

Identifying the Barriers to Knowledge Sharing in Knowledge Intensive
Organizations

by

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ABSTRACT

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This study investigated possible causes of resistance or support by knowledge workers to the sharing of knowledge within a project team and organization. The problem addressed was that existing knowledge was not being effectively disseminated throughout the organization, resulting in lost productivity and opportunity as a result of failure to exploit available knowledge. Leaders of businesses can use the findings of this study to develop new processes and procedures for overcoming resistance to knowledge sharing, which might translate to increased innovation, productivity and competitive advantage. This qualitative study with semi-structured, taped and transcribed interviews was conducted to explore barriers within the subject organizations due to lack of effective corporate knowledge sharing. Data was encoded within NVivo software, which was developed for the purposes of qualitative analysis.

This study demonstrated that there were a myriad of barriers to knowledge sharing. These included organizational as well as cultural barriers. In doing so it confirmed prior research, as discussed in Chapter two of this paper. The study also uncovered a relationship between willingness to share knowledge and

effective knowledge sharing, distributing the discovered barriers between each of these factors.

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INTRODUCTION

Knowledge was defined by Nonaka (1994) as a justified belief that increases an entity's capacity for effective action. Davenport and Prusak (2003) defined knowledge management as the processes which support knowledge collection, sharing and dissemination. The expectations for knowledge management were that it would be able to improve: growth and innovation, productivity and efficiency reflected in cost savings, customer relationships, decision making, innovation, corporate agility, rapid development of new product lines, employee learning, satisfaction and retention, and management decision making (Pollard, 2005; Alavi, Kayworth, & Leidner, 2005/2006).

The sources of competitive advantage have migrated from being based on economies of scale to being based on economies of expertise derived by leveraging knowledge distributed in the organization's network through intra-organizational and inter-organizational relationships. Subramani and Venkatraman's (2003) study found that, while physical asset specificity was a determinant of governance in the industrial age, domain knowledge specificity had the potential to be a key determinant in the knowledge-driven economy.

Many senior managers emphasized knowledge management as an important means of innovation (Parikh, 2001; Paraponaris, 2003; Suh, Sohn, & Kwak, 2004). In organizations it is essential to address effective knowledge flow among employees, as well as knowledge collaboration across organizational

boundaries, while limiting knowledge sharing barriers (Lee, & Ahn, 2005; King, Marks, & McCoy, 2002; Parikh, 2001; Paraponaris, 2003).

The focus of this document is to present research that identifies barriers that prevent successful knowledge sharing within for-profit organizations, as well as to make recommendations for overcoming these barriers.

Statement of the Problem

The problem being addressed throughout the study is that existing knowledge is not being effectively disseminated throughout organizations. Weiss, Capozzi and Prusak (2004) cited an International Data Group IDC report, which estimated that an organization with 1,000 workers might easily incur a cost of more than \$6 million per year in lost productivity when employees fail to find existing knowledge and recreate knowledge that was available but could not be located. On average, six percent of revenue, as a percentage of budget, is lost from failure to exploit available knowledge (So, & Bolloju, 2005).

Leaders of businesses can use these findings to develop new processes and procedures for overcoming resistance to knowledge sharing, which might translate to increased innovation, productivity and competitive advantage.

Background and Significance of the Problem

The recognition that knowledge is a key strategic asset for organizations of all sizes was discussed throughout the literature (Oltra, 2005). It followed then that knowledge management had also been widely discussed (i.e., the advantages and disadvantages, successes and failures). Carneiro (2000)

asserted that, with a few exceptions, there were few viable strategic knowledge systems developed within organizations.

There are a variety of reasons for knowledge management implementation problems. Oltra (2005) found that the emphasis was on cultural, organizational and human aspects as potential levers or inhibitors of knowledge management. However, Oltra also noted that several academics commented on the relatively slight consideration of cultural and people issues in the knowledge management literature. A key reason for lack of knowledge management viability was the unwillingness of employees to share their knowledge effectively with their peers (Lee, & Ahn, 2005). The results of the study identified various barriers to knowledge sharing. The goal of this paper is to provide sufficient insights and techniques to help managers overcome these hurdles.

Research Questions

The major research questions guiding this research were:

Question 1: What are the cultural reasons that employees resist the sharing of knowledge?

Question 2: What are the organizational reasons that employees resist the sharing of knowledge?

Question 3: What are key reasons employees list for not wanting to share their expertise?

The expected outcomes of this study included:

1. Employee ethnicity has an impact on willingness to share knowledge. Research revealed that there was a definite

relationship (Ardichvili, Maurer, Li, Wentling & Stuedemann, 2006).

Since the United States is widely diverse, it was assumed that there would be a relationship between ethnicity and knowledge sharing.

2. Employee age had an impact on willingness to share knowledge. Several studies offered age as one of many variables (Ojha, 2005; Riege, 2005). For the most part, researchers showed that the more *age compatible* a team was, the more likely that team would engage in effective knowledge sharing. Age differences were likely to stifle knowledge sharing. The question is how this relationship is affected by industry and the job position of the employee.
3. Employee educational level and employee ethics have an impact on willingness to share knowledge. Riege (2005) demonstrated a causal relationship between educational level and likelihood to share knowledge. Ojha (2005) found that differences in levels of education were likely to reduce the sharing of common experiences. Hence, a person with an educational background different from the rest of a team was less likely to participate in knowledge sharing. Individual sharing intentions increased when employees believed that sharing knowledge with colleagues was a basic part of workplace ethics (Wang, 2004).
4. Corporate culture has an impact on willingness to share knowledge. There are a wide variety of factors possible for this relationship: trust, management commitment, involvement, perception, rewards,

leadership, resources provided, job title, and tenure, among others.

Lin and Lee (2006) discussed organizational climate within the context of how knowledge sharing fits into the business process, and the degree to which knowledge sharing was perceived to benefit the conduct of business and management's intention to encourage knowledge sharing. Connelly and Kelloway (2003) discussed management commitment to knowledge sharing as well as the individual perception that a positive social interaction culture would more likely perceive a positive knowledge sharing culture.

Bock and Kim (2002) discussed the idea that, if employees believed they could make contributions to the organization's performance, they would develop a more positive attitude toward knowledge sharing. Willem and Scarbrough (2006) discussed the potentially negative effect of power and organizational politics on the role that social capital played in knowledge sharing.

5. IT support has an impact on willingness to share knowledge.

Flanagin (2002) discussed the tendency to reduce knowledge complexity artificially with the use of technologies for knowledge management. Lin and Lee (2006) found a positive causal relationship between the use of technology and knowledge sharing. Connelly and Kelloway (2003) mentioned the perception of a positive knowledge sharing culture due to the presence of technology.

Brief Review of Related Literature

A wide variety of knowledge sharing barriers was addressed in the literature (Riege, 2005; Sun & Scott, 2005). Barriers included: lack of time, fear of lost job security, lack of social network, education, fear of loss of ownership, among others. Barriers can generally be grouped into two major categories: cultural barriers and organizational barriers.

Hutchings and Michailova (2004) suggested that knowledge sharing was profoundly influenced by the cultural values of individual employees. Therefore, determining the similarities and differences of knowledge sharing strategies across various ethnic and national groups was critical (Ardichvili et al., 2006). This is particularly true in American organizations, where diversity is commonplace and embraced.

However, with diversity come significant problems. Ojha (2005) found that knowledge sharing was impacted by the mother tongue of the employee. People from different parts of the country, or with different cultural backgrounds, had different desires and abilities to participate in team activities and knowledge sharing. Putnam (2007) noted that, in ethnically diverse neighborhoods, residents of all races tended to *hunker down*. Trust, altruism and community cooperation were rare. While Putnam's study was about neighborhoods, not organizations, the diversity issues were similar.

There are a variety of predictors of the perceptions of employees about knowledge sharing. It was found that gender and age were viable predictors (Connelly, & Kelloway, 2003). Differences in types of education are also likely to

reduce the sharing of common experiences. Hence, a person with an educational background different from the rest of a team was less likely to participate in knowledge sharing (Ojha, 2005).

Personal ethics also plays a role in knowledge sharing. Since knowledge is controlled by individuals, knowledge sharing can be assumed to be an ethical behavior. Wang (2004) analyzed the relationship between ethics and knowledge sharing intentions and found a significant positive relationship. Wang also concluded that workers who felt threatened by competition from colleagues might reduce their knowledge sharing, essentially hoarding knowledge. Conversely, employees might develop guilt if they refused to share their knowledge and disobeyed the ethical codes.

Although knowledge sharing practices were a key component of most corporate-sponsored knowledge management programs (Alavi, Kayworth & Leidner, 2005/2006), it was not so easily accomplished. Employees might be unwilling to share knowledge or might even hoard knowledge (Currie, & Kerrin, 2004; Wang, 2004). Often, organizational culture itself acted as a barrier (McDermott & O'Dell, 2001). Sveiby and Simons (2002) suggested that the size of an organization influenced the effectiveness of knowledge sharing activities. They found that the collaborative climate of an organization improved with increasing organizational size, at least up to mid-size. Their results had interesting ramifications for larger organizations interested in stimulating a collaborative, knowledge sharing culture.

The use of corporate-sponsored technology also plays a role in stimulating a positive knowledge sharing culture. A wide variety of tools is available, such as electronic whiteboards and corporate intranets. However, the literature was mixed on the usefulness of these tools. Flanagin (2002) pointed to the artificial reduction of knowledge complexity in order to use knowledge management-based information technologies. Lin and Lee (2006) concluded that IT support did not significantly affect knowledge sharing, although they stressed that this ran counter to previous studies. Dixon (2000) noted that the selection of the appropriate knowledge sharing process and technology within an organization depended on the type of knowledge being shared, the frequency of the sharing process and who was receiving the knowledge.

As a result of the literature search, the researcher uncovered some solutions to the problems of knowledge sharing barriers. An examination of two hotel companies determined that there were four main ways to increase knowledge sharing: motivation, feedback, communication and socializing (*A Problem Shared*, 2005). Cross, Parker, Prusak, & Borgatti (2001) proposed mapping knowledge flows across the various boundaries in an organization to yield critical insights into where management should target efforts to promote collaboration. Widen-Wulff and Suomi (2007) developed a framework for creating an organization-wide knowledge sharing information culture, which included sources, organizational learning and business process re-engineering.

Definition of Key Terms

Human capital. That which was in the minds of individuals: knowledge, competencies, experience, know-how, etc. (Pearce, & Robinson, 2005).

Intellectual capital. Knowledge that is of value to an organization, made up of human capital, structural capital, and customer capital (Adelman, & O'Neill, 2007).

Knowledge. Knowledge is information transformed into capability for effective action. It is information interpreted through a process of using judgment and values (Slack, Chambers, & Johnston, 2004).

Knowledge asset. A discrete knowledge package. May be a best practice, lesson learned, process, procedure, guide, tip, patent or any other form of explicit, reusable knowledge. An element of intellectual capital—what an organization knows or needs to know to enable its business processes to generate profits. More generally, people and technology might be described as knowledge assets (Hicks, Dattero, & Galup, 2006).

Knowledge base. An organized structure of information which facilitates the storage of intelligence in order to be retrieved in support of a knowledge management process (Hicks, Dattero & Galup, 2006).

Knowledge management. The systematic process of finding, selecting, organizing, distilling and presenting information in a way that improved an employee's comprehension in a specific area of interest (Slack, Chambers, & Johnston, 2004).

Knowledge workers. Specialists, usually professionally trained and certified, who relied on information technology to design new products or create new businesses processes (Griffin, 2008).

Highlights and Limitations of Methodology

The primary design methodology for the data collection and analysis for the research was qualitative. Open-ended interview questions, as they permit subjects to freely articulate their beliefs and insights, were found to be the most appropriate device to understand why knowledge workers shared or did not share knowledge. Qualitative methods allowed for more flexibility and serendipity in identifying factors and practical strategies than the formal, structured quantitative approach and allowed for theory development (Hopkins, 2001). Descriptive statistics were also collected to assist in categorizing and summarizing results.

Two sets of interviews were conducted. A case study of a small high-technology (high-tech) firm, based in Cambridge, Massachusetts, served as the primary focus. Purposeful sampling is the dominant strategy in qualitative research. Purposeful sampling consisted of information-rich cases, which could be studied in depth (Patton, 1990). Therefore, there is no minimum number of interviews required for qualitative research. However, since the sample size of the case study firm was expected to be small, and the results narrowly focused on one particular company, a secondary sample was added, including random members of the New York Software Industry Association and other industry associations.

The high-tech industry was selected because of its familiarity to the researcher. In addition, the high-tech industry had a large concentration of highly educated knowledge workers, which was the focus of the research topic. The majority of interview participants were senior-level people with advanced degrees, although some mid-level and lower-level knowledge workers were also interviewed.

Summary and Conclusions

There are benefits when knowledge flows freely throughout an organization. However, a variety of cultural, social and technological barriers often limited an effective flow of knowledge among workers. Ojha (2005) determined that age was a variable affecting knowledge sharing. In a team, persons of similar age are likely to band together and interact more freely within their subgroup. The author also asserted that, as a result, individuals who perceived themselves in a minority were less likely to participate in team level knowledge sharing processes. Sun and Scott (2005) concluded that there were at least 14 sources from which barriers to knowledge sharing arose. These included the following categories: organizational relationships, organizational climate, organizational structuring and organizational imperative. Finally, Lin and Lee (2006) identified a positive relationship between the use of technology and knowledge sharing.

The research study confirmed and added to the research findings uncovered during the literature review process. Methods for overcoming these barriers were uncovered during the interview process and accompanying

research

There were several limitations to this study. The sample size was small and limited to the high technology sector of industry. A broader and more diverse sample might result in different findings. While the qualitative study was able to tap into a rich vein of participant commentary, an accompanying quantitative study would be able to provide more concrete results.

REVIEW OF RELATED LITERATURE

Knowledge and knowledge workers are considered to be the intellectual capital of a company and a key factor in its sustainable development. Carneiro (2000) asserted that managers must be able to embed more knowledge-value in their decisions in order to produce a new, improved or even better alternative than their competitors. Therefore, knowledge management has become a strategic tool in most organizations.

Siemens was an example of a company that fully adopted knowledge management as a strategic tool. At Siemens, knowledge was regarded as the means for effective action. At companies like Siemens, knowledge management systems were considered socio-technical systems (Halawi, McCarthy, & Aronson, 2006). These systems encompass competence building, emphasis on collaboration, ability to support diverse technology infrastructures, use of partnerships and knowledge codification for all documents, processes and systems.

Siemens was widely known as a company built on technology and was an early adopter of knowledge management. The company's goal was to share existing knowledge in a better way and to create new knowledge more quickly. Siemens' holistic approach clearly demonstrated the importance of people, collaboration, culture, leadership and support. Absence of these critical success factors would reduce the likelihood of knowledge sharing success.

Siemens was considered a knowledge management success story. However, Green (2006) asked whether most businesses in the knowledge era

had truly institutionalized the leveraging of knowledge adequately to manage and control the intangible assets that contributed 70% of the value to a typical business.

Knowledge Management and Knowledge sharing

Knowledge can be defined as a fluid mix of framed experiences, values, contextual information and expert insight that provided a framework for evaluation and incorporating new experiences and information (Davenport, & Prusak, 2000). In an organization, it is embedded in the minds of its employees, as well as in organizational routines, processes, practices and norms, sometimes referred to as socially constructed templates (Guzman, & Wilson, 2005).

The realization of organizational knowledge depends on people who interpret, organize, plan, develop and execute those socially constructed templates. Most importantly, organizational knowledge depends on specific situations and does not always depend on absolute truths or quantitative facts. Thus, one can conclude that organizational knowledge has some soft features, which are related to the subtle, implicit, embedded, sometimes invisible knowledge, presumptions, values and ways of thinking that permeate an employee's behavior, decisions and his or her actions. Ultimately, organizational knowledge is complex and ambiguous.

Effective management of these ambiguous layers of knowledge in organizations was a primary factor for success in the knowledge economy, where harvesting knowledge was a key to remaining competitive and innovative (Abdullah, Kimble, Benest, & Paige, 2006). Studies revealed that many large

organizations engaged in knowledge management to improve profits, to be competitively innovative, to respond to a perceived *brain drain* or simply to survive (Lau, Wong, Hui, & Pun 2003; Davenport, & Prusak, 2000). Keskin (2005) stated that “firms have become much more interested in stimulating knowledge, which is considered as the greatest asset for their decision making and strategy formulation” (p. 169). Knowledge, then, is considered by most firms as the key to competitive advantage.

Knowledge is a well-organized combination of information, assimilated within a set of rules, procedures and operations learned through experience and practice (Keskin, 2005). The literature classified knowledge into two main types: tacit and explicit. Explicit knowledge is knowledge that can be seen, shared and easily communicated to others. Most explicit knowledge is in the form of raw data, such as documents that contain the work experiences of staff, descriptions of events, interpretations of data, beliefs, guesses, hunches, ideas, opinions, judgment and proposed actions (Choo, 2000). Tacit knowledge is more difficult to share because it is embedded in a person’s memory.

DeLong and Fahey (2000) described tacit knowledge as what we know but cannot explain. They explained that tacit knowledge is: (a) embodied in mental processes; (b) originated from practices and experiences; (c) expressed through ability applications; and (d) transferred in the form of learning by doing and watching. Knowing how to solve a problem using tacit knowledge was, therefore, a matter of personal interpretation, ability and skill (Abdullah et al., 2006). Ardichvili et al. (2006) argued that sharing and internalizing tacit

knowledge required active interaction among individuals, using knowledge management techniques, such as storytelling. Tacit knowledge sharing is affected by distributive justice, procedural justice and cooperativeness, indirectly via organizational commitment. It was also affected by instrumental ties and expressive ties via trust in co-workers (Lin, 2006).

Knowledge Management is a broad discipline, one that can be subdivided into several themes: knowledge management procedures, knowledge management techniques, knowledge management technologies and knowledge sharing issues. It was this last area on which this study was focused.

Knowledge sharing can be compared to organizational citizenship behavior or pro-social organizational behavior. These are positive social acts carried out to produce and maintain the well-being and integrity of others (Connelly, & Kelloway, 2003). Pro-social behaviors include acts such as helping, sharing, donating, cooperating and volunteering. Knowledge sharing is not necessarily synonymous with pro-social behavior. Indeed, knowledge sharing may involve significant effort or sacrifice. Yet, one of the critical success factors for knowledge creation, transfer and sharing was that employees willingly contribute their knowledge or expertise to the company (DeTienne, Dyer, Hoopes, & Harris, 2004).

In general terms, research on knowledge sharing barriers tends to fall into several basic areas : (a) cultural background (e.g. age, ethnicity, educational level) affects knowledge sharing (Ardichvili, Maurer, Li, Wentling & Stuedemann, 2006; Ojha, 2005; Riege, 2005); (b) organizational culture affects knowledge

sharing (Lin & Lee, 2006; Connelly & Kelloway, 2003; Bock & Kim, 2002); and (c) IT support affects willingness to share knowledge (Flanagin, 2002; Lin & Lee, 2006; Connelly & Kelloway, 2003).

Riege (2005) considered 36 knowledge sharing barriers based on an extensive literature review. He categorized these barriers into three dimensions: a) individual, b) organizational and c) technological.

Reige's (2005) findings were reinforced by the extensive survey by Sveiby and Simons (2002) of 1,180 staff members in the Australian Transport Union (ATU). They determined that the ATU culture was not conducive to knowledge sharing for a variety of reasons, including: a) no support systems, b) lack of training, c) job security, d) employee competition, e) organizational culture and f) lack of recognition. Many of the barriers Reige described were exhibited in the results of the ATU survey with organizational culture scoring lowest.

There is also a relationship between group compatibility and knowledge sharing. The more compatible a person was with the group in terms of age, gender and other factors, the more likely he or she was to practice knowledge sharing (Ojha, 2005). Conversely, individuals who perceive themselves in a minority (e.g., gender, marital status, education, etc.) are less likely to participate in knowledge sharing. Of particular note is the finding that women participants required a more positive social interaction culture before they could perceive a knowledge sharing culture as positive (Connelly, & Kelloway, 2003). Sun and Scott (2005) confirmed Ojha's findings. The list of compatibility variables included more than just the obvious traits of age, gender, ethnicity and educational level.

Personality differences, communication skills and individual values also factored into the equation (Ojha, 2005)

Interestingly, Ojha (2005) also found a relationship between organizational tenure and knowledge sharing. A long organizational tenure had a negative effect on knowledge sharing. One employee commented in a study by MacKinlay (2002) that he felt he was being asked to give himself away when asked to share his knowledge. There are many reasons for this type of fear. For example, long term employees might feel threatened by those they consider to be possible replacements for their positions or they might feel a level of discomfort in dealing with newer, and often younger, arrivals.

Several studies employed age as one of many variables (Ojha, 2005; Riege, 2005). For the most part, researchers noted that the more *age compatible* a team was, the more likely the team would engage in effective knowledge sharing. However, there will often be teams where age diversity is present. Older workers are sometimes technology resistant or, as discussed above, may feel threatened by younger employees they consider rivals. Slagter (2007) recommended a more proactive management style toward older employees to facilitate successful use of knowledge management.

Ardichvili et al. (2006) discussed cross-cultural differences in knowledge sharing patterns based on three criteria: individualism versus collectivism, in-group versus out-group orientation, and fear of losing face. Individualism is the tendency of people to place their personal goals ahead of the goals of the organization, while individuals from collectivist cultures tend to give priority to the

goals of the larger collective, group or company to which they belong.

Essentially, members of individualist cultures, like the United States, view themselves as independent of others, whereas members of collectivist cultures (e.g., China, Brazil and Russia) see themselves as interdependent with other members of their group.

Collectivists tend to distinguish sharply between in-group and out-group members. Chow, Deng and Ho (2000) compared factors influencing knowledge sharing behaviors between American and Chinese managers and found that Chinese nationals were much more reluctant to share with an out-group member than employees in the United States were. Hwang, Francesco, Kessler (2003) found that individualists were more concerned with gaining face (i.e. impressing colleagues) than collectivists. They found that individuals who want to gain face were more likely to use formal communications channels to show their knowledge and ability, while those who feared losing face preferred informal communication channels. This has ramifications for use of formal knowledge sharing systems (e.g., intranets, blackboards, etc.) because collectivists might resist using these technologies.

The possible cultural barriers to successful knowledge sharing are many, with factors, such as age, gender, organizational tenure, culture and ethnicity being key factors.

Organizational Culture's Effect on Knowledge sharing

Organizational culture is the shared values, beliefs and practices of people in an organization. Beyond the mission statement and stated values of the

organization lies a deeper level of culture. This was embedded in the way people acted, what they expected of each other and how they made sense of each other's actions (McDermott, & O'Dell, 2001). Culture is rooted in core values and assumptions and is taken for granted, and is therefore often hard to articulate. Essentially, some aspects of organizational culture are confusing or even invisible to organization members.

In some organizations, there is a low awareness or realization of the value and benefit of possessed knowledge to others. Hierarchical, position-based status and formal power issues might also act as inhibitors. In other organizations, there might be a general lack of time and resources to share knowledge (Riege, 2005). Sun and Scott (2005) categorized organizational culture-related barriers as follows: organizational relationships, organizational climate, organizational structuring and organizational imperative.

Organizational culture influences knowledge-related behaviors in four ways: a) culture, particularly sub-cultures, heavily influences what is perceived as useful, important or valid knowledge in an organization; b) culture mediates the relationship between levels of knowledge, i.e., it dictates what belongs to the organization and what knowledge remains in control of the individual employee, determining who is expected to control specific knowledge as well as who must share it and who can hoard it; c) culture creates a subtext for social interaction in that it represents the rules and practices that determine the environment within which people communicate, i.e., the cultural ground rules; and d) culture shapes the creation and adoption of new knowledge (DeLong, & Fahey, 2004). Thus,

organizational culture (and its related sub-cultures) affects the level of collaboration within an organization and it is collaboration that is the key to successful knowledge sharing.

As noted by Sveiby and Simmons (2002), the collaborative climate was one of the major factors influencing the effectiveness of knowledge programs as it improved knowledge sharing and organizational effectiveness. It was suggested that a culture audit should be conducted to determine the extent to which organizational culture exhibited the cultural values of collaboration, empowerment, action taking and informality (Albert, & Picq, 2004)

Collaboration in organizations usually takes the form of teaming. Team performance increased with the amount of knowledge that employees shared (Kayworth, & Leidner 2005/2006; Wang 2004). A positive relationship between individual self-interest concerns (e.g., competition, job security) and reduction in knowledge sharing intentions was also identified (Wang, 2004). Riege (2005) reinforced this finding by asserting that there was a relationship between apprehension or fear that sharing might reduce or jeopardize job security and a lack of knowledge sharing intentions. Knowledge sharing does impose costs on knowledge contributors. Under intensive competition for rewards, status and promotions, employees often regard their unique knowledge as power in the organization. If others gained power, they feared they would lose power within the organization (Lee, & Ahn, 2005). It would take a great deal of trust to make an employee share this level of power.

Interestingly, Foos, Schum and Rothenberg (2006) found a positive correlation between knowledge sharing and trust among team members. Ultimately, successful teams do overcome these fears. This might be attributed to the concept of work place ethics, where knowledge sharing was considered the right thing to do (Wang, 2004).

Some companies might be tempted to reward knowledge sharing behavior as a spur to successful collaboration and teaming. However, Albert and Picq (2004) asserted that most companies do not provide individual rewards based solely on the ability to learn or to share knowledge. Bock and Kim (2002) found no relationship between the use of rewards and knowledge sharing. Instead, they concluded that promoting a positive attitude towards knowledge sharing caused a positive intention to share knowledge. However, Hutchings and Michailova (2004) recommended that the group, rather than the individual, be rewarded. Kwok and Gao (2005/2006) theorized that extrinsic motivation was not an influential variable; thus, it should not be necessary to establish reward systems. They suggested that more effort should be given to reinforce employee absorptive capacity (i.e., the ability to acquire, assimilate and use knowledge) and knowledge transmission mechanisms. They suggested that employees with closely-aligned knowledge bases should work together more frequently for knowledge sharing. They asserted that greater learning performance resulting from their large absorptive capacity would lead to favorable attitudes toward knowledge sharing and outstanding sharing achievement.

Organizational factors, such as hierarchy, power, available resources, support, reward systems and, ultimately, attitude about knowledge sharing, could either impede or promote knowledge sharing behaviors. Willem and Scarbrough (2006) discussed the potentially negative effects of power and organizational politics on the role that social capital played in knowledge sharing. They argued that the role of power was under explored in the literature. They also asserted that the effects of power were diverse, making it a highly complex factor in knowledge sharing.

IT Support's Effect on Knowledge sharing

Knowledge management systems are often driven by technology. McDermott and O'Dell (2001) analyzed the relationship between Information Technology (IT) support and knowledge sharing within an organization. They found that there was a relationship between IT support and the *perceived* relative advantage (i.e., the degree to which knowledge sharing was perceived to benefit the conduct of business) of knowledge sharing and the perceived compatibility (i.e., fits into the business process). They also concluded that IT support negatively affected the perceived complexity of knowledge sharing. Like McDermott and O'Dell (2001), Bock and Kim (2002) identified a positive relationship between the level of information technology usage by the individual and his or her knowledge sharing behavior. Indeed, most of the research evidenced a positive relationship between the use of technology and knowledge sharing intentions.

Devedzic (2001) listed the technologies thought to be knowledge sharing and knowledge management enablers. These included ontologies, document retrieval software, groupware, intranets, knowledge-based systems, pointers to people, decision support systems, data mining, and intelligent agents. However, Alavi, Kayworth and Leidner (2005/6) found that the values of organizational members influenced the ways in which technologies were used, implying that organizations cannot expect uniformity in the ways in which different groups will use knowledge management tools.

King, Marks and McCoy (2002) studied knowledge management practitioners and found that the success of knowledge management rested on an IT infrastructure. Such applications included: a) knowledge repositories, which are databases that allow the storage and retrieval of knowledge; b) best-practices and lessons-learned systems, which are knowledge repositories used specifically for the explication, storage and retrieval of business best practices and in making lessons learned available to others; c) expert networks, which are networks of individuals identified as experts and electronically accessible by others who have questions related to that expertise; d) communities of practice, which are electronically-enabled networks of self-organizing groups whose members share professional interests.

It is important to stress that a poor understanding of the relationships between sources of knowledge and users of knowledge, which often overlap, can result in one of two extremes: the focus on IT as the only tool or not dedicating an IT resource at all (Al-Ghassabi, Kamara, Anumba, & Carillio, 2004). Those

researchers also suggested that cultural implications could result in IT systems that were not compatible with the environment within the organization and its structure. For example, it was found that gender significantly affected knowledge management usage, with males more likely to use such systems than females were (Taylor, 2003).

Lam and Chua (2005) studied the mismanagement of knowledge management and found the key factors to be technological ignorance, technical over-complexity, lack of technical infrastructure scalability (i.e., unable to support the required volume of users) and techno-bias (i.e., believing that technology solved all problems). Abdullah, et al. (2006) extensively evaluated the role of knowledge-based systems in knowledge management and asserted that they had fallen out of favor due to organizational and managerial issues. However, they recommended that it was time to reevaluate the contribution of these systems to knowledge management.

Few new technologies are used by employees who have not received training or support from management (Connelly, & Kelloway, 2003). The researchers cited a study in which employees had no incentives to use a new system; in fact, they were afraid of giving away their expertise to colleagues who might use this knowledge to get promoted instead of them.

There are a wide variety of information technologies that fit within the knowledge management rubric. However, a variety of factors can lead to success or failure of such technology implementations, such as training, management support or even age, gender and culture of the employees.

Techniques for Promoting Knowledge Sharing

As a result of the literature search, the researcher also uncovered some solutions to the problems of knowledge sharing barriers. An examination of two hotel companies determined that there were four main ways to increase knowledge sharing: motivation, feedback, communication and socializing (*A Problem Shared*, 2005). By inspiring employees to increase their feelings of belonging to an organization, motivation for knowledge sharing increased. The authors projected a multiplier effect among employees as the benefits of sharing permeated throughout the organization. Most organizations send employees through a variety of training programs. The authors found that these training sessions could have a greater effect if employees shared the knowledge gained through debriefing sessions with their peers. These debriefing sessions were also good examples of enhanced, but informal, channels of communications where ideas and knowledge could be communicated. Finally, the authors proposed that organizations should enable frequent socialization, through events, outings and mentoring programs. These methods engendered experience sharing and could be used to build trust.

Cross, Parker, Prusak, & Borgatti (2001) proposed mapping knowledge flows across the various boundaries in an organization to yield critical insights into where management should target efforts to promote collaboration. Four relational qualities were found to promote effective knowledge sharing. Knowing what someone else knows (knowledge) is a precursor to seeking out a specific person when faced with a problem for which a solution is needed. However,

knowing to whom to turn is only useful if one can gain access to that person in a timely manner. Access is influenced by the closeness of one's relationship as well as physical proximity, organizational design and use of collaborative technology. Once access is made available, knowledge can only be shared if the expert understands the problem as experienced by the person seeking assistance (engagement). At this point, the expert can shape his or her knowledge to help solve the problem at hand. Finally, the safety of the person seeking knowledge is of utmost concern. Being able to admit a lack of knowledge and seek out assistance results in creativity and learning.

Cross et al. (2001) found it particularly important to identify points of knowledge creation and sharing that held strategic relevance. Example domains that might yield this sort of benefit included: senior management networks, collaborative initiatives, joint ventures and alliances and communities of practice.

Communities of Practice are a common knowledge sharing or transfer technique. In a Community of Practice, groups of individuals share knowledge about a common work practice over a period of time, although they are not part of a formally constituted work team. Communities of Practice often cut across traditional organizational boundaries. The purpose of this organizational structure is to enable individuals to acquire new knowledge more quickly. Jakobson (2008) documented the use of Communities of Practice at the Des Moines-based Weitz Company. Weitz implemented Communities of Practice as a way of enabling its workforce, which exhibited a wide diversity in ages, to collaborate more effectively. Weitz invested in its employees through a variety of methods,

including job rotation, shadowing programs, executive internships and mentoring. However, older Weitz employees were suspicious that the mentoring program was designed to drain their experience before terminating them. To counter this negative feeling about mentoring, Weitz created Communities of Practice in which junior and senior employees came together to share best practices; thus, the senior employees were not just offloading knowledge.

Widen-Wulff and Suomi (2007) developed a framework for creating an organization-wide knowledge sharing information culture, which included sources, organizational learning and business process re-engineering. They asserted that the organization needed to provide basic resources like technology. Once the resources were made available, the organization must ensure that the basic resources were turned into a competence, i.e., employees knew how to exploit these resources. The authors also asserted that the concept of organizational learning must be embedded in the organization. Most importantly, it was imperative to recognize that an organization's workforce was more than merely a collection of expert individuals. These experts had to hone their skills to adapt and distribute their expertise through official and unofficial networks. Thus, the authors suggested that effective knowledge sharing be rewarded.

Summary

There is a major benefit from knowledge that flows freely throughout the organization. However, a variety of cultural, social and technological barriers often limit an effective flow of knowledge among workers. Age was one variable affecting knowledge sharing (Ojha, 2005). In a team, persons of similar ages

were likely to band together and interact more freely within the subgroup. The author also asserted that, as a result, individuals who perceived themselves in a minority were less likely to participate in team level knowledge sharing processes. Sun and Scott (2005) concluded that there were at least 14 sources from which barriers to knowledge sharing arose. The major categories of barriers included: organizational relationships, organizational climate, organizational structuring and organizational imperative. Finally, Lin and Lee (2006) identified a positive relationship between use of technology and knowledge sharing.

The researcher also uncovered a variety of techniques to promote successful knowledge sharing, ranging from knowledge mapping to reward systems to developing communities of practices. The key is that management cannot just expect knowledge sharing to occur on its own. Rather, management must be the instigator of knowledge sharing within the organization.

FINDINGS

Findings

The researcher utilized qualitative techniques to examine the barriers to knowledge sharing in the high-tech sector. Twenty-one intensive interviews were conducted over the course of one month. Two modalities were used. A case study was conducted within a single high-tech firm based in Cambridge, Massachusetts. The CEO of the company acted as interviewer for this case study. The remaining interviews, which constituted the majority, were performed by the principal researcher.

Each interview lasted between fifteen and thirty minutes. All interviews were taped and then transcribed. The interviews were then inputted into the NVivo software, used for qualitative analysis. NVivo provided the ability to code qualitative text within nodes for the purposes of analysis. A variety of nodes were created (e.g., culture, trust, politics, IT support, etc.) and interview data transferred to the appropriate node. NVivo provided the ability to model and query the data, capabilities which were used throughout the analysis part of this study.

The major research questions that were addressed in the research were:

1. What are the cultural reasons that employees resist the sharing of knowledge?
2. What are the organizational reasons that employees resist the sharing of knowledge?

3. What are the key reasons employees list for not wanting to share their expertise?

An analysis of the interviews uncovered myriad reasons why knowledge sharing worked or failed within a typical organization.

This chapter describes the participant interviewees. This brief section is followed by an analysis of the study findings, organized according to the research question listed above. Appendix B includes various participant quotes not included in the body of this study.

Analysis of Findings

Twenty-one participants were involved in the study, all of whom were interviewed over a four-week period. Participants were involved in some aspect of the high-tech industry and could be considered knowledge workers. The spread of the sample by age, gender and position is detailed in Tables 1 through 3, respectively.

Table 1

Distribution of Subjects by Age (Question 4)

Age of subject:	Number (percentage):
21-30	0 (0%)
31-40	2 (9.5%)
41-50	10 (47.6%)
>51	9 (42.8%)

Table 2

Distribution of Subjects by Gender (Question 5)

Gender of subject:	Number (percentage):
Female	7 (33%)
Male	14 (66%)

Table 3

Distribution of Subjects by Position (Question 1)

Position of subject:	Number (percentage):
Non-management	4 (19%)
Middle manager	12 (57%)
Senior manager	5 (24%)

Tables 1 through 3 provide some basic demographic information on age (Question 4), gender (Question 5) and position (Question 1). Table 4 compares each participant's tenure in his or her company to tenure in the industry (Questions 2 and 3, respectively).

Table 4

Tenure in Company versus Tenure in Industry

	Tenure in company (percentage)	Tenure in industry (percentage)
0-10 years	15 (71%)	4 (19%)
11-20 years	1 (4.7%)	5 (23.8%)
21-30 years	4 (19%)	6 (28.5%)
31 years and over	1 (4.7%)	6 (28.5%)

The majority of participants were senior staff members with lengthy tenure in their company and many years within the industry. Their senior status was reflected in their educational attainment, as shown in Table 5.

Table 5

Distribution of Degrees

Degree	Number (%)
Doctorate	7 (33%)
Masters	5 (24%)
Bachelors	6 (29%)
Some college	3 (14%)
No college	0

Thus, the sample for this study consisted of highly educated knowledge workers with lengthy tenure within the industry and some with lengthy tenure in their organizations.

This expertise was readily evidenced during the interviews. The participants were uniformly cooperative and reflective. They were knowledgeable on the subject of knowledge management and fully understood the ramifications of knowledge sharing or lack of knowledge sharing. Question seven specifically addressed the importance of knowledge sharing. Each of the participants provided a thoughtful response to this question. All articulated the importance of knowledge sharing to the organization and to them.

Question 1: What are the cultural reasons that employees resist the sharing of knowledge?

Age, education, ethnicity, gender and tenure within the company and industry were examined to determine if these factors affected the sharing of knowledge.

Table 6

Cultural Factor Summary

Cultural Factor	Number of Sources: (%)	Number of References: (%)
Ethnicity	8 (38%)	13 (29%)
Education	3 (14%)	4 (8%)
Age	7 (33%)	8 (18%)
Gender	2 (10%)	3 (7%)
Tenure, Organization	0	0
Tenure, industry	0	0

Table 6 summarizes the cultural reasons the participants suggested for knowledge sharing problems in their respective companies. None of the study participants felt that tenure, either organizational or within the industry, impacted knowledge sharing. Of the remaining cultural factors, education had a moderate impact while ethnicity and age had the most pronounced effect on knowledge sharing.

While most study participants indicated that there were no significant knowledge sharing problems related to age, some interesting perspectives were uncovered. Mature, less-educated participants felt that younger colleagues did not adequately share knowledge. Participant seven, who was over 50 and did not

complete college, clearly articulated this as, “Some younger people are not personable. There is no respect. They don’t even say hello to me in the hall.”

Two out of the 21 participants emphasized the concept of respect. While this was only casually mentioned by 19% of the other participants, respect – or lack thereof – has the potential of being an important factor in knowledge sharing.

Participant 14, also a senior manager with an advanced degree in computer science, confirmed the fact that age might be a variable to be considered in knowledge sharing. The participant noted, “Age wise we’re fairly homogeneous so we really don’t have knowledge sharing problems.” 19% of the participants observed that older employees had more problems in sharing and obtaining knowledge for their own use. Participant 19, a computer engineer, shared this insight, “Knowledge is power and people are trying to hold onto some of their advantage over other employees. I think older people have this problem more.”

Participant five, a senior manager in his fifties, noted that some older employees might not have a command over modern technologies and, thus, ran the risk of being kept out of the knowledge sharing loop. “I find that people over the age of 50 have less knowledge of the Internet and how to use IT. I have my phone. I use it as a phone. I don’t text. People in their 20s and 30s are texting like crazy. The younger crowd is more technically involved. There is definitely a risk for people over 50 for being kept out of the loop. I see them struggling.”

Advanced degrees were held by 57% of the participants in the study. The majority of participants, some 86%, indicated that education had little to do with knowledge sharing. Participant eight, the CEO of the case study firm, said, “I had several people working for me with advanced degrees. There were no problems with knowledge sharing. What’s important is you’re only as good as your last project. When the guy stops hitting home runs, he’s fired. What matters here is how good you are – not the degrees you have.”

There were dissenters, however. Participant 19 noted that those with higher educations shared more. “If you work with someone who has less than a bachelor’s degree, they might want to share less because that’s just their upbringing, and they might feel more threatened.”

Ethnicity was a difficult subject for many of the participants. Some feared being labeled as a racist if they articulated their true feelings. Many of the participants were located in culturally diverse metropolitan areas and felt that there were few real knowledge sharing problems related to this level of diversity, aside from the language barriers. However, 24% of the participants did note problems in this area.

Participant seven, who worked in a company located in the part of New York labeled by the press as the most diverse in the United States, said, “We have a diverse workforce. However, knowledge sharing is impeded by inability to speak proper English. They are just hard to understand them. You can’t get a point across.” The same participant added, “With different ethnicities, there is no common ground, so it is hard to share information with them.”

Common ground was a recurring theme in the discussion. Participant nine, a non-managerial employee who did not complete college, had this to say about her diverse workplace:

In terms of the comfort factor, if you have different cultures trying to get along it could put up a barrier because you don't feel comfortable relating. In terms of knowledge sharing, there has to be some sort of comfort factor that you will be understood what you are trying to share.

Some of the participants pointed to the reticence to communicate in some cultural groups. Asians were singled out on two occasions. Participant ten, a senior manager who is pursuing a doctorate, said, "Some cultures may be more reticent to communicate. Just a natural quietness. Sometimes I run into some folks of Asian background that tend to be less communicative. But that's just my experience."

Summary: Demographics

The cultural factors studied included: a) ethnicity, b) education, c) age, d) gender and e) tenure. Tenure within the organization or industry had no effect on knowledge sharing. On the other hand, the research demonstrated that education did somewhat impact knowledge sharing. While 86% of participants felt that education did not impact knowledge sharing, some of the participants felt that the higher the educational level, the more likely it was that the person would share knowledge. Consequently, the lower the educational level, the less likely persons would share knowledge, possibly due to fear that they would lose the only thing that made them valuable to the company.

The research uncovered a more definite relationship between age and knowledge sharing and ethnicity and knowledge sharing. 33% of the participants felt that there was a divide between older and younger workers, with the younger workers less willing to share with older workers. 19% of the participants indicated that senior workers, who tended to be more mature in years, felt threatened by younger workers and, as a result, did not share knowledge with them. As Participant 17 put it, “they don’t want to be taken over.”

Participant five brought up an interesting issue concerning the fact that younger people might be more technologically adept. For example, younger people tend to use text messaging to stay in constant communication. Like many of the older participants, Participant five preferred face-to-face and email communication and feared that his lack of “technological savvy” in terms of communication mediums might keep him out of the loop.

The research found that ethnicity was a factor in knowledge sharing. The ability to understand what was being communicated and cultural mores in terms of the way different groups communicated, as well as work ethics, were cited as barriers to knowledge sharing by the participants.

Trust, comfort and respect figured prominently in the interviews. The participants uniformly asserted that these three factors needed to be present in the cultural mix if knowledge sharing were to be successful in their organizations.

Question 2: What are the organizational reasons that employees resist the sharing of knowledge?

Table 7 maps the participants against the various organizational factors examined in the study. Number of sources indicates the number of participants who mentioned this factor. Number of references indicates the number of times the factor was brought up during the interview. A number of organizational factors were discussed during the interviews. As a result, several new nodes were introduced within NVivo: a) job security, b) metrics, c) time and d) politics.

Table 7

Organizational Factor Summary

Organizational factors	Number of sources (%)	Number of references (%)
Job security	4 (19%)	7 (7%)
Metrics, use of	1 (4%)	1 (1%)
Organizing	2 (9%)	3 (3%)
Politics	8 (38%)	10 (10%)
Time	7 (33%)	7 (7%)
Organizational, general	19 (90%)	44 (44%)
IT support	15 (71%)	23 (23%)

Ten percent of the participants indicated that they withheld knowledge due to job security issues. However, 19% mentioned that they knew of others who had this problem. Participant 16, a chief technology officer with a Masters degree, had this to say:

Technology people are often not the best in terms of sharing knowledge or communicating. My team members do have that problem. I think it's job security – they haven't been trained or led to believe that it's important to

do that. It's a lot of desire to keep things to themselves because then they have this particular power over others.

It was understandable that office politics would figure prominently in the discussions. More than 38% of the participants mentioned politics in their interview sessions. Participant one summed this up nicely by stating simply that "knowledge is power."

Two aspects of politics are fear and control. Participant 18 stressed that sharing "knowledge opens people up and makes them vulnerable ... it might open me up to criticism." Participant 13, a senior manager pursuing his doctorate, continued this thought:

In some cases, people may hesitate because of the political arena ... so to speak. They may be fearful to speak up about something that others may not agree with ... They might be afraid that what they say will not be well-received by others – whether it's someone above them or just their colleagues.

Thus, fear was a factor, fear of disagreements or fear of looking foolish. Control was the most common aspect of corporate politics. Participant 12, a computer engineer with a Masters, summed up the thoughts of most participants. "There are egos involved. There are control freaks – someone wants absolute control so they keep information from others."

Perhaps the most corrosive political problem preventing knowledge sharing was a work environment which, as Participant nine, put it "has a survivor mentality." She remarked:

People do not want to share between departments. There is a definite “Survivor” type feeling. They do things to make themselves look good. I think it’s much healthier for us to work together and share information, but we can’t. We are wary about giving other departments information, because they’ll utilize it to make us look bad.

As Participant nine observed, corporate politics was influenced by management. Participant 15 explained it this way:

In a small company, it comes from the CEO. The CEO creates that kind of culture. In a larger company, it’s more departmental because people don’t have that sort of visibility. Who is the top guy or woman that this person’s career is influenced by and that’s the person whose culture that they create drives those sorts of behaviors.

As Participant 15 so aptly observed, it was management that set the tone for effective knowledge sharing within the organization. However, as Participant four, a project manager with a Masters, phrased it, “I’m not real sure if management really recognizes their responsibility or that there may be a problem.” 33% of the participants indicated that their managements did not actively support knowledge management practices. As Participant 10 explained, “Corporate sees a different world. It’s just perspective. You can’t appreciate or understand something you can’t perceive.”

Some participants viewed management as the principal problem. As Participant nine put it:

The head of the company was hired to “bring back the money.” He has pets, shows favoritism. He is very political. He is playing one group against the other. He comes across as wanting all of this. He seems very interested in a good culture and sharing. But he’s really interested in playing the game. He is just interested in looking good with the Board of Directors – so that his contract will be extended. We are very fragmented. I find out much of my information third hand. The head of the company comes across as very involved. He wants all of this “Kumbaya.” He wants all this knowledge sharing – openness. That’s his philosophy. But he doesn’t implement it.

Participant 14 talked about management’s inertia and the *ad hoc* nature of any attempts at knowledge sharing.

The company could benefit from officially supporting knowledge sharing. I don’t know why there is a problem. Some of it may be political. Some of it may be because it’s never been done. Senior management is aware of it, they just don’t do it. There was some talk, but nothing happens. There’s a level of inertia. It’s mentioned and then there’s not really a follow through. If it were going to be organizational wide it should be top down, bottom up. There is no pilot program. No one leading it. It’s just kind of *ad hoc*.

Even when management supported knowledge sharing, there were other factors that needed to be overcome if employees were to share knowledge effectively. 29% of the participants brought up the subject of time constraints. Participant 13 described this problem. “Time limitations are a definite factor.

People are busy. They've got other priorities. It's difficult to have a structure that's ongoing that brings people out of their daily routine that gets them talking and sharing."

Participant 20, one of the case study participants, best summed it up by saying that knowledge sharing was impeded by "sleep deprivation" caused by too much work. Participant three, a CEO and holder of a doctorate, linked the problems of time to the problems of effective organizing. "No problem in doing this but staff has problems organizing stuff, making it available, always time issues, what's the priority."

Most organizations maintain a variety of databases. Those practicing knowledge management might also have a multiple of knowledge-bases. Organizing these for effective knowledge sharing could be a challenge, although less than 10% of the participants indicated that this represented a major hurdle. Participant 12 asserted that the notion of knowledge silos was a problem, leading to redundant information and work efforts:

Two weeks ago I went to a meeting. This room had a bunch of poster boards in there. I said, hey, this is just what we're working on. I talked to one of my colleagues. I said, you know about that project up there. Isn't it the same thing that we're doing, I said, but why weren't we collaborating? I am not sure what the barrier is. They were a totally different group. But why weren't we collaborating? We are working in silos.

Only one of the participants worked at a company that emphasized knowledge sharing. Participant 16 described it this way:

We have a department called Center for Leadership and Organizational Excellence. Knowledge sharing is their charter. It's ingrained in the culture. All managers are required to take certain training that explains the importance of knowledge sharing and how do they have to promote it to their direct reports.

Participant 15, whose company did not actively promote knowledge sharing, had advice for management on how to promote effective knowledge sharing within the organization:

One way they do this is by tying people's business goals together. In my organization people get compensated and they get bonuses and their bonuses are based on certain metrics. And I think that the best way to promote the sharing of information is to tie people's metrics together down to the line item. If I get compensated for something and a peer that I collaborate with doesn't, he might not share information with me or seek information from me. By tying people's goals together you get the best cooperation.

All of the participants indicated that one of the major ways organizations could promote effective knowledge sharing was by providing technologies to assist in this area. Most of the participants indicated that their organizations provided some of these technologies. Participant four talked about his company's use of intranet-based technologies to support this effort. "Managers have web pages where they can post solutions to problems. This way we can all be on the same page and knowing what each other are doing."

A variety of collaborative technologies was being used, including Microsoft Sharepoint, Centra for white-boarding and video and WebEx for video-enhanced distributed meetings and document sharing. In spite of the wealth of technology available, other participants indicated that their organizations were not particularly forward thinking in this area. Participant 18 said, “We’re so behind the curve that we needed to have a meeting on how to share your Calendar in Outlook. I would like a more intuitive and user-friendly knowledge sharing product.”

Other participants described how post 9-11 security concerns had forced IT departments to take stringent measures at the request of management. As Participant 12, a computer engineer at a firm with government contracts, emphasized:

There’s a whole lot of ill feelings between the people that run the computer networks and the computer users because they put the network security in place as if computers are used for one purpose – word processing and email. It doesn’t really facilitate engineering and science. The security restrictions have gotten bad since 9/11. However, if this system ever did get used, it would be very valuable as much of the information cannot be found in any book. Computer networks are great, but this is where the barrier has been put up. When 9/11 happened they put this big barrier up. They took away all of the file sharing. We went from Ethernet to sneakernet. No chat. Period. That’s just a no-no. We don’t have collaborative technologies. We have to pass files around via email.

Summary: Organizational factors

There are a variety of organizational factors that either support or impede effective knowledge sharing within an organization. These include: a) job security, b) use of metrics, c) organizing, d) office politics, e) lack of time, f) organizational, management issues and g) IT support.

19% of the participants indicated that the issue of job security was two-fold: a) fear of losing face if others disagreed or one provided incorrect information; and b) the desire to control a particular situation or people by sharing or withholding information.

Office politics was another factor discussed by 38% of the participants. It could have a corrosive effect, particularly if management spearheaded the political problem or overlooked it. As Participant 15 put it, "who is the top guy or woman that this person's career is influenced by, and that's the person whose culture drives those sorts of behaviors."

Lack of time and the inability to organize properly the vast information stores these organizations possess were also cited as factors that inhibited the effective sharing of knowledge by 29% of the participants. Participant 15 advised that the only way knowledge sharing could be effective was to add it to the goals of the organization and to measure its use.

It was organizational issues related to management that generated the most discussion. 33% of the participants stressed that many of those in charge of companies did not effectively promote knowledge sharing. Some did not endorse it at all (i.e., by omission) and some paid it lip service but did not provide the

support required for this effort. One notable exception, Participant 16, stated that knowledge sharing was engrained in his company's corporate culture and pointed to a department created just for this purpose.

All of the participants discussed the technology tools in use at their organizations. These ran the gamut from email to collaborative whiteboards. Some of the participants pointed out problems in using these technologies, including high-level security infrastructures, which precluded easy sharing of files and "being behind the curve" in the use of technologies.

Question 3: What are key reasons employees list for resistance to the sharing of knowledge?

Questions one and two enumerated the general cultural and organizational factors that impeded or enhanced effective knowledge sharing within an organization. Question 8 in the interview attempted to elicit the key reasons for knowledge sharing problems. Many of them were addressed in the discussions in the preceding sections and are diagrammed using NVivo in figure 1 below.

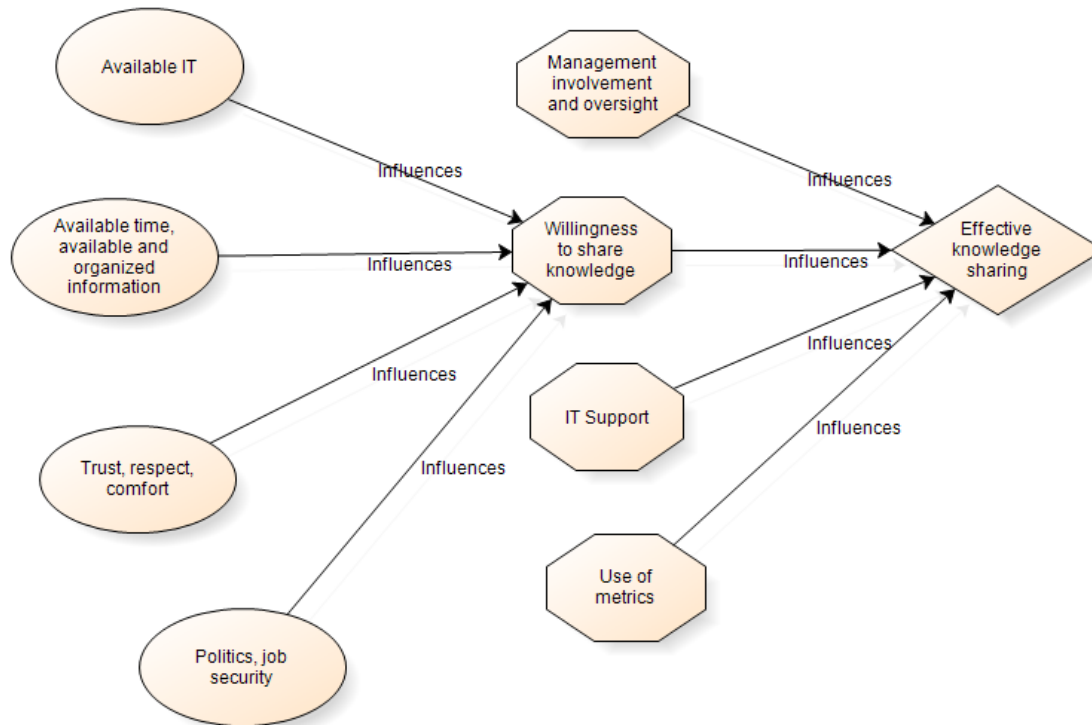


Figure 1. Key factors affecting knowledge sharing.

Willingness to share knowledge

A variety of factors affected the willingness to share knowledge in the sample population. Workers first needed to feel secure in their jobs. They needed to know that the act of sharing knowledge with their co-workers would not diminish their job in any way. Perhaps, more importantly, office politics had the potential to become a barrier for effective collaboration and knowledge sharing, diminishing any eagerness toward knowledge sharing. One participant even mentioned the survivor-type mentality in her office, an allusion to the popular television where teams are pitted against teams.

Trust, respect and comfort were mentioned as variables that also affected the tendency towards willingness to share knowledge. It was stated that workers

needed to trust and respect their co-workers. Given the diversity of the modern organization, one of the most important factors that seemed to affect willingness to share knowledge was the level of comfort in dealing with others. If there were a language or cultural barrier, that level of comfort did not effectively exist, thereby, diminishing the level of effective knowledge sharing.

More than a few of the participants in the sample indicated that they simply did not have sufficient time to share knowledge; they were too busy getting their base-level work completed. Several of the participants also complained about the lack of knowledge organization within their companies. Essentially, they felt that it was difficult to find the information they needed so that they could effectively collaborate and share knowledge.

Lack of available information technology assets was another factor in affecting willingness to share knowledge. Modern collaborative software, such as lessons learned databases, Wikis, and other technologies were simply not available to them. One of the participants complained about the post 9-11 enforced security restrictions that effectively rendered his network useless.

Effective knowledge sharing

Willingness to share knowledge, discussed in the last section, is just one of four factors that affect effective knowledge sharing. The other three factors are: a) management involvement and oversight, b) IT support and c) use of metrics.

Many of the participants indicated that their senior management was not actively involved in promoting knowledge management within the company; in

fact, knowledge management was not mentioned at all. Other participants indicated that their senior managers stated they supported knowledge management but did little else to promote it or did little to integrate it into the organization's performance management and measurement programs. One participant suggested that one way a company could promote a more effective knowledge sharing atmosphere was to utilize metrics to measure how it was used, when it was used and how effective it was.

Finally, IT support was seen as critical to effective knowledge sharing. In some instances the IT department was seen as the barrier, effectively limiting what information could be shared across teams and among members of teams. In other cases, IT was castigated for not providing modern technologies that supported knowledge sharing (e.g. Wikis, whiteboards, etc.). It should be noted, however, that some participants indicated that IT fully supported the move into these technologies.

Figure 2 lists the technologies being used by the participants and the technologies that they desired to use.

	Technology desired	Technology used
Participant 1	0	f2f, online forums, email, intranet
Participant 10	blogs	email, Wiki
Participant 11	wiki	f2f, bulletin board
Participant 12	0	email
Participant 13	0	f2f, email, chat, whiteboard
Participant 14	wiki, repository	f2f
Participant 15	whiteboard	Sharepoint, intranet, email, cellphone
Participant 16	0	f2f, email
Participant 17	0	f2f, whiteboard
Participant 18	0	email, chat, WebEx
Participant 19	0	f2f, email, chat, intranet
Participant 2	0	email, web-based conferences, f2f,
Participant 20	0	email
Participant 21	0	email
Participant 3	wiki	chat
Participant 4	0	f2f, email, web pages
Participant 5	0	f2f, email, conference calls
Participant 6	0	chat
Participant 7	0	phone, email
Participant 8	0	f2f
Participant 9	0	email, f2f, shared drive

Figure 2. Technology desired and in use in sample organizations.

It was noted that face-to-face (f2f) is still the predominant method of knowledge sharing with email coming in a close second. Participant 19 summed up the general feeling on use of face-to-face communication, “I might be old-fashioned in that I just like face-to-face. There are just more nuances that can be given face-to-face. You can see if the person is receiving it and understanding it properly that way.”

Although everyone in the sample was using e-mail, some complained about the problems of doing so, as Participant three mentioned, "E-mails have problems. Communicating orally and through email can be very time-consuming depending on the people who are on the team. They get files lost and they have to send again. Timeliness is a barrier."

Participant eight agreed with this assessment:

I don't like email because so many misunderstandings take place on email. How one-dimensional it is. Because people walk away from the opposite impression of what was meant. Many people don't read emails and then they miss the point. They don't get the inflection. They don't get the sarcasm. You got to have the back and forth.

Chat was less popular than expected, although many project leaders used it with their younger projects teams but not without some complaints. Participant three had this to say about chat:

What I find a little difficult with chat is that sometimes you are overlapping your thoughts. You are asking a question while the other person is answering the last question. Or you're making a comment while the other person is making another comment. Might be transferring the wrong knowledge.

However, in all cases, technology was a fundamental component of the way information was transferred within these organizations. In many cases, the participants recommended more cutting edge technologies, such as blogs and wikis, although none of them seemed to be aware of the many knowledge

sharing technologies and techniques available to them. These will be discussed in the final chapter of this study.

Information technology (IT) support, therefore, can be said to be a critical factor in effective knowledge sharing.

Summary

The study's findings have corroborated the research as described in chapter two. Age, culture, both personal and organizational, and IT support have been shown to either promote or impede knowledge sharing. The research, through its use of the qualitative methodology, was able to dig deeper into the reasons employees provided for sharing or not sharing knowledge. Key among these reasons were time availability, office politics, job security, organization or lack of organization of existing information stores, management support, availability of IT, and the aspects of trust and respect and the comfort level of working with their peers.

SUMMARY, CONCLUSIONS, AND RECOMMENDATIONS

The relationship between willingness to share knowledge and a variety of cultural and organizational factors, such as age, gender, tenure, management support and use of information technology, was examined and established through a review of the literature.

A series of interviews with knowledge workers in the high-tech industry was conducted to determine the specific barriers, hurdles and conflicts that prevent effective corporate knowledge sharing.

Restatement of the Problem

The problem addressed within the research study was that existing knowledge was not being effectively disseminated throughout the organization. On average, six percent of revenue, as a percentage of budget, was lost through failure to exploit available knowledge (So, & Bolloju, 2005). An International Data Group IDC study estimated that an organization with 1,000 workers might easily incur a cost of more than \$6 million per year in lost productivity as employees failed to find existing knowledge and recreated knowledge that was available but could not be located (Weiss, Capozzi & Prusak, 2004).

This qualitative study with semi-structured, taped and transcribed interviews was conducted with a sample of knowledge workers to explore barriers they perceived as lacking effective corporate knowledge sharing within their organizations. This purposive sample was comprised of adults over the age of 18 who performed knowledge work in the information technology industry.

Summary

The major research questions that were addressed in the research were:

Question 1: What are the cultural reasons that employees resist the sharing of knowledge?

Question 2: What are the organizational reasons that employees resist the sharing of knowledge?

Question 3: What are key reasons employees list for not wanting to share their expertise?

Conclusions

The research study began with the assumption that the findings would confirm the results uncovered during the literature search (Ardichvili et al., 2006; Bock, & Kim, 2003; Connelly, & Kelloway, 2003; Flanagan, 2003; Lin, & Lee, 2006; Ojha, 2005; Riege, 2005) and represented by the study questions. This section will review each of the research questions, the results pertaining to the research questions and any assumptions, limitations and delimitations affecting the results.

Question 1: What are the cultural reasons that employees resist the sharing of knowledge?

The expectation was that several cultural factors would have an impact. The research indicated that employee ethnicity had an impact on the willingness to share knowledge (Ardichvili et al., 2006).

There were also several studies where age was one of many variables (Ojha, 2005; Riege, 2005). For the most part, researchers revealed that the more

“age compatible” a team, the more likely that team would engage in effective knowledge sharing. Age differences were likely to stifle knowledge sharing. In addition, employee educational level and employee ethics had an impact on willingness to share knowledge. Riege (2005) demonstrated a causal relationship between educational level and likelihood to share knowledge. Ojha (2005) found that differences in type of education were likely to reduce the sharing of common experiences. Hence, a person with an educational background different from the rest of a team was less likely to participate in knowledge sharing. Individual sharing intentions increased when employees believed that sharing knowledge with colleagues was a basic part of workplace ethics (Wang, 2004).

The cultural factors studied included: a) ethnicity, b) education, c) age, d) gender and e) tenure. It was found that tenure within the organization or industry had no effect on knowledge sharing.

The research uncovered a moderate relationship between education and knowledge sharing. While the majority of participants felt that education did not impact knowledge sharing, some of the participants felt that the higher the educational level, the more likely it was that the person would share knowledge. The lower the educational level, the less likely the person would share knowledge, possibly due to fear that they could lose the only thing that made them valuable to the company.

The research uncovered a more definite relationship between age and knowledge sharing and ethnicity and knowledge sharing. Some participants felt that there was a divide between older and younger workers, with the younger

workers less willing to share with older workers. Other participants indicated that senior workers, who tended to be more mature in years, felt threatened by younger workers and, as a result, did not share knowledge with them. As one participant put it, "They don't want to be taken over."

Another participant brought up an interesting issue concerning the fact that younger people might be more technologically adept. For example, younger people used text messaging to stay in constant communication. Like many of the elder participants, this participant preferred face-to-face and email communications and feared that his lack of "technological savvy" in terms of communication mediums might keep him out of the loop.

The research found that ethnicity was somewhat a factor in knowledge sharing. The ability to understand what was being communicated and cultural mores in terms of the way different groups communicated, as well as work ethic, were cited as barriers to knowledge sharing by the participants.

Trust, comfort and respect figured prominently in the interviews. The participants uniformly asserted that these three factors needed to be present in the cultural mix if knowledge sharing were to be successful in their organizations.

Question 2: What are the organizational reasons that employees resist the sharing of knowledge?

Based on the literature search, it was expected that corporate culture would have an impact on willingness to share knowledge. There was a wide variety of variables possible for this relationship: trust, management commitment, involvement, perception, rewards, leadership, resources provided, job title,

tenure, and others. Lin and Lee (2006) discussed organizational climate within the context of how knowledge sharing fit into the business process, the degree to which knowledge sharing was perceived to benefit the conduct of business and management's intention to encourage knowledge sharing.

Connelly and Kelloway (2003) discussed management commitment to knowledge sharing as well as the individual perception that a positive social interaction culture would be more likely to perceive a positive knowledge sharing culture. Bock and Kim (2002) posited that, if employees believed they could make contributions to the organization's performance, they would develop a more positive attitude toward knowledge sharing.

The study found that there were a variety of organizational factors that either supported or impeded effective knowledge sharing within an organization. These included: a) job security, b) use of metrics, c) organizing d) office politics, e) lack of time, f) organizational and management issues and g) IT support.

Several of the participants indicated that the issue of job security was twofold, including fear of losing face if others disagreed or one provided incorrect information and the desire to control a particular situation or people by sharing or withholding information.

Office politics was another factor discussed by many of the participants. Politics could have a corrosive affect, particularly if management spearheaded the political problem or overlooked it. As Participant 15 phrased it, "Who is the top guy or woman that this person's career is influenced by, and that's the person whose culture drives those sorts of behaviors."

Lack of time and inability to organize the vast information stores these organizations possess were also cited as factors that inhibited the effective sharing of knowledge. Participant 15 advised that the only way knowledge sharing could be effective was to add it to the goals of the organization and to measure its use.

Organizational issues related to management generated the most discussion. The research found that many of those in charge of companies did not effectively promote knowledge sharing. Some did not endorse it at all (i.e., by omission) and some paid it lip service but did not provide the support required for this effort. One notable exception, Participant 16, stated that knowledge sharing was engrained in his company's corporate culture and pointed to a department created just for that purpose.

All of the participants pointed to the technology tools in use at their organizations. These ran the gamut from email to collaborative whiteboards. Some of the participants pointed out problems in using these technologies, including high-level security infrastructures which precluded easy sharing of files and "being behind the curve" in the use of technologies.

Question 3: What are key reasons employees list for not wanting to share their expertise?

It was also expected that IT support would have an impact on willingness to share knowledge. Flanagin (2002) discussed the tendency to reduce knowledge complexity artificially with the use of technologies for knowledge management. Lin and Lee (2006) found a positive causal relationship between

use of technology and knowledge sharing. Connelly and Kelloway (2003) mentioned the perception of a positive knowledge sharing culture due to the presence of technology.

The study found that IT support did, indeed, have an impact on the willingness to share knowledge. The study found a distinction between willingness to share knowledge and effective knowledge sharing, as shown in figure 3.

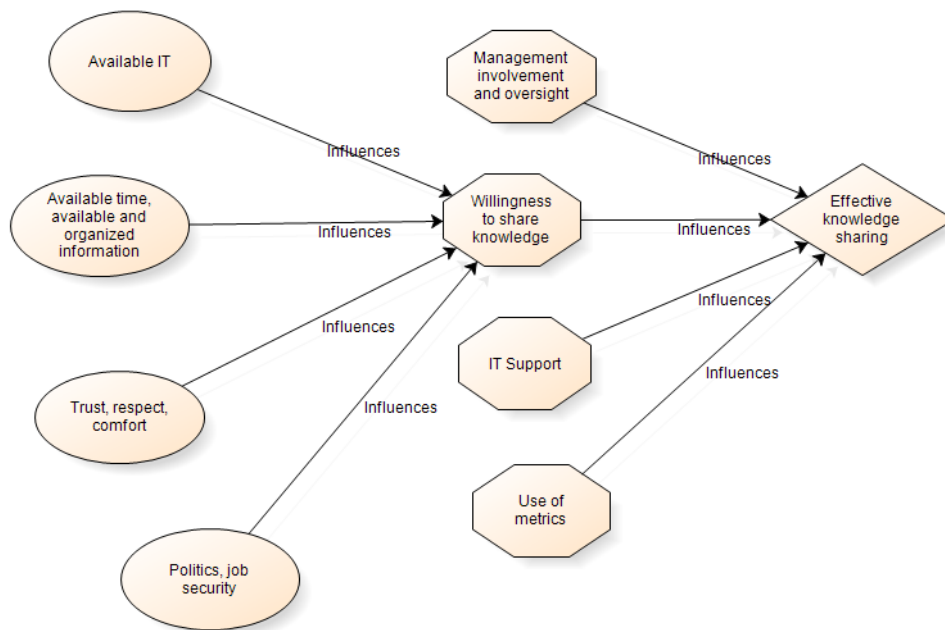


Figure 3. Key factors affecting knowledge sharing.

A variety of factors affected the willingness to share knowledge in the sample population. Workers first needed to feel secure in their jobs. They needed to know that the act of sharing knowledge with their co-workers would not diminish their job in any way. Perhaps, more importantly, office politics had the potential to become a barrier to effective collaboration and knowledge sharing, diminishing any eagerness toward knowledge sharing. One participant

even mentioned the survivor-type mentality in her office, an allusion to the popular television where teams were pitted against teams.

Trust, respect and comfort were mentioned as variables that also affected a tendency towards willingness to share knowledge. It was stated that workers needed to trust and respect their co-workers. Given the diversity of the modern organization, one of the most important factors that seemed to affect willingness to share knowledge was the level of comfort in dealing with others. If there were a language or cultural barrier, that level of comfort did not effectively exist, thereby, diminishing the level of effective knowledge sharing.

More than a few of the participants in the sample indicated that they simply did not have sufficient time to share knowledge; they were too busy getting their base-level work completed. Several of the participants also complained about the lack of knowledge organization within their companies. Essentially, they felt that it was difficult to find the information they needed so that they could effectively collaborate and share knowledge.

Lack of available information technology assets was another factor in affecting willingness to share knowledge. Modern collaborative software, such as lessons learned databases, Wikis and other technologies, were simply not available to them. One of the participants complained about the post 9-11 enforced security restrictions that effectively rendered his network useless.

Willingness to share knowledge was just one of four factors that affected effective knowledge sharing. The other three factors were: a) management involvement and oversight, b) IT support and c) use of metrics.

Many of the participants indicated that their senior management was not actively involved in promoting knowledge management within the company (i.e., knowledge management was not mentioned at all). Other participants indicated that their senior managers stated that they supported knowledge management but did little else to promote it or to integrate it into the organization's performance management and measurement programs. One participant suggested that one way a company could promote a more effective knowledge sharing atmosphere was to utilize metrics to measure how it was used, when it was used and how effective it was.

Finally, IT support was seen as critical to effective knowledge sharing. In some instances, the IT department was seen as the barrier, effectively limiting what information could be shared across teams and among members of teams. In other cases, IT was castigated for not providing the modern technologies that supported knowledge sharing (e.g. Wikis, whiteboards, etc.). It should be noted, however, that some participants indicated that IT fully supported the move into these technologies. IT support, therefore, could be a critical factor in effective knowledge sharing.

Reliability and Validity

Few studies have no threats to the validity of the study. The threats to the validity and reliability of this study are listed and examined below.

1. *The participants were indeed knowledge workers.* The participants of this study were all involved in high-level work involving the transfer of knowledge. For the most part, the

participants were involved in the high-tech industry, the very nature of which implies the knowledge-intensive nature of the participant's work. Knowledge workers were specialists, usually professionally trained and certified, who rely on information technology to design new products or create new businesses processes (Griffin, 2008).

2. *The participants accurately shared their insights with the researchers.* There is no real way to know if the participants accurately shared their insights with the researchers. However, the research methodology was designed carefully to probe and then re-verify data collected through the interview process.
3. *No bias was involved in the study.* There is always the possibility of bias in a study. Again, the research methodology, as described in chapter 3, was designed to minimize bias.
4. *Information was captured and encoded properly.* NVivo software was used to minimize coding errors. The data was also verified manually and double-checked for accuracy.

Implications

According to Pollard (2005), the expectations for knowledge management, and by definition knowledge sharing, were that it would be able to improve growth and innovation; productivity and efficiency reflected in cost savings; customer relationships; employee learning, satisfaction and retention; and management decision making.

Knowledge sharing could meet these goals if it were embedded in the organization using a bottom-up approach, rather than a top-down approach. Top-down approaches were usually forced upon employees and, hence, resisted or, at least, ignored. The bottom-up approach is somewhat akin to viral marketing, where one person becomes enthusiastic about a product or service and tells someone who tells someone else. By providing the tools, methodologies, training and support on a unit or departmental level, employees are encouraged to capture, share and archive their knowledge for the good of the organization.

However, knowledge management needs to have a focus. Pollard (2005) found that knowledge management's safe haven seemed to be the IT department. This was quite a natural fit given knowledge management's definition, which included topics, such as organizational learning, technology transfer, competitive intelligence, data warehousing and business intelligence and document management (Davenport, & Prusak, 2003) and a dependence on information technology resources.

Pollard suggested a number of techniques to disseminate knowledge sharing practices:

1. Don't force people to adapt. They must be self-motivated.
2. Change the job of knowledge professionals. Enable everyone to carry on the task of knowledge management.
3. Consider localized knowledge bases. There is no reason why employees cannot store their domain of knowledge in their own private databases.

Pollard made a good point about respecting the privacy and confidentiality of people's personal information. People do not like to share what gives them their own personal competitive edge.

4. Help people connect to experts inside and outside the organization.

The current emphasis on a balanced scorecard (Kaplan, & Norton, 1996) and performance management and measurement might also be used as a lever to further embed knowledge sharing within an organization. A balanced scorecard had four perspectives to define a set of objectives, measures, targets and initiatives to achieve the goals of that perspective. While the learning and growth perspective was a natural fit for knowledge sharing, the remaining perspectives should also be considered. Adding goals, metrics and others for knowledge sharing activities is a sure way to get these departments at least to consider usage within the department.

Sunasseee and Sewry (2003) proposed a framework for organizational knowledge management. The proposed framework consisted of three main interlinked components: Knowledge Management of the Organization, Knowledge Management of the People and Knowledge Management of the Infrastructure and Processes. They indicated that the organization needed to achieve a balance between these three subsystems to achieve a successful knowledge management effort.

They stressed that it was critical that the knowledge management of the organization be carefully aligned with the overall business strategy of the organization. A close second in importance was an effort to make people feel as

if they were part of the change process when implementing knowledge management, including an emphasis on individual learning and innovative thinking.

The model also proposed a set of Critical Success Factors that increased the chances of a successful implementation:

1. Align knowledge management strategy with business strategy
2. Top management support
3. Create and manage knowledge culture
4. Use of pilot project
5. Create and manage organizational learning
6. Manage people
7. Choose the right technology
8. Include double-loop learning.

Argyris (1976) proposed double-loop learning theory, which pertains to changing underlying values and assumptions. The theory focused on solving problems that were complex, poorly structured and changed as problem-solving advanced.

Recommendations

The study produced some intriguing results, consistent with most of the prevailing research on this topic (Ardichvili et al., 2006; Bock, & Kim, 2003; Connelly, & Kelloway, 2003; Flanagan, 2003; Lin, & Lee, 2006; Ojha, 2005; Riege, 2005). However, it is difficult to draw generalizations from an isolated study.

It is recommended that this study be replicated using a larger sample. Although Sampson (1996) asserted that 20-30 participants was the optimum size for a qualitative study, that number certainly stretches the abilities of a single researcher to handle; however, a joint effort by two or more researchers could certainly handle a larger sample.

A second recommendation for further study is to couple the qualitative study with quantitative analysis. While the interviews were certainly informational, a complementary survey soliciting the opinions of hundreds of knowledge workers would have provided the opportunity to triangulate the results of the two approaches.

Finally, a broader sampling of knowledge workers is suggested. The study focused on high-tech workers, predominately in the information technology arena. Given the team-focused nature of work in this industry, collaboration and knowledge sharing is necessary if a worker expects to achieve success. A good example of this was the 2006 Netflix challenge. The company offered a million dollar award to the person or team that was able to create a movie-recommending algorithm ten percent better than its own. The competitors were startlingly open about the methods they were using. One even posted a complete description of his algorithm for all to see. When asked about this surprising openness, given the million-dollar prize, the general response was that the primary prize was learning and interacting with other teams (Ellenberg, 2008).

Given the evident pro-collaboration nature of technology workers, it is suggested that this population be more thoroughly studied to determine ways in

which this mind-set might be transferred to other categories of knowledge workers.

To promote knowledge sharing, senior management must take a more pro-active and visible role in supporting the development of a knowledge management framework within their organizations (Corcoran, & Robison, n.d.). The most important aspect of this framework is the design of a process for creating and sharing knowledge. Not only should a vision and mission be developed similar to other strategic efforts but incentives that will influence others to adopt this vision and mission must be determined. Incentives can be in the form of compensation, promotions or giveaways.

Performance measurement was also a critical success factor, as some of the study's interview participants suggested. Kaplan and Norton (1996) developed the balanced scorecard approach to compensate for the perceived shortcomings of using only financial metrics to judge corporate performance. They recognized that it was also necessary to value intangible assets as well. They urged company managers to measure such esoteric factors as quality, customer satisfaction, learning and knowledge sharing.

In the scorecard scenario, a company organized its business goals into discrete, all-encompassing perspectives: Financial, Customer, Internal Process and Learning/Growth. The company then determined cause-effect relationships, e.g., satisfied customers bought more goods, which increased revenue. Next, the company listed measures for each goal, pinpointed targets and identified projects and other initiatives to help reach those targets.

Departments create scorecards tied to the company's targets and employees and projects have scorecards tied to their department's targets. This cascading nature provides a line of sight between individuals, what they are working on, the unit they support and how that impacts the strategy of the whole enterprise. Table 8 provides a list of recommended metrics from a sample of knowledge management artifacts.

Table 8

Recommended Knowledge Sharing Metrics

KM Initiative	Key System Measures
Best Practice Directory	Number of downloads
	Number of users
	Number of contributions
	Contribution rate
Lessons Learned Database	Number of downloads
	Number of users
	Total number of contributions
	Contribution rate
Communities of Practice or Special Interest Groups	Number of contributions
	Frequency of update
	Number of members
	Number of members vs. number of contributors
Expert or Expertise Directory	Number of site accesses
	Frequency of use
	Number of contributions
	Contribution/update rate over time
Portal	Searching precision and recall
	Usability survey
Collaborative Systems	Latency during collaborative process
	Number of users

The interviews uncovered some of the techniques that participants were using or wished to use to promote effective knowledge sharing. There are many ways for an organization to identify, store, and transfer knowledge. Some

strategies will work better in one organization than another. Some may not be appropriate for specific types of content. The challenge is to identify and develop complementary ways to further knowledge management and transfer in an organization. Recommendations for knowledge sharing techniques and tools follow.

Apprenticeships, Internships and Traineeships. These are formal arrangements where an experienced person passes along knowledge and skill to an entry-level employee.

Best Practices. Best practices are the identification and use of practices that result in excellence. Best practices include processes, methods, and strategies. These best practices have been honed over time to a point where they are viewed as exemplary and should be adopted by others. Identifying and sharing best practices is an important way to incorporate the knowledge of some into the work of many.

Communities of Practice. Communities of Practice are groups of individuals who share knowledge within a particular area of interest over a period of time. These lead to opportunities for peer-group recognition and support continuous learning, which reinforce knowledge transfer.

Documenting Processes. This constitutes an electronic record of a specific work process that includes the business case for the process, steps in the process, key dates, relationship to other processes that come before and after, key players and contact information, any required references and legal citations,

back-up procedures and copies of forms, software, data sets, and file names associated with the process.

Expert Interviews. These involve sessions where people who are considered experts in a particular subject, program, policy or process meet with others to share knowledge. There are many methods for accomplishing this, including conducting lessons learned debriefings or videotaping a meeting where experts reflect on the reasons for success and failure. Expert interviews are a way of making tacit knowledge more explicit. The expert can describe not only what was done but why, providing context and explaining the judgment behind the action.

Knowledge Fairs. These events can be used internally to provide a forum for sharing information or externally to educate customers or other stakeholders about important information.

Knowledge Audits or Mapping. Knowledge audits identify an organization's knowledge assets, including what knowledge is needed and available. The audits provide information on how knowledge assets are produced and shared and where there is a need for internal transfer of knowledge. This technique is used in conjunction with knowledge maps and inventories.

Knowledge Maps and Inventories. Maps and inventories catalog knowledge available in an organization and where it is located. They point to information but do not contain it. An example is an Experts or Resource Directory that lists people with expert knowledge who can be contacted by others in need of that knowledge. Because a knowledge map describes what knowledge is used

in a process and how it flows around the process, it is the basis for determining knowledge commonality or areas where knowledge is used across multiple processes.

Lessons Learned Debriefings. These debriefings, typically done at the end of a project, identify, analyze and capture experiences, including what worked well and what needed improvement, so others can learn from those experiences. Results can also be shared with future teams or other work groups so they can learn from the experiences of others.

Mentoring. In mentoring, an experienced, skilled person (mentor) is paired with a lesser experienced person (protégé), with the goal of developing or strengthening the competencies of the protégé.

Storytelling. Storytelling involves the construction of fictional examples or the telling of real organizational stories to illustrate a point and effectively transfer knowledge. An organizational story is a detailed narrative of management actions, employee interactions or other intra-organizational events that are communicated informally within the organization. When used well, story telling is a powerful transformational tool in organizations (Denning, 2001).

Use of Technology. Knowledge management requires the use of computer technologies to effectively support knowledge sharing and collaboration. All participants in this study had access to email, which is now universally available. However, not everyone had access to the newer collaborative technologies, such as whiteboards, corporate intranets and innovative products like Cisco's Telepresence. Electronic whiteboards permit two or more employees to work

together synchronously on a project artifact (e.g., memo, plan, specification), even if they are thousands of miles apart.

Some of the newer software that has entered the market has been geared to the knowledge sharing paradigm. One of the study participants discussed the use of Basecamp (<http://www.basecamphq.com/>). This project management software enables collaboration on internal and client projects. More importantly, the Basecamp software enables the creation of threads, where each project can be discussed online via a web-based client.

While corporate intranets are becoming increasingly popular, for the most part, they are used for human resources activities (e.g., 401k, schedule vacation time, payroll). Since the corporate intranet is web-enabled and available to employees, including those not on-site, this is the perfect venue for the databases and discussion boards listed in the earlier part of this discussion. Wikis, blogs, best practices, communities of practice, documenting processes, knowledge maps and lessons learned can all be enabled on the intranet, although the Information Technology department would have to support its use by implementing database and knowledge base software for this purpose.

The Information Technology department plays a pivotal role in the transformation of information to knowledge and the resultant transformation of the company to a knowledge-based company. The Information Technology department needs to take a leadership role in seeking out these newer collaborative technologies, learning how to use these technologies, implementing these technologies and then supporting these technologies. For example, quite a

few of the participants said that their preferred method of knowledge sharing was still face-to-face. They insisted that important communication nuances were lost when face-to-face was replaced with the collaborative technologies available today. Thus, the marketplace must be continually monitored in order that technologies that overcome these limitations might one day be introduced.

Towards this end, it is recommended that a Chief Knowledge Officer be appointed, whose role would be to promote knowledge management with particular emphasis on knowledge sharing in the organization. This person would be responsible for implementing many of the recommendations discussed in this section.

Chief Knowledge Officer is not a new job description. Many companies have Chief Knowledge Officers. However, the dot-com. bust coupled with slow economic growth caused organizations to cut costs. One of the first things to go was the Chief Knowledge Officer. Desouza and Raider (2006) asserted the importance of the Chief Knowledge Officer and offered some suggestions for linking this position to the bottom line, including increasing the drive towards business value and use of metrics. Earlier in this section, Table 8 listed recommended knowledge sharing metrics. Desouza and Raider (2006) suggested adding metrics for customer retention, employee retention, innovation rates, customer evaluations and speed to market. They maintained that these metrics were the measurable results that displayed the value of knowledge management initiatives.

Conclusion

The recognition that knowledge was a key strategic asset for organizations of all sizes was discussed throughout the literature (Oltra, 2005). It followed then that knowledge management was also widely discussed (i.e., the advantages and disadvantages, successes and failures). Carneiro (2000) asserted that, with a few exceptions, there were few viable strategic knowledge systems developed within organizations.

There were a variety of reasons for knowledge management implementation problems. Oltra (2005) found that the emphasis was on cultural, organization and human aspects as potential levers or inhibitors of knowledge management. However, Oltra also noted that several academics commented on the relatively slight consideration of cultural and people issues in the knowledge management literature. A key reason for lack of knowledge management viability was the unwillingness of employees to share their knowledge effectively with their peers (Lee, & Ahn, 2005).

This study has demonstrated that there are myriad barriers to knowledge sharing. In doing so, it confirms prior research, as discussed in chapter two of this paper. The study also uncovered a relationship between willingness to share knowledge and effective knowledge sharing, segmenting the discovered barriers between each of these factors. The study also made recommendations for enhancing the effectiveness of knowledge sharing within the organization. The author hopes that this study facilitates better understanding of knowledge sharing

dynamics within the organization to promote more effective knowledge management.

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APPENDIXES

Appendix A:
Interview Questionnaire

- Q1. What is your title?
- Q2. How long have you worked for the company?
- Q3. How long have you worked in this industry?
- Q4. What is your age?
- Q5. Gender (based on observation)
- Q6. What is your educational level (high school, college, graduate school)?
- Q7. How important is knowledge sharing among teammates to the success of the collaboration?
- Q8. Do you have any problems sharing knowledge with others? If there are issues, what are they?
- Q9. How does your organization promote the sharing of knowledge?
- Q10. What is the preferred method for sharing knowledge – e.g. face-to-face, email, intranet, chat, or whiteboard?
- Q11. How does the use of IT support knowledge sharing? What sorts of tools are being used? What sorts of tools would you like to use?

Appendix B:
Selected Participant Quotes

Age

Sometimes people who are older versus younger... there might be problem. It's ... a problem of respect. Someone who works with someone that they don't respect probably wouldn't share information with them, wouldn't want to help them. They don't respect or personally like them.

Education and Intelligence

There are pretty normal people on the team, but they don't have the same educational level. It is a factor – there is one person, in particular, on the team who is almost uneducated in her view of things. She doesn't have a degree, but is working on it. I see it as a problem in that her world knowledge is limited. She sometimes does things that are sneaky. She'll say I am going to do that and then doesn't do it correctly.

I'm being very frank. I have to label this as arrogance on my part. If I think you're stupid, I don't think you are really going to understand and appreciate this. I am only going to share what I think you need to know.

Ethnicity

I haven't noticed any problems due to age or ethnicity, except in the case of Asians, who play it close to the vest.

I think that foreign work ethic is such they tell you one thing and try to give you something else. They share very little information.....In that part of the world there are no lies. There's only a positive truth and a negative truth. As long as the negative truth comes to a positive it's okay.

Job Security

There are people who know something about the system and they don't share it because of job security. I am guilty of this. I may not share information with a colleague because I want to be the one that brings it up in the meeting on Monday.

Organizing data

It seems like there are so many different places where people have to go to find stuff. We're in the process of doing a consolidation and putting it on Sharepoint but it's a tough transition right now. We're learning this product. They call it New Source. Trying to get all information on Sharepoint so people don't have to go to multiple destinations. So much knowledge within organization, people in every tenure are learning stuff everyday, so it does take a while to get up to speed to find out where the knowledge is in the organization.

They are trying to use Sharepoint to do this. No master index now but creating it now with New Source.

Power

I have noticed that people have problems sharing with me. I always assumed that the reason was to protect their position. In other words, “knowledge is power.” If they give away their knowledge, they give away their power. That was my working assumption. My peers and I would discuss, “why are they so reluctant to share information with us.” It was because they were protecting the keys to the kingdom. This was usually the older employees, who had a lot of seniority and a lot of knowledge. They didn’t want to be taken over.

Technology

Participant 11, a senior manager with a doctorate, agreed. “IT has to be humanized and untextualized. I know it makes me a minority because everyone is texting today. I prefer systems that allow for exchanges in more than just text.

Tools

They do a good job of providing the technology tools to support knowledge sharing and looking forward down the road. We focus a lot on identifying particular types of tools. We’re looking at these tools ourselves. We evaluate them. If this turns out to be a beneficial tool, we recommend this to IT.

AUTHOR BIO

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