijerse, R.P. (2000), ''Knowledge management in small and medium-sized companies: knowledge management for entrepreneurs'', *Journal of Knowledge Management*, Vol. 4 No. 2, pp. 162-77.

Buckman, R.H. (1998), ''Knowledge sharing at Buckman Labs'', *Journal of Business Strategy*, January/February, pp. 11-15.

Chase, R. (1998), ''The people factor'', *People Management*, Vol. 4 No. 2, p. 38.

Chase, R. (2004), personal communication, 13 September.

Chow, C., Deng, J.F. and Ho, J. (2000), ''The openness of knowledge sharing within organizations: a comparative study in the United States and the PRC'', *Journal of Management Accounting Research*, Vol. 12, pp. 65-95.

Coleman, D. (1999), ''Groupware: collaboration and knowledge sharing'', in Liebowitz, J. (Ed.), *Knowledge Management Handbook*, CRC Press, Boca Raton, FL, pp. 12-15.

Connelly, C.E. and Kelloway, E.K. (2003), ''Predictors of employees' perceptions of knowledge-sharing culture'', *Leadership & Organization Development Journal*, Vol. 24 Nos 5/6, pp. 294-305.

Cross, R. and Baird, L. (2000), ''Technology is not enough: improving performance by building organizational memory'', *Sloan Management Review*, Vol. 41 No. 3, pp. 69-78.

Davenport, T.H. (1996), ''Some principles of knowledge management'', *Strategy & Business*, Vol. 1 No. 2, pp. 34-40.

Davenport, T.H. (1997), ''Ten principles of knowledge management and four case studies'', *Knowledge and Process Management*, Vol. 4 No. 3, pp. 187-208.

Davenport, T.H. and Prusak, L. (1998), *Working Knowledge: How Organisations Manage what they Know*, HBS Press, Boston, MA.

De Long, D.W. and Fahey, L. (2000), ''Diagnosing cultural barriers to knowledge management'', *The Academy of Management Executive*, Vol. 14 No. 4, pp. 113-27.

Dixon, N.M. (2000), *Common Knowledge: How Companies Thrive by Sharing What They Know*, Harvard Business Press, Boston, MA.

Doz, Y. and Schlegelmilch, B.B. (1999), ''Global knowledge management as a strategic resource'', Annual Meeting of the Academy of International Business, Charleston, SC, 21-24 November.

Earl, M. (2001), ''Knowledge management strategies: toward a taxonomy'', *Journal of Management Information Systems*, Vol. 18 No. 1, pp. 215-33.

Ellis, K. (2001), ''Dare to share'', *Training*, February, pp. 74-80.

Epple, D., Argote, L. and Murphy, K. (1996), ''An empirical investigation of the micro structure of knowledge acquisition and transfer through learning by doing'', *Operations Research*, Vol. 44 No. 1, pp. 77-86.

Fai, F. and Marschan-Piekkari, R. (2003), ''Language issues in cross-border strategic alliances: an investigation of technological knowledge transfers'', Annual Meeting of the European International Business Academy, Copenhagen, 10-13 December.

Feely, A.J. and Harzing, A-W. (2003), ''Language management in multinational companies'', *Cross-cultural Management*, Vol. 10 No. 2, pp. 37-52.

Finerty, T. (1997), ''Knowledge – the global currency of the 21st century'', *Knowledge Management*, Vol. 1 No. 1, pp. 20-6.

Ford, D.P. and Chan, Y.E. (2003), ''Knowledge sharing in a multi-cultural setting: a case study'', *Knowledge Management Research & Practice*, Vol. 1 No. 1, pp. 11-27.

Gold, A.H., Malhotra, A. and Segars, A.H. (2001), ''Knowledge management: an organizational capabilities perspective'', *Journal of Management Information Systems*, Vol. 18 No. 1, pp. 185-214.

Grant, R.M. (1996), ''Toward a knowledge-based theory of the firm'', *Strategic Management Journal*, Vol. 17 No. 4, pp. 109-22.

Gurteen, D. (1999), ''Creating a knowledge-sharing culture'', *Knowledge Management*, Vol. 2 No. 5.

Hansen, M.T., Nohria, N. and Tierney, T. (1999), ''What's your strategy for managing knowledge'', *Harvard Business Review*, Vol. 77 No. 2, pp. 106-16.

Hendriks, P. (1999), ''Why share knowledge? The influence of ICT on the motivation for knowledge sharing'', *Knowledge and Process Management*, Vol. 6 No. 2, pp. 91-100.

Hickins, M. (1999), ''Xerox shares its knowledge'', *Management Review*, Vol. 88 No. 8, pp. 40-5.

Husted, K. and Michailova, S. (2002), ''Knowledge sharing in Russian companies with Western participation'', *Management International*, Vol. 6 No. 2, pp. 17-28.

Ingram, P. and Baum, J.A.C. (1997), ''Opportunity and constraint: organizations learning from the operating and competitive experience of industries'', *Strategic Management Journal*, Vol. 18, special Summer issue, pp. 75-98.

Ives, W., Torrey, B. and Gordon, C. (2000), ''Knowledge sharing is a human behavior'', in Morey, D. *et al.* (Eds), *Knowledge Management*, MIT Press, Cambridge, MA.

Jarvenpaa, S.L. and Staples, D.S. (2001), ''Exploring perceptions of organisational ownership of information and expertise'', *Journal of Management Information Systems*, Vol. 18 No. 1, pp. 151-84.

Katz, R. and Allen, T.J. (1982), ''Investigating the not invented here (NIH) syndrome: a look at the performance, tenure, and communication patterns of 50 R&D project groups'', *R&D Management*, Vol. 12 No. 1, pp. 7-19.

Kogut, B. and Zander, U. (1996), ''What do firms do? Coordination, identity and learning'', *Organizational Science*, Vol. 7, pp. 502-18.

Lelic, S. (2001), ''Creating a knowledge-sharing culture'', *Knowledge Management*, Vol. 4 No. 5, pp. 6-9.

Lesser, E., Mundel, D. and Wiecha, C. (2000), ''Managing customer knowledge'', *Journal of Business Strategy*, Vol. 21 No. 6, pp. 34-7.

Levy, M., Loebbecke, C. and Powell, P. (2003), ''SMEs, co-opetition and knowledge sharing: the role of information systems'', *European Journal of Information Systems*, Vol. 12 No. 1, pp. 3-17.

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. 231-41.

McAllister, D.J. (1995), ''Affect- and cognition-based trust as foundations for interpersonal cooperation in organisations'', *Academy of Management Journal*, Vol. 38 No. 1, pp. 24-59.

McDermott, R. (1999), ''Why information technology inspired but cannot deliver knowledge management'', *California Management Review*, Vol. 41 No. 4, pp. 103-17.

McDermott, R. and O'Dell, C. (2001), ''Overcoming culture barriers to sharing knowledge'', *Journal of Knowledge Management*, Vol. 5 No. 1, pp. 76-85.

Marschan, R., Welch, D.E. and Welch, L.S. (1997), ''Language the forgotten factor in multinational management'', *European Management Journal*, Vol. 15 No. 5, pp. 591-8.

Master, M. (1999), ''Making it work'', *Across the Board*, Vol. 36 No. 8, pp. 21-4.

Meyer, P. (2002), ''Improvisation power'', *Executive Excellence*, Vol. 19 No. 12, pp. 17-18.

Michailova, S. and Husted, K. (2003), ''Knowledge-sharing hostility in Russian firms'', *California Management Review*, Vol. 45 No. 3, pp. 59-77.

Moeller, K. and Svahn, S. (2004), ''Crossing East-West boundaries: knowledge sharing in intellectual business networks'', *Industrial Marketing Management*, Vol. 33 No. 3, pp. 219-28.

Murray, P. (2002), ''Knowledge management as a sustained competitive advantage'', *Ivey Business Journal*, Vol. 66 No. 4, pp. 71-7.

Nahapiet, J. and Ghoshal, S. (1998), ''Social capital, intellectual capital, and the organizational advantage'', *Academy of Management Review*, Vol. 23 No. 2, pp. 242-66.

Nonaka, I. (1994), ''A dynamic theory of organizational knowledge creation'', *Organizational Science*, Vol. 5 No. 1, pp. 14-37.

Nonaka, I. and Takeuchi, H. (1995), *The Knowledge-Creating Company*, Oxford University Press, Oxford.

O'Dell, C. and Grayson, C.J. (1998), ''If only we knew what we know: identification and transfer of internal best practices'', *California Management Review*, Vol. 40 No. 3, pp. 154-74.

Probst, G., Raub, S. and Rombhardt, K. (2000), *Managing Knowledge*, John Wiley & Sons, Chichester.

Riege, A. (2004), ''How to overcome diverse knowledge-sharing barriers in MNCs'', paper presented at a Griffith Asia-Pacific Research Institute Seminar, Griffith University, Brisbane.

Riege, A. and O'Keeffe, M. (2003), ''Influences of human resources on knowledge management and its contributions on faster speed to market time'', Annual Meeting of the European International Business Academy, Copenhagen, 10-13 December.

Rowley, J.E. (2002), ''Reflections of customer knowledge management in e-business'', *Qualitative Market Research*, Vol. 5 No. 4, pp. 268-81.

Ruddy, T. (2000), ''Taking knowledge from heads and putting it into hands'', *Knowledge and Process Management*, Vol. 7 No. 1, pp. 37-40.

Sarvary, M. (1999), ''Knowledge management and competition in the consulting industry'', *California Management Review*, Vol. 41 No. 2, pp. 95-107.

Schlegelmilch, B.B. and Chini, T.C. (2003), ''Knowledge transfer between marketing functions in multinational companies: a conceptual model'', *International Business Review*, Vol. 12 No. 2, pp. 215-32.

Schotte, T. (2003), ''Customer knowledge management: how does my customer look and feel?'', in Beerli, A.J. *et al.* (Eds), *Knowledge Management and Networked Environments*, American Management Association, New York, NY, pp. 17-38.

Senge, P. (1990), *The Fifth Discipline: The Art and Practice of the Learning Organization*, Currency/Doubleday, New York, NY.

Sivula, P., van den Bosch, F.A.J. and Elfring, T. (2001), ''Competence-based competition: gaining knowledge from client relationships'', in Sanchez, R. (Ed.), *Knowledge Management and Organisational Competence*, Oxford University Press, Oxford.

Skyrme, D.J. (2000), ''Developing a knowledge strategy: from management to leadership'', in Morey, D. *et al.* (Eds), *Knowledge Management*, MIT Press, Cambridge, MA.

Spender, J.-C. (1996), ''Making knowledge the basis of a dynamic theory of the firm'', *Strategic Management Journal*, Vol. 17, special Winter issue, pp. 45-62.

Stauffer, D. (1999), ''Why people hoard knowledge'', *Across the Board*, Vol. 36 No. 8, pp. 16-21.

Straub, D., Loch, K., Evaristo, R., Karahanna, E. and Strite, M. (2002), ''Toward a theory-based measurement of culture'', *Journal of Global Information Management*, Vol. 10 No. 1, pp. 13-23.

Sveiby, K.-E. (1997), *The New Organisational Wealth*, Berrett-Koehler Publishers, San Francisco, CA.

Sveiby, K.-E. (2002), ''What is knowledge management?'', available at: www.sveiby.com/au/Knowledge Management.html (accessed 27 November).

Sveiby, K.-E. (2003), personal conversation, Griffith Business School, Brisbane, 8 October.

Sveiby, K.-E. and Simons, R. (2002), ''Collaborative climate and effectiveness of knowledge work'', *Journal of Knowledge Management*, Vol. 6 No. 5, pp. 420-33.

Teece, D.J. (1998), ''Capturing value from knowledge assets'', *California Management Review*, Vol. 40 No. 3, pp. 55-79.

Terpstra, V. and David, K. (1991), *The Cultural Environment of International Business*, 3rd ed., South-Western Publishing, Cincinnati, OH.

Tiwana, A. (2002), *The Knowledge Management Toolkit*, Prentice-Hall, Upper Saddle River, NJ.

TMA Journal (1999), ''Interpersonal skills are the key in office of the future'', *TMA Journal*, Vol. 19 No. 4, p. 53.

Tschannen-Moran, M. (2001), ''Collaboration and the need for trust'', *Journal of Educational Administration*, Vol. 39 No. 4, pp. 308-31.

Urch-Druskat, V. and Wolff, S.B. (2001), ''Building the emotional intelligence of groups'', *Harvard Business Review*, Vol. 79 No. 3, pp. 80-9.

von Krogh, G. and Roos, J. (1996), *Managing Knowledge: Perspectives on Cooperation and Competition*, Sage, London.

Wheatley, M. (2000), ''Can knowledge management succeed where other efforts have failed?'', in Morey, D. *et al.* (Eds), *Knowledge Management*, MIT Press, Cambridge, MA.

Zhou, A.Z. and Fink, D. (2003), ''Knowledge management and intellectual capital: an empirical examination of current practice in Australia'', *Knowledge Management Research & Practice*, Vol. 1 No. 2, pp. 86-95.