Knowledge Sharing:

A Review of the Literature

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Knowledge Sharing: A Review of the Literature

Since 1996, when the Bank made a commitment to become a global knowledge bank, it has taken numerous steps to improve its information systems, strengthen internally and externally focused knowledge-sharing activities, and foster broader global knowledge-sharing initiatives, all in support of enhancing the Bank's and its partners' and clients' access to and sharing of ideas (Wolfensohn, 1996). As background to an assessment of the Bank's knowledge-sharing activities, this paper presents an exploration of the literature on the factors that can affect knowledge sharing success.

Knowledge management involves the panoply of procedures and techniques used to get the most from an organization's tacit and codified know-how (Teece, 2000). While defined in many different ways, knowledge management generally refers to how organizations create, retain, and share knowledge (Argote, 1999; Huber 1991). The study of knowledge sharing, which is the means by which an organization obtains access to its own and other organizations' knowledge, has emerged as a key research area from a broad and deep field of study on technology transfer and innovation, and more recently from the field of strategic management. Increasingly, knowledge-sharing research has moved to an organizational learning perspective. Indeed, experience and research suggest that successful knowledge sharing involves extended learning processes rather than simple communication processes, as ideas related to development and innovation need to be made locally applicable with the adaptation being done by the 'incumbent firms' (Nelson & Rosenberg, 1993) or 'the local doers of development' (Stiglitz, 1999) for the ideas to be successfully implemented.

The literature identifies five primary contexts that can affect such successful knowledge-sharing implementations, including the relationship between the source and the recipient, the form and location of the knowledge, the recipient's learning predisposition, the source's knowledge-sharing capability, and the broader environment in which the sharing occurs. A synthesis of this research suggests three types of knowledge-sharing activities to be evaluated. First, analyses of the form and the location of the knowledge are important because each can affect the types of sharing processes that will be necessary as well as how challenging these

processes might be. Second, the types of agreements, rules of engagement and managerial practices adopted by the parties are important to evaluate in that they can shape both the flows of resources and knowledge between the parties and the actions taken to overcome and accommodate significant relational differences between the parties. Third, the specific knowledge-sharing activities used are important in that they are the means through which the parties seek to facilitate knowledge sharing.

The paper begins with a discussion of why knowledge is important. Following this section, the paper provides a brief overview of knowledge-sharing research from the technology transfer & innovation and strategic management fields, and provides a definition of knowledge-sharing success. Based on these research streams, a framework is developed that identifies the five primary contexts affecting knowledge-sharing success. After exploring each of these contexts in some detail, the research is synthesized in a final section to identify key areas for evaluation of knowledge-sharing efforts.

Importance of ideas

"Ideas are…the critical input in the production of more valuable human and nonhuman capital," (Romer, 1993, p. 71). While investments in machinery, technological infrastructures and human capital are correlated with economic growth (e.g., DeLong & Summers, 1991), it is the *ideas* of what to put those investments to use on – ideas developed through education, research, and experimentation – that both drives the investments and provides the mechanisms through which economic growth occurs (Freeman, 1982). That factor accumulation alone is insufficient to support development is amply illustrated by the failures of East European countries to succeed as the Asian newly industrializing economies (NIEs) thrived over the last several decades (Nelson & Pack, 1999). Unlike most other countries, which also developed high education levels and many research institutes, the distinguishing features of the NIEs have been their openness to foreign knowledge, their superior capacity to use and improve upon transferred knowledge, and the competitiveness of the markets into which they sold their outputs (Pack, 2000).

It is this type of evidence that led Arrow (1999, p.19) to conclude that "countries and firms must be open to new ideas, have multiple sources of new ideas, and see that ideas are

diffused" if they are to achieve economic development and growth. Acceptance of and competition among new ideas is what allows organizations and their nations to remain on the creating rather than on the destructing end of Schumpeter's (1942) 'perennial gale of creative destruction', and the widespread diffusion of these ideas is what fosters the development of what Quinn, Anderson & Finkelstein (1996) call *know why* (system understanding and trained intuition) instead of only *know what* (cognitive knowledge) and *know how* (advanced skills). At the same time, however, pursuit of new ideas does not come without costs, as organizations encounter knowledge search (Stigler, 1961) and knowledge exchange (Hansen, 1999) costs and limitations, as well as run risks of being distracted from using or progressing local knowledge that could benefit them in the longer run (Atkinson & Stiglitz, 1969). Thus, those charged with overseeing an enterprise's knowledge management functions must balance the costs and benefits inherent in knowledge sharing activities.

The study of knowledge sharing

The study of knowledge sharing has its roots within the technology transfer and innovation literature. The research in this area has focused on explanations for different nations' successes or failures in fostering economic growth through technological development. While some theorists argue that high investment rates in physical and human capital drive national innovation and growth rates (Young, 1993; Kim & Lau, 1994; Krugman, 1994), 'assimilation theorists' instead argue that entrepreneurship, effective learning, and innovation are separate, but equally important variables affecting development (OECD, 1971; Freeman, 1982; Kim & Nelson, 2000). Central to both approaches, nonetheless, is an understanding of the importance of the sharing of ideas.

In this literature, successful knowledge sharing results in firms mastering and getting into practice product designs, manufacturing processes, and organizational designs that are new to them (Nelson, 1993). As evidenced by the title of Richard Nelson's recent volume on technology transfer, *Technology, Learning, & Innovation* (Kim & Nelson, 2000), knowledge sharing is seen as occurring through a dynamic learning process where organizations continually interact with customers and suppliers to innovate or creatively imitate. Consider the case of technology transfer as articulated by Lall (2000, p.15):

Developing countries obtain industrial technologies mainly from the industrialized world, and their main technological problem, at least initially, is to master, adapt, and improve on the imported knowledge and equipment… Unlike the sale of a good, where the transaction is complete when physical delivery has taken place, the successful transfer of technology can be a prolonged process, involving local learning to complete the transaction. The embodied elements can be used at best practice levels only if they are complemented by a number of tacit elements that have to be developed locally.

These conclusions have led development experts to recommend that activities focused on *facilitating knowledge sharing* rather than on *transmitting Northern knowledge to the South* are likely to prove more successful (Ellerman, Denning & Hanna, 2001; Knowledge for Development, 1998; Social Development Group, 2002; Prusak, 1999). In other words, while communication of knowledge is important, it is the processes through which knowledge is shared that determine whether organizational learning occurs and, therefore, whether a knowledge-sharing process was a success.

Consistent with this literature, since the resulting designs, structures or strategies will often be adapted and modified to a significant degree through learning by doing in interaction with local interested parties, the technological heritage of what ultimately gets put into practice may not be possible to identify. Moreover, while sometimes the underlying knowledge that has been transferred may be embodied in easily identifiable offerings (Hedlund & Nonaka, 1993), it just as often may take the form of a competence embedded in multiple repositories (Walsh & Ungson, 1991) or routines, processes, procedures or structures (Teece, 2000). As Lall & Streeten (1977) point out, and as Contractor (1981) confirmed empirically, technology transfers are usually comprised of a mix of patented and unpatented knowledge. As a result, with limited exceptions (e.g., Griliches' work on the diffusion of hybrid corn), obtaining clear indicators of transfer success, particularly on a micro, project level, is not within the domain of this literature. Instead, this literature remains focused on identifying the patterns of institutional, industrial and national factors that best support knowledge transfer in general – or what is termed knowledge diffusion – among firms and between science and technology (Mansfield, 1961; 1977).

Sagafi-nejad (1990) synthesized this literature to identify four clusters of variables affecting knowledge transfers. These clusters include the characteristics of the technology being transferred, the activities and modes through which the transfers occur, organizational profiles of the parties involved in the transfers, and broad environmental factors such as the level of development and technological absorptive capacity of the host country. This literature provides significant guidance on national capacity building, as well as many insights into how broad environmental factors may affect knowledge-sharing activities (Rousseau, 1985).

Other studies from this literature have focused on micro-level issues related to how organizations can best accomplish international technology transfers. Early research found that greater knowledge-sharing experience was associated with lower transfer costs (Mansfield, Romeo & Wagner, 1979; Teece, 1976, 1977). Another topic was concerned with the speed through which multinational organizations are able to transfer innovations to subsidiaries (Mansfield & Romeo, 1980; Davidson, 1980; 1983). Other researchers examined the influences of the mode of association between the parties (Mason, 1980; Balasubramanyam, 1973), the level of technological development of the host country (Baranson, 1970), and the appropriateness of the technology with respect to its capital- or labor-intensiveness (Schumacher, 1973). Gupta and Govindarajan (1991) integrated these and other studies to develop a model of the organization that categorized subsidiaries on the basis of the knowledge flows to and from the rest of the organization. They posited that the key variables affecting organizational knowledge flows were the broad task environments in which the flows occur, organizational structural characteristics that can affect the relationship between the parties, and organizational cultural norms with respect to a willingness to keep knowledge proprietary or accept outside knowledge.

Knowledge sharing has also become an important focus in the strategic management field, where knowledge is seen as "the most strategically-important resource which [organizations] possess," (Grant, 1996, p. 376) and a principal source of value creation, (Nonaka, 1991; Spender & Grant, 1996; Teece, Pisano & Shuen, 1997). Indeed, "in many industries, the importance of developing abilities to better utilize the knowledge contained in the firm's network has become apparent...Benchmarking has demonstrated the potentially great benefits of best practices transfer. Instances of failure in downsizing, on the other hand, have revealed the costs of losing knowledge. Empowerment and globalization have created local knowledge with

potential for utilization elsewhere, and information technology has given individuals increasingly differentiated knowledge, unknown to [the] head office," (Bresman, Birkinshaw & Nobel, 1999, p. 441). Moreover, the very basis for some organizational activities is the sharing of knowledge both between units *and* with outside partners and clients.

Knowledge sharing has been viewed from two theoretical perspectives in this literature. Beginning with Roger's (1983) investigations of early and late adopters of technological innovations, and more recently with Szulanski's (1996) study of best practices transfers within organizations, many researchers have used communications theory (Shannon & Weaver, 1949) to examine in particular the factors that make knowledge transfers difficult. According to this theory, "a transfer of knowledge is likened to the transmission of a message from a source to a recipient in a given context. Characteristics of the message or the situation that limit the amount of knowledge that can be transferred render the transfer stickier" (Szulanski, 1996, p. 438). More recently, organizational learning theories have become a central focus in this field, as successful knowledge transfers are increasingly seen as requiring an ongoing process of learning interactions, rather than just a series of communications (Szulanski, 2000).

As with the technology transfer and innovation research, strategic management scholars have also identified a number of variables that can affect knowledge sharing, notably the nature of the knowledge being shared in terms of its tacitness and embeddedness (Zander, 1991; Szulanski, 1996, Dinur, Inkpen & Hamilton, 1998; Dixon, 2000), the strength of relationship ties between the parties (Hansen, 1999), the learning mind-set and capability of the recipient (Yeung, Ulrich, Nason & von Glinow, 1999), and the transfer activities undertaken (Dinur, et al., 1998; Davenport & Prusak, 1998). In combination, the research and findings of this and the technology transfer and innovation field, as explored in some detail below, provide a rich set of literature from which to identify the critical factors affecting knowledge-sharing success. Before turning to these variables, however, a discussion of knowledge-sharing success is first in order to establish an appropriate focus for an organization's knowledge-sharing efforts.

Knowledge-sharing success

At its most basic level, knowledge sharing involves the processes through which knowledge is channeled between a source and a recipient. The Bank may be, alternatively, a

knowledge source, a knowledge recipient, or a facilitator or broker of knowledge between a source and a recipient. Regardless of the Bank's role, the objective of any knowledge-sharing process is to transfer source knowledge *successfully* to a recipient.[1]

One approach to defining knowledge-sharing success focuses on the degree to which the knowledge is *re-created* in the recipient. Consistent with the innovation literature but on more micro basis, knowledge can be seen as knowledge packages embedded in different structural elements of an organization, such as in the people and their skills, the technical tools, and the routines and systems used by the organization, as well as in the networks formed between and among these elements (Argote & Ingram, 2000; Leonard-Barton, 1992). From this perspective, knowledge transfer involves the re-creation of a source's knowledge-related elements – its knowledge package – in the recipient (Winter, 1995). Thus, knowledge-transfer success is defined as the degree to which the underlying knowledge elements have been re-created in the recipient to conform to those of the source. At a macro level, this is what a good deal of the work on national innovation systems focuses on, as researchers seek to identify the key capacity-building elements within industries and nations that best support the innovations that drive economic development. At the micro level, however, this definition is problematic in that it is often difficult to know which elements (e.g., people, tools and routines) comprise a source's knowledge package. Consider the case of EL Products, a manufacturer of electro-luminescent lamps (Leonard-Barton, 1995).

In the early 1990s, EL Products acquired another lamp-making company, Grimes, in order to gain access to its dust-free lamp-making knowledge. However, while the company indeed acquired the assets, equipment and related documents of Grimes, EL Products' employees were unable to duplicate the routines used by Grimes' employees to reduce dust in the production process. For EL Products, awareness of the knowledge that allowed Grimes' employees to operate their equipment dust-free (their undocumented knowledge about the appropriate routines to follow) only came about after EL employees experienced operation of the equipment first-hand. Prior to having this first-hand experience, EL employees did not know that

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[1] In most knowledge-sharing situations, reciprocal knowledge exchanges, rather than one-way knowledge transfers, are either sought or occur. Nonetheless, even in reciprocal exchanges, each party is at times either a source or a recipient with respect to what they are sending or receiving. A one-way perspective is adopted in the discussions that follow for clarity purposes.

the knowledge package to be transferred should have also included the uncodified, routine-based knowledge that Grimes' employees possessed.

In addition to the fact that it is often difficult to know what aspects of knowledge are important (Sowell, 1980), or which elements need to be transferred (Spender & Grant, 1996), there is significant evidence that effective re-creation also requires that the knowledge package is made accessible to the recipient so that 'the local doers of development' can convert it, adapt it or reconfigure it to their localized needs (Dixon, 1994; Nonaka, 1994; Leonard-Barton, 1988; Moreland, Argote & Krishnan, 1996; Devadas & Argote, 1995; Wegner, Erber & Raymond, 1991; Argote & Ingram, 2000; Epple, Argote & Murphy, 1996). Thus, even if the elements of the knowledge package can be clearly identified, they may be hard to discern in their adapted forms within the recipient. As a result, rather than using some notion of knowledge re-creation to gauge sharing success, Kostova (1999) argues that a recipient's *internalization* of knowledge is more appropriate.

Knowledge internalization refers to the degree to which a recipient obtains ownership of, commitment to, and satisfaction with the transferred knowledge. With respect to ownership, when knowledge is fully internalized by a recipient, it becomes *theirs*. "Control of an object appears to be a key characteristic of the phenomena of ownership," and the higher the discretion exercised by individuals, the more likely that they "will invest more of their own ideas, unique knowledge, and personal style" in the knowledge, thereby *making it theirs* (Pierce, Kostova & Dirks, 2001, pp. 301, 302). In addition, development of a thorough understanding of the knowledge is also related to ownership, and can be influenced by the intensity of the association (i.e., the number of interactions involving the knowledge). A last aspect of ownership relates to the degree that an individual invests energy, time, effort, and attention in the knowledge, as such investments tend to cause individuals to develop ownership of the knowledge (Csikszentmihalyi & Rochberg-Halton, 1981).

Commitment is the second aspect of knowledge internalization. Since the relative strength of an individual's identification and ongoing involvement with the knowledge can also affect the degree to which the recipient puts the knowledge into use (Mowday, Steers & Porter, 1979), obtaining knowledge commitment is another important element in knowledge

internalization. Individuals develop knowledge commitment to the extent that they see the value of the knowledge, develop competence in using the knowledge (Leonard-Barton, 1990), maintain a working relationship or interaction with the knowledge, and are willing to put in extra effort to work with the knowledge (Mowday, et al., 1979).

The third aspect of knowledge internalization is satisfaction. Recipient satisfaction with the knowledge is important because it can reduce the recipient's stress (Ettlie, 1986) and resistance levels in adapting and using the knowledge (Leonard-Barton & Deschamps, 1988) as well as reduce the likelihood of the not-invented-here syndrome (Katz & Allen, 1982) occurring.

Only when a recipient internalizes knowledge can it be sufficiently understood and adapted by the recipient to allow for its effective re-creation and, ultimately, its use. In order to foster knowledge internalization, researchers suggest that an organization needs to adopt an active learning perspective through which it fosters situations where the knowledge sharing parties catalyze the recipient's learning experiences so that the recipient can actively reappropriate, adapt, or reconfigure the knowledge to its needs (Dixon, 1994; Nonaka, 1994; Leonard-Barton, 1988; Moreland, Argote & Krishnan, 1996; Devadas & Argote, 1995; Wegner, Erber & Raymond, 1991; Argote & Ingram, 2000; Epple, Argote & Murphy, 1996). Such 'reappropriation' requires the clients to have the discretion to localize the knowledge, see the value in doing so, invest in doing so, etc. (i.e. internalize the knowledge). Hence, the factors that matter most to any given knowledge-sharing processes are those that support or inhibit the recipient's ability to internalize knowledge. For example, Cohen & Levinthal (1990) have found that a recipient with limited absorptive capacity – with a limited stock of prior related knowledge – is less likely to see the value of new knowledge. Thereby, the recipient is also less likely to see the value in actively participating in knowledge sharing and, ultimately, is less likely to internalize the knowledge.

In the following sections, similar additional factors identified as affecting knowledge internalization are explored. The literature identifies five primary contexts that can affect knowledge internalization, including the relationship between the source and the recipient, the form of the knowledge, the recipient's learning predisposition, the source's knowledge-sharing capability, and the broader environment in which the sharing occurs. Collectively, as depicted in

Figure 1, these five contexts define the overall setting in which knowledge sharing occurs. Each context is discussed in the following sections.

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Relational context

The relational context includes those factors that create different types of distances between the parties. Five key relational factors identified in the literature include 1) the organizational distance between the units, based on the governance modes through which the transfer is conducted; and the distance between the source and recipient in terms of 2) physical location 3) institutional settings, 4) knowledge competence, and 5) their relationship.

Organizational distance

Research has found that parties embedded in superordinate relationships, such as franchises (Darr, Argote & Epple, 1995), chains (Baum & Ingram, 1998), federations (Ingram & Simons, 1997), strategic alliances (Powell, Koput & Smith-Doerr, 1996), and networks (McEvily & Zaheer, 1998; Uzzi, 1996; Burns & Wholey, 1993), are able to share knowledge more effectively among members than with outsiders. In an empirical study of 227 small manufacturers participating in training, equipment demonstration, and certification activities through specialized regional institutions, McEvily & Zaheer (1998) found that participation enhanced firm capabilities. In another study, Uzzi (1996) found that more tacit knowledge flowed across firms within a network than across independent firms.

A key argument underlying much of this literature is that being embedded within a network enhances the denseness of social ties (Tichy, Tushman & Frombrun, 1979; Tushman, 1977), and this, in turn, creates more opportunities to share knowledge and experiences, and develop trust (Granovetter, 1985). Incentives for cooperation and communication are also greater within franchises, chains, and networks, as "competition is usually minimized" among the organizations, and "the organizations generally trust each other to a greater degree than those not

[so] embedded," (Argote, 1999:168). In addition, the structural arrangement between the parties can serve "to shape (a) the flow of assets, (b) the depth and breadth of interaction between the two [units], and (c) the incentives for collaboration" (Baughn, Denekamp, Stevens & Osborn, 1997, p. 109). These findings and conclusions about knowledge sharing across organizations are similar to those related to knowledge sharing within organizations. For example, Birkinshaw & Morrison (1995) found that firms that use organizational structures that support combining activities and sharing resources across subsidiary boundaries are more innovative than firms lacking such organizational linkages. Others have highlighted how different administrative controls, such as the extent of decision-making authority delegated to a subsidiary manager, can affect both knowledge flows (Gupta & Govindarajan, 1991) and the types of activities that might be undertaken to support knowledge sharing (Stopford & Wells, 1972; Brooke & Remmers, 1978; Anderson & Gatignon, 1986; Geringer & Hebert, 1989; Killing, 1982; Kim & Hwang, 1992; Schaan, 1993). Administrative controls refer to the organizational systems and procedures by which one entity uses power, authority (Etzioni, 1965) and bureaucratic, cultural, and informal mechanisms (Baliga & Jaeger, 1984) to influence the behavior and output of another entity (Ouchi, 1977). Where administrative controls are established that provide a subsidiary manager with limited autonomy in decision-making and little communication with headquarters, for example, knowledge flows and related activities that might support effective knowledge sharing can similarly be limited. Moreover, in the context of an organizational acquisition, Bresman, Birkinshaw & Nobel (1999: 442) argued that, consistent with the concept of a social community (Durkheim, 1933; Etzioni, 1961; Selznick, 1966; Ouchi, 1980), individuals within the source and recipient units "will only participate willingly in knowledge exchange once they share a sense of identity or belonging with their colleagues."

In sum, the research on organizational distance suggests that the strength of social ties, free-flow of communication, consistency in administrative controls, and levels of trust between the source and recipient will be greater to the degree that the units interact through defined, structured organizational arrangements, rather than through ad hoc processes. In turn, such aspects of organizational distance can thereby have an effect on the ability of the recipient to internalize the desired knowledge.

Physical distance

The physical distance between the parties can affect the difficulties, time requirements and expenses of meeting face-to-face and communicating. Early work on agglomeration economies, for example, argued that organizations concentrated their economic activities in urban areas to obtain positive externalities, such as knowledge spillovers from other firms (Marshall, 1916; Jacobs, 1969). As Marshall (1920) noted in his comparative analysis of nations, economic activity is often drawn to regions rich in knowledge. More recently, consistent with Wheeler's (2001) contention that cities offer significant returns in the form of lower search costs, Almeida (1996) found that patent citations frequently cluster in certain regions, and also are often of a firm-to-firm nature. For example, SGS-Thomson in Texas commonly extends Texas Instrument patents, as does Siemens-New Jersey with respect to nearby Bell Labs and AT&T. On a more general basis, Galbraith (1990) found that the transfer of technology-embedded knowledge was slower when the organizations transferring the knowledge were farther apart. Lester & McCabe (1993) found that the transfer of knowledge related to nuclear reactor operations was greatest when the reactors were located at the same, versus at geographically distant, sites. In addition, Athanassiou & Nigh (2000) found in a study of top management team knowledge transfer that strategically important issues facing executives were more likely to be addressed in face-to-face meetings. Dutton & Starbuck (1979) found that face-to-face meetings and conferences were more effective in transferring computer simulation technology than exchanges of documents, manuals, and correspondences. Lastly, as Davenport & Prusak (1998, p. 99) noted, "sometimes knowledge transfer can only work if the various parties are brought together physically."

In each of these cases, the underlying logic is that the parties draw upon social capital embedded within the regional or group relationships to facilitate knowledge transfer. For example, a large contracting firm responsible for the tunneling for the Boston Harbor tunnel project had overseen a similar project in New Zealand, and wanted the Boston tunnelers to adopt some of their innovations. However, despite sending memos, detailed descriptions, diagrams and manuals, and hiring consultants to speak with the Boston crew, it was only after the New Zealanders joined the Boston crew "over rounds of Foster's lager" that the Bostonians were able to internalize and apply these innovations (Davenport & Prusak, 1998, p. 99). Cohendet, Kern,

Mehmanpazir & Munier (1999: 232) suggest that such socialization contributes to the creation of a "common knowledge base that becomes part of the organizational memory" that helps to eliminate the spatial distances between the parties. Nonetheless, the physical distance separating knowledge-sharing parties could have an impact on the ability and/or willingness of the parties to develop such social relationships. This is because of the time, emotional and financial resources associated with traveling to and from different locations, particularly the farther the distance of the trips.

There is also evidence that sharing mechanisms that involve people interactions can be superior to those involving only document exchanges (Allen, 1977; Berry & Broadbent, 1984, 1987; Galbraith, 1990), since knowledge often needs to be adapted to the new context in order for it to be effectively utilized (Leonard-Barton, 1988). In an empirical study of technology transfer, Hakanson & Nobel (1998) found that even poorly articulated knowledge could be transferred through personal contact, instruction, and apprenticeship. Others have argued that successful knowledge sharing often requires the establishment of a sense of identity and belonging between the parties (Bresman, et al., 1999). As with the transfer of technology-related knowledge, the transfer of complex and causally ambiguous routines also typically requires reconstruction and adaptation at the receiving end (Attewell, 1992; Kogut & Zander, 1992). This is because the incompatibilities and incongruence of the routines, and their associated organizational inefficiencies, may only come to light as they are put to use in the recipient (von Hippel & Tyre, 1995; Argote, 1982; Leavitt, 1965; Nadler & Tushman, 1980). The subsequent changes to the knowledge necessarily involve some degree of continual knowledge sharing as comparisons between the templates and benchmarks and the replicas are made (Nelson & Winter, 1982). The transfer of people facilitates such a process, as they can know who is good at what activities, and it is this knowledge that the recipients need to figure out how to reconfigure and adapt the original knowledge. Indeed, Saxenian (1990) cited the interaction of employees as the key mechanism that supported the emergence of Silicon Valley and Boston's Route 128 as major innovation clusters.

In addition to creating barriers to getting people together physically, large physical distances can also create communication difficulties. Indeed, Allan's (1977) empirical study demonstrated that communication between R&D employees decreased markedly with increased

physical distance. While personnel can conduct many knowledge exchanges through telephone and other communication mechanisms, to the extent that the other party is in a different time zone, the cost and arduousness of such communications can increase significantly. One exception to this conclusion was found in Darr's (1994) study of knowledge transfer in pizza franchises, where strategic similarity mediated the relationship between geographic distance and transfer success. Even with great physical distances between them, since all of the franchises faced similar operating dynamics, they shared a common sense of purpose that allowed them to exchange strategic knowledge without difficulty. Thus, the research suggests that physical distance can have an impact on knowledge-sharing success; although where the parties share a common sense of purpose, the impact may be less.

Institutional distance

Following Kostova (1999), institutional distance refers to the degree of congruity between the institutional environments facing the two parties. Empirical studies have supported the notion that managers' strategic orientations can change the way that they categorize competitors, opportunities, threats, etc., whether such orientations are spawned from the managers' different educational backgrounds or from the different institutional environments in which their organizations operate (Tyler & Steensma, 1998; Hitt, Dacin, Tyler & Park, 1997). At the international level, technology transfer researchers have investigated the appropriation and spillovers of technologies between countries with a specific focus on the role of national institutional structures on such processes. For example, Almeida (1996) found that organizations use foreign plants to upgrade technological ability in fields that are weak in their home countries. Mansfield (1988) examined the basis for Japan's apparent superior ability as imitators of technologies developed in other nations, particularly with respect to the costs and speeds of innovating, finding that the Japanese firms' closer collaboration between engineers and workers, and lesser investments in pre-product introduction marketing are key contributors to their quick and effective use of external technology. More generally, recent research on U.S. and Japanese firms supported the importance of the regulatory environment on knowledge transfer with respect to explicit scientific knowledge (Spencer, 2000). Indeed, this research found that "differences in national institutional structures led to differences in communication among a country's firms," (Spencer, 2000, p. 527). Similarly, Appleyard (1996) found that factors such as

the intellectual property regimes and employment systems of an industry affected the knowledge-transfer activities undertaken.

According to Kostova (1999), since knowledge is often meaning and value based, the success of knowledge transfer is determined by the transferability of meaning and value, in addition to the transferability of knowledge. Kostova's (1999) argument is consistent with an extensive literature on the differences in organizational practices across countries (e.g., Lincoln, Hanada & McBride, 1986; Graham, 1985; Hofstede, 1980). As she stated, "the main ideas here are that (1) countries differ in their institutional characteristics; (2) organizational practices reflect the institutional environment of the country where they have been developed and established; and, therefore, (3) when practices are transferred across borders, they may not 'fit' with the institutional environment of the recipient country, which, in turn, may be an impediment to transfer," (Kostova, 1999, p. 314).

Knowledge distance

Knowledge distance refers to how large a gap exists between the source and the recipient in terms of their knowledge bases. Hamel (1991, p. 97) found that organizational learning was enhanced when the knowledge gap between a source and a recipient was not so great to make the recipient unable "to identify, if not retrace, the intermediate learning 'steps' between its present competence level and that of its partner." Lane & Lubatkin (1998) found that a recipient that has a large knowledge gap between it and the source would be less likely to assimilate the source's knowledge. They developed the concept of 'relative absorptive capacity' to move the concept of absorptive capacity from an organizational basis to a relational basis. In other words, an organization's absorptive capacity, although the focus of numerous knowledge-related studies (see e.g., Szulanski, 1996; Dixon, 2000; Cohen & Levinthal, 1990; Lyles & Salk, 1996; Baughn et al., 1997), is not the appropriate concept to address the issue of the ability of an organization to absorb knowledge. Rather, it is the *relative knowledge* of the recipient with respect to the source's knowledge (i.e., the extent of the knowledge gap between the parties) that is important, and this is a relational concept. This is also consistent with Dinur, et al.'s (1998) discussion with respect to the need for the two parties to have some alignment in terms of their knowledge to facilitate knowledge transfer. They argued that the greater the degree to which the new context is

in alignment with the natural context of the knowledge in terms of environment, culture, strategy, decision making/organizational structure, and technology, the less difficult the internalization of the knowledge will be in the new unit. Nonaka & Takeuchi (1995) also emphasize the need for knowledge redundancy or overlapping areas of expertise to facilitate knowledge transfer. As Nelson & Winter (1982, p. 78) noted, "the same knowledge, apparently, is more tacit for some people than for others" depending upon how much knowledge overlap exits. Moreover, as Hamel (1991, p. 97) concluded, "if the skill gap between partners is too great, learning becomes almost impossible."

On the other hand, at times a recipient could be burdened with unlearning some existing knowledge to avoid developing a 'core-rigidity' (Leonard-Barton 1992; March 1991), as the presence of some knowledge may constrain learning or even encourage ineffective learning if such knowledge focuses the organization inappropriately (Dixon, 1992; Burgleman, 1983; Hedberg, 1981; Nystrom & Starbuck, 1984). For example, when CT scanners were first introduced in radiology departments, their initial implementation was somewhat ineffective because new role structures first had to be negotiated between radiologists and technicians (Barley, 1986). Thus, existing knowledge of the roles of the radiologists and the technicians had to be unlearned to allow for the new technology and related knowledge to be accepted. This is similar to the argument that in some organizations a not-invented-here syndrome can prevent recipients from accepting outside knowledge (Hayes & Clark, 1985; Katz & Allen, 1982). As Leonard-Barton (1995) noted, people who have developed what she termed 'signature skills' can become very resistant to any knowledge that may require them to abandon the very abilities and knowledge that so define them professionally. In such situations, the dominance of the organization's inward-looking absorptive capacity "impedes the incorporation of outside knowledge and results in the pathology of the not-invented-here (NIH) syndrome," (Cohen & Levinthal, 1990: 133). As a result, as Szulanski (1996: 31), drawing on Zaltman, Duncan & Holbek (1973) noted, this "may result in foot dragging, passivity, feigned acceptance, hidden sabotage, or outright rejection in the implementation and use of new knowledge."

On the whole, whether it is too little a knowledge overlap between the parties, or too extensive a knowledge base on the part of the recipient relative to the knowledge to be shared,

the knowledge distance between the parties to a knowledge transfer can affect the ability of the recipient to internalize shared knowledge.

Relationship distance

Relationship distance refers to the duration and quality of the experience that the source and recipient have working together. Research has identified several relationship-related factors that can affect knowledge-sharing success. For example, in their examination of knowledge transfer from a population-level perspective, Baum & Berta (1999) found that organizations seek to imitate the routines of other organizations that have high status, are socially proximate, and are strategically similar. These findings stem in large part from the fact that organizations tend to maintain the direction and emphasis of prior actions (Amburgey & Miner, 1992; Miller & Friesen, 1980). In a study of knowledge transfer in international joint ventures, Child & Rodrigues (1996) found that knowledge transfer is facilitated when the parties hold similar social identities. In their work on cognitive strategic groups, Peteraf & Shanley (1997) found that managers identify with managers in competing firms who are socially similar. Thus, one aspect of relationship distance is the degree of similarity of social identities of the members of the units involved in the transfer. The research suggests that as the social similarity of the parties' increases, so will their ease of communications, and this will allow for greater transfer success.

In addition to social similarity, researchers have also found that strategic similarity between the source and recipient can affect knowledge transfer. For example, in Darr's (1994) study of knowledge transfer in pizza franchises, transfer success was found to be greater among firms with similar generic strategies (Porter, 1980) of cost competitiveness or product differentiation. Porac & Thomas (1994), in a study of retail organizations, found that similar organizations were more likely to monitor and imitate each other than dissimilar ones. Likewise, Baum & Berta (1999), in a quasi experiment using student groups, found that groups in similar market positions in a simulation were more likely to imitate each other, and such imitation can be viewed as a form of knowledge transfer. Yeung, et al. (1999) also found that strategy similarity affects knowledge transfer.

Sometimes, however, the relationship between two organizations is less than pleasant. For example, in a hostile acquisition, the acquired unit's members may be less than receptive to passing along their knowledge and expertise for fear that they will then become expendable. On the other hand, Schrader (1991) concluded that a strong positive relationship between recipient and source facilitates the trading or the transfer of information. Indeed, in an empirical study of knowledge transfer, Szulanski (1996) found that the arduousness of the relationship between the source and recipient was associated with knowledge stickiness or knowledge transfer difficulty. Thus, the level of arduousness in the relationship is a third aspect of relationship distance.

Following Lei & Slocum (1992), lack of experience in transferring knowledge in a collaborative relationship can also lead to difficulties in the transfer process. Simonin (1997) found empirical support for the hypothesis that collaborative knowledge-sharing experience supports the development of competence at working collaboratively. The argument is that "familiarity with...transfer processes facilitates the task of knowledge absorption by eliminating much of the disruptive noise of cooperation," (Simonin, 1999, p. 474). In addition, since "the exchange of tacit knowledge must rely on extended social contact...it is not readily disentangled and transferred in codified form" (Baughn, et al., 1997, p. 107). Rather, disentanglement requires the development of a sense of identity or belonging with colleagues (Bresman, et al., 1999) as well as of a social community (Durkheim, 1933; Etzioni, 1961; Selznick, 1966; Ouchi, 1980). The argument is that as parties to a knowledge sharing arrangement work together, they develop social bonds that allow them to better access the tacit knowledge that may only become accessible (Dixon, 1994) through the use of experiential interactions between the parties (Hansen, 1999). In addition, over time, as the parties develop an appreciation of their partner's social context, they establish their own social norms and expectations of one another, "thereby enabling the development of trust and with it the successful exchange of knowledge" (Roberts, 2000: 434). Thus, the depth of experience of the parties in transferring knowledge is critical to knowledge-sharing success.

In addition to the depth of experience between the parties, the motivation of a recipient has also been found to be associated with transfer difficulty, in that overly motivated sources could exhibit "impatient enthusiasm" that can lead to transfer difficulties, so that some parity between source and recipient motivations seemed to be in order (Szulanski, 1996). Other

researchers have identified the conceptually similar concept of 'learning intent' of the recipient as an important factor in transfer success (Baughn, et al., 1997; Hamel, 1991). "When circumstances place a great premium on effective articulation, remarkable things can sometimes be accomplished. For example, it has been established in occasional emergency situations that it is not impossible to convey by radioed verbal commands enough information on how to fly a small plane so that a person who lacks a pilot's skills can bring the plane in for landing," (Nelson & Winter, 1982, p. 78). Moreover, the perception of substantial opportunities related to the knowledge would also motivate the learners (Doz & Hamel, 1998). Hamel (1991) also noted that the newness of knowledge could also provide motivations for a transfer to occur successfully, given that this newer knowledge may carry significant first-to-make premiums. The idea is that, when a recipient sees the knowledge to be transferred as valuable or important, the recipient will have greater motivation to support the transfer than if the knowledge is seen as less significant.

Related to arduousness, depth of experience between the parties, and recipient motivation, another relational factor affecting knowledge-sharing processes is the level of trust between the parties. Trust, which is a "warranted belief that someone else will honour their obligations" (Casson, 1997: 118), is needed in situations where the complexity of the relationship, or the fact that it is marked by unanticipated contingencies, prevents the parties from having the ability to find recourse if things should not go as planned (Lazaric & Lorenz, 1998). Since knowledge has at least some degree of tacitness (Polanyi, 1966b; also see e.g., MacKenzie & Spinardi's (1995) study of codified computer aided design data in the development of nuclear weapons), while its transfer is thereby subject to a high level of risk and uncertainty, knowledge-sharing processes are not generally amenable to enforcement by contract. As a result, what the parties ultimately must rely upon is their trust in the other party throughout the exchange of knowledge. Trust is related to several of the other relational factors because, as Granovetter (1985: 490) noted, "information from one's own past dealings" with a party helps a recipient to accept knowledge at face value, since "individuals with whom one has a continuing relation have an economic motivation to be trustworthy, so as not to discourage future transactions; and…continuing economic relations often become overlaid with social content that carries strong expectations of trust and abstention from opportunism." Thus, trust is seen in as a key factor affecting knowledge-sharing efforts.

Finally, the consistency between the parties' normal ways of 'doing business' can also affect knowledge sharing outcomes. Research has found that "group interaction will unfold immediately in a well-coordinated fashion if (a) group members' scripts (Abelson, 1976) are similar to one another's and (b) members' definition of the situation are also similar. In effect, the norm is imported and the absence of disagreement and miscues implicitly affirms that all members accept it" (Gersick & Hackman, 1990, p. 76). As Hackman (1969) noted, when the new assignment facing members is similar to the members' prior experience, the member will be prompted to recall, and be predisposed to act in accord with, routines that have worked in the similar situation; Louis & Sutton (1991) argued the same. Further, research on technology transfers has shown that differences in work values and organizational cultures can significantly impair knowledge transfers (Allen, 1977; Tushman, 1977; Dougherty, 1990). Thus, the degree of similarity of business norms is also an aspect of relationship that can impact upon knowledge-transfer success.

On an overall basis, each of these relational factors can be seen as potentially affecting knowledge-sharing processes. The evidence seems to point to the need to develop extensive, deep, friendly relationships between the parties so as to bridge any distances between them.

Knowledge context

The second context in Figure 1 relates to the knowledge that is transferred. Two aspects of knowledge have been emphasized in the literature, including explicitness and embeddedness.

Knowledge explicitness

Knowledge explicitness refers to the extent to which knowledge is verbalized, written, drawn or otherwise articulated; highly tacit knowledge is hard to articulate, is acquired through experience (Polanyi, 1966a), whereas explicit knowledge is transmittable in formal, systematic language. As first stated by Polanyi (1966a), individuals know more than they can explain. This is because individuals have knowledge that is non-verbalized, intuitive, and unarticulated. Polanyi (1962) defined such knowledge as 'tacit.' Tacit knowledge is hard to communicate and is deeply rooted in action, involvement and commitment within a specific context; it is "a continuous activity of knowing," (Nonaka, 1994: 16); it is "the way things are done around

here," (Spender, 1996). On the contrary, individuals also have knowledge that is verbalized, written, drawn or otherwise articulated (e.g., patents, computer programs). Thus, a primary distinction with respect to knowledge is between its explicitness and its tacitness.

According to Polanyi (1962), the tacit dimension of knowledge defines and gives meaning to its complementary explicit dimension. That is, the inarticulable tacit aspect of knowledge is only known by an awareness of it through a sensing of its corresponding explicit complement (Polanyi, 1966a, p. 10). At the same time, as Polanyi (1966b, pp.7, 12) goes on to state, "while tacit knowledge can be possessed by itself, explicit knowledge must rely on being tacitly understood and applied. Hence all knowledge is either tacit or rooted in tacit knowledge. A wholly explicit knowledge is unthinkable." Many researchers have developed knowledge taxonomies and categorization schemes along the lines of the explicit-tacit divide (see e.g., Winter, 1987; Anderson, 1983; Ryle, 1949; Kogut & Zander, 1992; Hedlund, 1994; Nonaka & Takeuchi, 1995). Inkpen & Dinur (1998) argued that the distinction between tacit and explicit knowledge is not a dichotomy, but a spectrum or continuum with extremes of the two types at either end. At the explicit end of the continuum, knowledge is codified in specific products and processes; at the tacit end, knowledge resides in individual cognition and organizational routines all developed through experience and use.

The logic behind identifying the explicitness vs. tacitness of knowledge is that explicit knowledge is seen as more easily transferable than tacit knowledge. Lippman & Rumelt (1982) argued that the transfer of knowledge is more difficult to the extent that there is "causal ambiguity", which is ambiguity about what factors, skills, or knowledge elements interactively define the function of interest. The greater the causal ambiguity, the more difficult it is to identify the related knowledge elements and subnetworks (i.e., the people, tools, and routines in Figure 1) supporting the functional activity. Causal ambiguity, therefore, is often singled out as an important factor affecting knowledge transfer (Spender, 1996; Nonaka, 1994; Grant, 1996). For example, research has shown that knowledge embedded in products, that is codifiable, and that is explicit, and thereby exhibits little causal ambiguity, transfers between units more easily than less explicit knowledge (Zander & Kogut, 1995). On the other hand, given that "poorly articulated knowledge is difficult to teach and learn," such knowledge is more difficult to

transfer (Hakanson & Nobel, 1998, p. 13). In an empirical study of best practices transfers, Szulanski (1996) found causal ambiguity to be an important barrier to knowledge transfer.

However, organizational learning theories tell us that the sending of a fully explicit development manual to a client does not necessarily result in the contents and meanings of that manual being internalized by the client. On the contrary, such a complete codification of knowledge as would be contained in a manual could instead effectively preclude a recipient from localizing or taking ownership of the knowledge, since the knowledge could be so predefined to limit its adaptability. For example, the work of Nonaka (1994), Dixon (1994) and Yeung, et al. (1999) in general suggest that organizational learning occurs through a process along the lines of: 1) tacit knowledge – knowledge held in someone's head – is accessed from internal and external boundary crossing interactions; 2) accessible knowledge is translated and recategorized to allow members to make sense of it, to see where it fits within their focused area and overall within the organization; 3) tacit knowledge is made explicit through dialogues; 4) knowledge is put into action to allow its conversion from explicit to tacit by 'learning by doing.' While these activities do not necessarily proceed in this order, the extent to which each does occur is likely to have an influence on knowledge-sharing success. This organizational learning process suggests that, by participating in articulation processes, recipients might be able to have better opportunities to translate and recategorize the given knowledge, which in turn could allow them to see how it fits within their own area, organization or country, as well as participate in the dialogues through which much of the meaning behind the tacit components of the knowledge can become evident (Nonaka, 1994). In other words, a recipient's early participation is akin to their helping to create a presentation rather than only being in the audience that receives one; all that would be omitted from the final presentation, as well as the rationales for everything included and excluded, can only be learned if the recipient is involved in the presentation's creation.

Thus, explicitness is potentially a two-edged sword. On the one hand, the existence of casual ambiguity with respect to a package of knowledge to be shared suggests that efforts to codify or articulate the knowledge could enhance its transferability. Indeed, Intel's "copy exactly" policy for building semiconductor plants (Iansiti, 1998) follows such a philosophy. On the other hand, too much reliance upon codification might limit a knowledge package's internalization, as a seemingly complete codification could ignore the reality that tacit elements

still exist (Polanyi, 1966b). For example, research on the use of information and communication technologies to bring internationally dispersed teams together found that, while the technologies were effective at facilitating the transfer of codified knowledge, they could not transfer related sensory information, feelings, intuition, and non-verbal communications that were important to the knowledge's ultimate implementation (Boutellier, Grassmann, Macho & Roux, 1998). Moreover, since knowledge codified by a source may be incompatible with a recipient's cultural beliefs (Morosini, Shane & Singh, 1998) and idiosyncratic ways of conducting business (Luo, 2000), such knowledge could lack legitimacy in the recipient's context (Scott, 2001), and the recipient may be less motivated (Kirkman, Gibson & Shapiro, 2001) to take ownership of, and become committed to this knowledge.

Knowledge embeddedness

The second aspect of knowledge that has been emphasized in the literature is embeddedness. The concept of knowledge embeddedness is consistent with the notion of knowledge complexity (Dixon, 2000). The issue, as depicted in Figure 1 within the recipient context, is how many knowledge elements and related sub-networks (e.g., people, tools, and routines) will need to be transferred, absorbed, adapted and adopted by the recipient, and/or how many other recipients will be required to do so to allow the knowledge to be applied by the recipient. In many situations, a significant component of an organization's knowledge is embedded in people (Engstrom, Brown, Engstrom & Koistinen, 1990; Starbuck, 1992). At its simplest, the sharing of people-embedded knowledge would require only the movement of people between units, since they would carry the knowledge with them. Alternatively, people-embedded knowledge can also be shared by extracting their tacit knowledge through some series of knowledge transfer activities.

Knowledge can also be embedded in products, tools or technology (Argote & Ingram, 2000). Research on the transfer of such technology-embedded knowledge is quite extensive, and covers both intra-firm transfers (e.g., Teece, 1976, 1977; Mansfield, et al, 1979; Mansfield & Romeo, 1980; Davidson, 1980, 1983; Zander, 1991), and inter-firm transfers (e.g., Mowery, et al, 1996; Bresman, et al., 1999). Such transfers have been studied from multiple perspectives (see e.g., Zhao & Reisman, 1992), including with respect to the roles of national institutional

structures on such processes (Mowery & Rosenberg, 1989; Mansfield, 1988; Mowery & Teece, 1992; Almeida, 1996), the impact of evolutionary patterns or 'technology life cycles' on knowledge development (Abernathy & Utterback, 1978; Utterback, 1994; Anderson & Tushman, 1990, 1991; Foster, 1986; Hamilton, 1990), and the effects of technological complexities on the ease of transfers (Zander & Kogut, 1995; Galbraith, 1990). What this literature tells us about the sharing of technological knowledge is that since the knowledge itself may be in different stages of flux or transition, its transferability may be affected, as the source's ability to share the knowledge may be in part determined by the degree of specificity of the knowledge. When such specificity is not yet available, the knowledge can be much harder to share, as identification of the appropriate knowledge elements to be shared is difficult. For example, while many companies have reverse-engineered Sony's products to make their own similar products, most have had great difficulty understanding how to miniaturize electronic components and apply miniaturization processes to other developments (Prahalad, 1993). Sony's knowledge is, at least to some degree, related to, and embedded in, its specific sites, physical assets, dedicated assets, human assets, and organizational routines (Williamson, 1985; Nelson & Winter, 1982).

In addition to being embedded in people or tools and technology, knowledge may also be embedded in tasks or routines. Routines are "the forms, rules, procedures, conventions, strategies, and [soft] technologies around which organizations are constructed and through which they operate," (Levitt & March, 1988: 517). Simon (1945), drawing on Stene (1940), described organizational routines as actions taken without conscious consideration of alternatives in response to recurring questions. Whereas technological knowledge may be important because of its contribution to the development of certain processes, services or products, routines are important because their automatic launch can continue to occur even in inappropriate new situations, and thus are both ungovernable (Barnard, 1945) and govern most organizational behavior (March & Simon, 1978). While several researchers have argued that organizational routines and their development form the basis for the evolution of the firm (Nelson & Winter, 1982; Fuller, 1988; Plotkin, 1994), most of the research on routines has focused on how they form (Hannan & Freeman, 1984; March, 1991; Tyre & Orlikowski, 1994), how they have staying power (Miliken & Lant, 1991; Starbuck, 1983; Tyre & Orlikowski, 1994), and how they help to both improve organizational efficiency as recipes of success (Miller, 1999) and create so

called 'competency traps' (see e.g., Levitt & March, 1988; Starbuck & Hedberg, 1977; Whetten, 1980).

The transfer of routines is complex. According to Kostova (1999), some routines as encompass more than the task sequences represented, to include also the underlying meanings as well. Similarly, Leonard-Barton (1992) argues that an organization's knowledge system includes, among other components, the value assigned to the context and structure of knowledge. Because routines are implicitly embedded with underlying meaning structures, this makes their transfer difficult.

The final place where knowledge can be embedded is in a complex mix of multiple elements and subnetworks. The people-routines network contains knowledge about who is good at what tasks (Argote & Ingram, 2000). It is this knowledge that the recipients of routine-embedded knowledge will need in order to figure out how to reconfigure and adapt the original knowledge. While a routine may be easy to transfer, knowledge about who is good at using that routine may take time to develop. In response to this very issue, many organizations have attempted to codify who-knows-what in their organizations through the development of directories of expertise or knowledge yellow pages (Davenport & Prusak, 1998; Prusak, 1999; Yeung, et al., 1999; Dixon, 2000) so that they may access the organization's intellectual capital (Stewart, 1997; Sveiby, 1997). Moreover, knowledge about which tools best support which routines (held in the tools-routines network) is also important with respect to the effectiveness and the efficiency of the reconfiguration and adaptation process. As Teece (2000:36) noted, since organizational knowledge is embedded in processes, procedures, routines and structures, "such knowledge cannot be moved into an organization without the transfer of clusters of individuals with established patterns of working together." Kogut & Zander (1992: 383) made a similar argument: "because we know that hiring new workers is not the equivalent to changing the skills of a firm, an analysis of what firms can do must understand knowledge as embedded in the organizing principles by which people cooperate within the organizations... The capabilities of the firm in general are argued to rest in the organizing principles by which relationships among individuals, within and between groups, and among organizations are structured."

Research on the transfer of such complex knowledge is quite limited. In one study, Moreland, Argote & Krishnan (1996) found that when there were no personnel transfers accompanying knowledge transfers, the recipients failed to learn who was good at what tools and tasks. Even where personnel transfers accompanied knowledge transfers, however, Devadas & Argote (1995) found that the transfers were less successful when new people lacked a fit with existing people-routines and people-technology networks. Also, organizational performance was found to suffer when a shuffling of personnel made identification of member's expertise more difficult (Wegner, Erber & Raymond, 1991). Consistent with these findings, Argote & Ingram (2000) concluded that new organizations are more successful than organizations with longer operating histories as knowledge recipients due to their lack of established long-standing people-related subnetworks that might inhibit their capacity to assimilate and adapt new knowledge.

In terms of the transfer of knowledge about which tasks are best performed using which tools (knowledge embedded in a technology-routine network), Epple, Argote & Murphy's (1996) study stands alone. This study examined a second shift added to an existing assembly line. It found that the second shift was able to achieve performance levels consistent with and even superior to the first shift within weeks of beginning operations. According to Epple, et al. (1996), this indicated that the knowledge that the first shift had about which tools to use for any given task was readily transferred to the second shift.

With respect to the transfer of knowledge embedded in other networks, research has found that group performance increases when everyone in a group is informed of each other member's expertise (Stasser, Stewart & Wittenbaum, 1995; Wegner, 1987; Moreland, et al., 1996). This is because, as Sutton & Hargadon (1996) posit, such knowledge allows groups to engage in joint brainstorming sessions that allows group members to explore new ideas and discuss difficult issues, and so doing can help groups to avoid sub-optimal solutions (Ancona & Caldwell, 1992; Jehn, Northcraft & Neale, 1999). Moreover, groups can provide forums for sharing information across functional and cultural boundaries (Lipnack & Stamps, 1993), and can gather together the diversity of information, backgrounds, and values necessary to make things happen (Jackson, 1992). Moreland's (1999) research confirmed that group training about member's expertise produces better group performance, and disruptions to a group's knowledge

about member's expertise (through the reassignment or turnover of people) hurts group performance.

In sum, knowledge can be of different degrees of explicitness vs. tacitness, and it can be embedded in different organizational elements. Since explicitness can vary across different combinations of embeddedness, although the two concepts are related (as more deeply embedded knowledge also generally carries a higher degree of tacitness than knowledge embedded in only one element), they are nonetheless distinct. As such, each is discussed in the literature as affecting the ease of transfer and the degree of internalization achievable based on the particular knowledge being transferred. The research suggests that the development of a deep understanding about these two aspects of to-be-transferred-knowledge might allow the knowledge-sharing parties to be in positions to devise an appropriate assortment of source-recipient interactions to both expose any related tacit knowledge and incorporate all appropriate knowledge elements in the transfer. For example, research has shown that the implementation of knowledge new to an organization requires the development of new organizational and social knowledge (Attewell, 1992; Orlikowski, 1993), and one way that this is accomplished is in-group settings through story telling (Brown & Duguid, 1991). In addition, it has also posited that failure to include the recipient in some pre-transfer knowledge-preparation processes may effectively prevent them from being able to assimilate certain tacit knowledge (Dixon, 1994), since such knowledge may be accessible only through the dialogues in which the recipient did not participate (see Boisot (1998) and Dixon (2000) for nascent treatments of how the selection of alternative transfer mechanisms might affect knowledge transfers for knowledge in different forms and possessing different degrees of embeddedness). That knowledge sharing is more difficult than expected and expectations are often not met is widely reported (Galbraith, 1990; Gupta and Govindarajan, 2000). Two often cited examples include General Motor's failures in sharing what it learned from its Saturn division's successes with other divisions (Kerwin & Woodruff, 1992), and IBM's limitations in sharing its reengineered hardware design processes (Economist, 1993). While perhaps not the only potential culprits with respect to these company's difficulties in knowledge sharing, the literature suggests that knowledge explicitness and knowledge embeddedness are considered to be important factors affecting knowledge-sharing success.

Recipient context

The third broad context in Figure 1 is termed 'recipient context.' Prior studies have included several constructs within the recipient context, including the recipient's motivation (Szulanski, 1996), absorptive and learning capacities (Szulanski, 1996; Dixon, 2000; Cohen & Levinthal, 1990; Lyles & Salk, 1996; Baughn, et al., 1997), intent (Baughn, et al., 1997; Hamel, 1991), knowledge experience (Hackman, 1969; Gersick & Hackman, 1990) collaborative experience (Doz, 1996; Powell, Koput & Smith-Doerr; 1996; Simonin, 1997), retentive capacity (Glaser, Abelson & Garrison, 1983; Druckman & Bjork, 1991) and learning culture (Davenport & Prusak, 1998). Many of these constructs are relational in nature, as Lane & Lubatkin (1999) demonstrated with respect to absorptive capacity. The one variable emphasized in the literature as specifically within the recipient context is its learning culture (Davenport & Prusak, 1998), learning capability (Yeung, et al., 1999) or fertileness (Szulanski, 1996).

The need for a culture of learning in an organization to facilitate organizational learning in general, and knowledge internalization in specific, has been emphasized by many researchers (Aubrey & Cohen, 1995; Argyris, 1982, 1991; Delta Consulting Group, 1990; Fiol & Lyles, 1985; Huber, 1991; Wick & León, 1993; Davenport & Prusak, 1998). In an organization that fosters delegating responsibility, tolerating creative mistakes, and providing slack time to work on new ideas, the richness of the knowledge transferred is likely to be much higher (Davenport & Prusak, 1998). On the other hand, if learning is not considered important, the slack required to enable people to think and discuss, and for learning groups to emerge, may be sacrificed in the name of efficiency (Stewart, 1996). Moreover, in some organizations, as discussed above, the not-invented-here syndrome can prevent recipients from accepting outside knowledge (Hayes & Clark, 1985; Katz & Allen, 1982). Moreover, even when knowledge is transferred to a willing recipient, the transfer will only be effective when the knowledge is retained (Glaser, et al., 1983; Druckman & Bjork, 1991). As Szulanski (1996) noted, retention cannot be taken for granted, given the evidence from research on innovations (e.g., Rogers, 1983) and planned organizational change (see e.g., Glaser, et al., 1983). In addition, even if retained, the knowledge may not be nurtured and further developed. Szulanski (1996, p. 32) termed organizational environments as 'fertile' or 'barren' depending on the extent to which they facilitated the development of transferred knowledge or hindered the "gestation and evolution" of this knowledge.

Taken together, the literature on learning culture posits that organizations with extensive sets of routines and competencies designed to retain and nurture transferred knowledge are better able to support knowledge internalization than less fertile organizations (Yeung, et al., 1999). Lacking the ability to invest significant time or other resources in new knowledge due to a barren organizational learning environment, a recipient may be simply incapable of developing the necessary degree of commitment and ownership toward the new knowledge to allow for its full internalization. Moreover, since a recipient's ability to retain and nurture transferred knowledge interacts with its motivation to do so (Vroom, 1964; Porter & Lawler, 1968; Campbell, 1976), having a fertile organizational environment can provide an offset to mitigate any potential low motivation on the part of the recipient. Thus, the literature concludes that a recipient's capability with respect to accepting, retaining and nurturing new knowledge are an important factor affecting the success of knowledge-sharing efforts.

Source context

Yeung, et al., (1999) suggest that a source's learning culture is also an important factor affecting knowledge-transfer success. This is because a capable source is able to manage knowledge-sharing activities in a way that improves a recipient's learning of the specific knowledge, much as a university professor structures lectures, readings and assignments to best facilitate their students' learning. In addition, a capable source may also be able to help a recipient overcome some of the many of what Yeung, et al. (1999) term 'learning disabilities.' For one, by engaging the recipient through an administrative structure that allows for a greater degree of autonomy for the recipient than it might generally have, the recipient may become more adaptive and flexible Weick (1979), and this, in turn, can allow it to pursue the types of varied experience-based learning opportunities that can move it along its learning curve (Yelle, 1979; Westney, 1988; Epple, Argote & Devadas, 1991). A second way that a capable source can assist a less capable recipient is to help remove some of the perceptual 'blind spots' that can lead it to fail to consider the decisions of others in its own decisions (Zajac & Bazerman, 1991). Similarly, as research has shown that an organization's existing stocks of resources and capabilities can limit and channel its ability to develop these and other resources, thereby also affecting its decision-making (Teece, Pisano & Shuen, 1997), the source can introduce new resources that can help the recipient avoid becoming too constrained or developing learning

myopia (Levinthal & March, 1993). In addition, a related stream of research examines how cognitive processes can cloud organizations' views as to with whom they are really competing. Since managers model the behaviors of others in order to learn about uncertain environments (Bandura, 1986), "the types of observations and experiences that prove useful will be repeated and refined, while those that prove less useful will be discontinued. In this manner, social learning processes give direction to the basic categorization processes that managers use to cognitively order their environment," (Peteraf & Shanley, 1997: 169). In other words, a capable source can have positive effects on a recipient's organizational learning capabilities by broadening the recipient's dominant logic (Prahalad & Bettis, 1986), path dependencies, and categorization schemes, and even altering its 'tried and proven ways of doing things' (Argyris, 1990).

In addition, however, two other recipient variables can also affect transfer success. These variables include the credibility of the source with the recipient (Arrow, 1971) and the strategic intent of the source to complete the transfer (Hamel, 1991). As described, knowledge internalization requires that a recipient see the value of the knowledge being shared. If the source is seen as less than credible, then its knowledge may also lose value in the eyes of the recipient, thereby affecting the outcomes of the sharing processes. One oversight in the literature related to credibility seems to be that it does not consider the content relevance of the knowledge-to-be-shared to the recipient's context (Feinstein, 2002). That is, it does not take into consideration the applicability of a given knowledge's content (e.g., how to organize a banking system) to a certain context (e.g., in Uruguay). Instead, the literature looks at factors and activities that can affect knowledge-sharing processes in general regardless of the content of the knowledge being shared. For an organization like the Bank, which operates in very different content-related contexts, content relevance could be a crucial factor affecting the credibility of its knowledge and knowledge-sharing efforts.

At the same time, the source's intent also has an impact on knowledge transfer to the extent that it creates the organizational incentives to learn. For example, since many knowledge-sharing situations are reciprocal rather than one way, when one party has obtained what it has sought from the sharing arrangement, it may terminate or fail to continue to participate actively in the sharing processes (Khanna, Gulati & Nohria, 1998). Moreover, recent research suggests

that time, budget, and job insecurity pressures can create disincentives for sharing, as possession of knowledge can provide a source with a form of power (Pfeffer & Sutton, 2000). Indeed, a recent study within the Bank found that 58% of focus group participants viewed incentives for knowledge-sharing as inadequate (Prusak, 1999). Thus, both the source's credibility and its intent are important factors that can affect the success of a knowledge-transfer effort.

Environmental context

The entrepreneurial, learning and innovation environments in which knowledge sharing takes place can affect the parties and knowledge-sharing processes in many ways (Kim & Nelson, 2000). For example, organizations in rapidly changing technological environments have been found to pursue fewer site visits, benchmarking studies, and direct forms of communication than those in more stable industries (Appleyard, 1996; von Hippel, 1988). In addition, the stage of knowledge within its life cycle has also been posited to affect knowledge-transfer success, given that the newer the knowledge in general, and to the recipient specifically, the less that the recipient will be burdened with unlearning old knowledge (Burgleman, 1983; Hedberg, 1981; Nystrom & Starbuck, 1984). Moreover, research has also found that the mobility of personnel, a key industry structure measure, contributes to the flow of technology-related knowledge within certain regions (Almeida & Kogut, 1999).

Importantly, while numerous additional salient variables have also been identified related to economic, cultural, political, and institutional environments in which knowledge sharing occurs (e.g., see Yeung, et al., 1999; Sagafi-nejad, 1990), the strategic management literature subsumes these variables primarily within the relational context. For example, many aspects of the economic and societal sub-contexts are incorporated within the relational factors related differences in social identities, knowledge gaps and strategic intents. Likewise, this literature addresses level-of-development type variables through the relational variable, institutional distance (Kostova, 1997, 1999). Moreover, the discussion on the embeddedness of knowledge, especially on technology-embedded knowledge, incorporates many aspects of the technological environment. With respect to other environmental variables, a nation-by-nation analysis may be in order to fully understand the dynamics at play. For example, research on Korea has attributed much of its rapid economic growth to the close coordination that exists between government and business, as well as to the *chaebol* strategy followed by most of its businesses (Kim, 2000). The

argument can be made that the use of *chaebol* strategies by Korean firms indicates that they have cultural norms supportive of collaboration. Where a party to a knowledge transfer with a Korean organization has a less collaborative culture, the two organizations' ways of 'doing business' would likely differ considerably, and, as discussed in the relationship distance context, this can significantly impair knowledge transfers (Allen, 1977; Tushman, 1977; Dougherty, 1990).

In the strategic management literature, both organization-level and environment-level variables are as seen as affecting organizational performance, and it is through the strategies adopted by organizations that the two sets of variables are joined (Andrews, 1971; Barney, 1991). With respect to the knowledge-sharing arena, what this literature suggests is that the broad economic, cultural, political, and institutional environmental variables need to be examined to determine the extent to which they play a role in affecting the micro-context variables. In other words, a complete examination of the factors that can create distances between the parties (relational context), make knowledge assessment and analysis more challenging (knowledge context), or have an effect on the motivations and intents of the parties (source and recipient contexts), requires consideration of the broader environment in which the two parties conduct their knowledge-sharing.

A synthesis for evaluation

Since knowledge sharing is but part of the organizational learning that takes place within and between organizations, the generalized assessment question for the Bank is *to what extent does it facilitate organizational learning between its knowledge-sharing parties?* More specifically, the Bank undertakes all sorts of activities in its attempts to facilitate the sharing and receiving of knowledge. The key question, however, is *does it use an appropriate mix of activities to address the many factors affecting (and related barriers to) successful knowledge transfers?*

A synthesis of the literature suggests that successful knowledge sharing requires the use of three interdependent types of knowledge-sharing activities, including:

- Those focused on assessing the form and embeddedness of the knowledge,

- Those focused on establishing and managing an administrative structure through which differences and issues between the parties can be accommodated and reduced, and

- Those focused on transferring the knowledge.

These activities are interdependent in that knowledge assessments and administrative requirements will change as differences and issues become apparent between the parties, all while efforts to transfer the desired knowledge are being implemented. Each type of activity is also important in that, while an organization may implement of an appropriate administrative structure (e.g., by entering into a formal knowledge-sharing agreement that sets out reporting relationships, resource commitments, etc.) and take a number of managerial initiatives designed to overcome any differences between the organizations, a lack of an assessment as to the embeddedness of the knowledge may result in a less than successful outcome. Recent findings within the Bank, for example, found that while managerial initiatives were sufficient in one aspect of its knowledge-sharing efforts, more administrative resources would likely to enhance outcomes (Social Development Group, 2002; Prusak, 1999).

What these examples and the literature point to is that successful knowledge-sharing outcomes require attention to each of the three types of activities, suggesting, therefore, that an evaluation of the Bank's knowledge-sharing efforts cover each of these sets of activities. In the following sections, a number of questions related to these different types of activities are presented for evaluation. The "Bank" referred to in each question is the Bank unit responsible for facilitating knowledge sharing, whether this unit is the source, the recipient, or a third party facilitating knowledge sharing between a source and a recipient.

Knowledge assessment: The form and embeddedness of knowledge

The first area of focus is on the knowledge that is to be shared. Understanding the explicitness vs. tacitness and embeddedness of the knowledge to be shared could prove critical both to the development of appropriate knowledge-sharing activities and to the analysis of the other factors to be considered throughout the sharing processes. This suggests several questions for evaluation.

1. *To what extent does the Bank make comprehensive embeddedness assessments of who knows what (people-people network), who works best with what tools or technology (people-tool network), and who does which tasks most effectively (people-task network)?* Knowing all of the knowledge elements (people, tools, routines, and networks) that need to be transferred can be important in achieving desired outcomes. The development of a "knowledge repository map" for the knowledge to be shared is a first step in making sure that all necessary elements are first identified and then shared. Such a scheme would also allow managers to assess to the relative match of the parties' knowledge repositories, so as to allow for development of appropriate knowledge-transfer plans. Importantly, since the literature tells us that the sharing of knowledge may be affected by the degree to which the knowledge is specific to the source (i.e., the degree to which it is related to specific organizational assets, people, routines, etc.), such an embeddedness analysis needs to highlight any source-specific assets that might be related to the knowledge to be shared. With the benefit of this information, the Bank can tailor knowledge-sharing activities to ensure an appropriate level of interaction with, or exchange of such assets to obtain more complete knowledge sharing outcomes.

2. *To what extent does the Bank ensure that everyone within the units is informed of each other member's expertise?* Given that transfer performance increases when group members are informed about who knows what, the Bank can ensure that any such assessments are shared with the parties. In addition, since who knows what depends on who remains within a unit, and disruptions to a group's membership can hurt group performance, a related question is *how stable is each group's membership?*

3. *To what extent does the Bank assess the degree to which the knowledge is explicit vs. tacit?* The literature indicates that explicit knowledge is easier to transfer, but may be more challenging to have internalized by the recipient. On the other hand, highly tacit knowledge, which is embedded with meanings and values, is more difficult to transfer, but the commitment and effort required to transfer it can lead to fuller internalization by the recipient. Thus, with explicit knowledge, a reverse-engineering approach might be in order to allow the recipient to create an opportunity to participate in the knowledge's re-articulation; whereas with highly tacit knowledge, a series of activities might need to be

undertaken to allow the knowledge to become portable. In either case, lack of an assessment of the knowledge's form could lead to inappropriate sharing activities being undertaken.

Relationship management: Establishing rules and goals; identifying and accommodating differences

Organizational learning theory posits that learning is enhanced when it takes place in an environment of established rules, goals and norms, and where participants understand and appreciate the other's differences. In addition, administrative controls are known to shape the flows of knowledge. The following questions seek to address the extent to which the Bank unit charged with facilitating knowledge transfers has sought to establish such settings and controls, and undertakes the types of efforts necessary to identify and manage any important differences between the parties.

1. *To what extent does the Bank develop, communicate and reinforce shared goals between the parties?* The Bank's facilitation of the development of shared missions and goals, and/or of the inclusion of parties sharing similar strategic outlooks within knowledge sharing situations, could prove helpful in bridging any strategic distances that might exist between the parties. As one Bank study noted, "there is a sense among regional SD staff that knowledge sharing has been supply driven from the anchor to the Regions", suggesting the need for more "learning from the ground" to take place (Social Development Group, pp. 4, 5). At the same time, such a common sense of purpose can also help to mediate the challenges presented by the Bank's vast spatial distances between knowledge-sharing parties. Moreover, since one party may terminate its participation in a sharing arrangement at any time, a related question is *to what extent have the parties' intentions with respect to participating in the knowledge-sharing arrangement been identified, and to what extent has the Bank sought to reinforce intentions consistent with the knowledge-sharing objectives of the parties?*

2. *To what extent does the Bank support joint development of rules of conduct between the parties?* The greater the national, cultural, and institutional differences that exist between the parties, the greater will be the need for the development of a shared agreement on

how a knowledge-sharing arrangement will operate. The Bank can facilitate establishment of high norm similarity – of shared ways of doing business – by encouraging the joint development of a common set of rules of conduct by the parties engaged in extended knowledge-sharing activities.

3. *To what extent does the Bank put in place administrative structures to support desired knowledge flows?* Whereas question 1 focuses on the goals of the knowledge-sharing arrangement, and question 2 focuses the rules of engagement between the parties, this question focuses on the organizational structure put in place to support the goals of the knowledge-sharing arrangement. The Bank's creation of Thematic Groups seems consistent with the idea of creating organizational support structures to shape knowledge flows. However, the commitment of sufficient resources might also be of concern here. For example, one Bank unit found that "a committed and skilled social scientist in the SD anchor with responsibility for the coordination of knowledge-sharing activities would be desirable" (Social Development Group, p. 8). Moreover, Prusak (1999) suggested that Thematic Groups provide facilitators/coordinators to support knowledge-sharing activities. Thus, a related question is *to what extent does the Bank provide necessary resources to support effective knowledge sharing?*

4. *To what extent does the Bank facilitate each party's appreciation for the other's operational and cultural situation?* The Bank can help the parties bridge any such differences that exist by helping them develop appreciation for the others' situations. Approaches identified in the literature include cultural training and job rotations, among others. A related question has to do with the parties' credibility; it involves evaluation of the Bank's efforts first to assess if any credibility issues exist, and then second, to develop remedies to any identified deficits in the credibility of either party. The question is *to what extent has the parties' credibility been assessed, and to what extent has the Bank developed remedies, if needed, with respect to either party's credibility?*

5. *To what extent does the Bank assess the knowledge-sharing capacities of the parties and develop plans through which to help them achieve compatible capacities?* Evidence from the literature suggests that significant differences in knowledge bases between parties can

hinder knowledge sharing. An assessment of "relative absorptive capacities" is first in order to make sure that an appropriate combination of knowledge-sharing activities is undertaken. Second, any gaps identified can then be addressed through the design of an appropriate plan to guide learning. At the same time, given the difficulties in bridging significant knowledge gaps, the Bank might also seek to use knowledge-capacity assessments to make selections from among alternative sources or recipients to ensure close matches. This suggests the related question *to what extent does the Bank guide its knowledge sharing partner selections based on its knowledge-capacity assessments?*

6. *To what extent does the Bank manage the combinations of personnel involved in the sharing arrangement?* The literature suggests that the degree of arduousness is driven fundamentally by mismatches, whether such mismatches are due to differences in skills, abilities, cultures, or personality types. Since arduous relationships can make knowledge sharing more difficult, the Bank's careful management of the personnel involved in any given knowledge-sharing situation could prove important to sharing outcomes. Whereas in question 4 the assessment focuses on the unit's efforts to reduce existing mismatches, here the focus is on managing the staffing processes to avoid mismatches.

7. *To what extent has the Bank analyzed the many potential relational differences that might exist between the parties, and how great are such differences?* The idea here is to assess the degree to which the Bank has sought to identify relational differences as a first step to allow for the eventual development of plans and implementation of actions to remedy or address any differences. The greater the differences identified, the greater the challenges the knowledge sharing project is likely to face. Upon the identification of any such differences, the question then becomes *to what extent has the Bank developed and implemented appropriate remedies?*

1. *To what extent does the Bank seek to evaluate the recipient's perception of the relevance of the knowledge?* Again, the activities undertaken to transfer knowledge need to consider both the form and location of the knowledge if the transfer is to occur successfully

Transfer activities: Facilitating organizational learning

The final area of focus is on the repertoire of activities undertaken to share knowledge. As described in the section on knowledge explicitness vs. tacitness, organizational learning theories posit that different types of knowledge-sharing activities might be more effective with some forms of knowledge than with others, although, in general, research on the effectiveness of different types of activities is quite limited. The following questions seek to address the extent to which the Bank facilitates an appropriate set of knowledge-sharing activities for the parties.

1. *To what extent does the Bank facilitate the use of knowledge-preparation processes involving both the source and recipient units?* Research has found that knowledge-sharing success is enhanced when recipients are included in the processes through which knowledge is articulated and codified by the source, rather than only as recipients of prepackaged knowledge. On the other hand, the exclusion of the recipient from the knowledge-conversion processes through which the knowledge is prepared for transfer from the source may limit the recipient's willingness or ability to internalize this knowledge.

2. *To what extent does the Bank facilitate the interactions of people from the different units where appropriate?* As described in the discussion on physical distance, the direct interaction of people from the source and recipient units is often seen as necessary to allow for knowledge to be adapted to a new context. The transfer of people facilitates such a process, as they can know who is good at what activities, and it is this knowledge that the recipients will need to figure out how to reconfigure and adapt the original knowledge.

3. *To what extent does the Bank facilitate group-based training activities between the parties?* Research has confirmed that group training (the development of a transactive memory system for a group) produces better group performance because, among other reasons, group members can often avoid sub-optimal solutions by bouncing their ideas off of others. As a result, knowledge transfer activities engaging groups from the recipient unit may be more effective in creating a fertile environment within the recipient than individual-based activities.
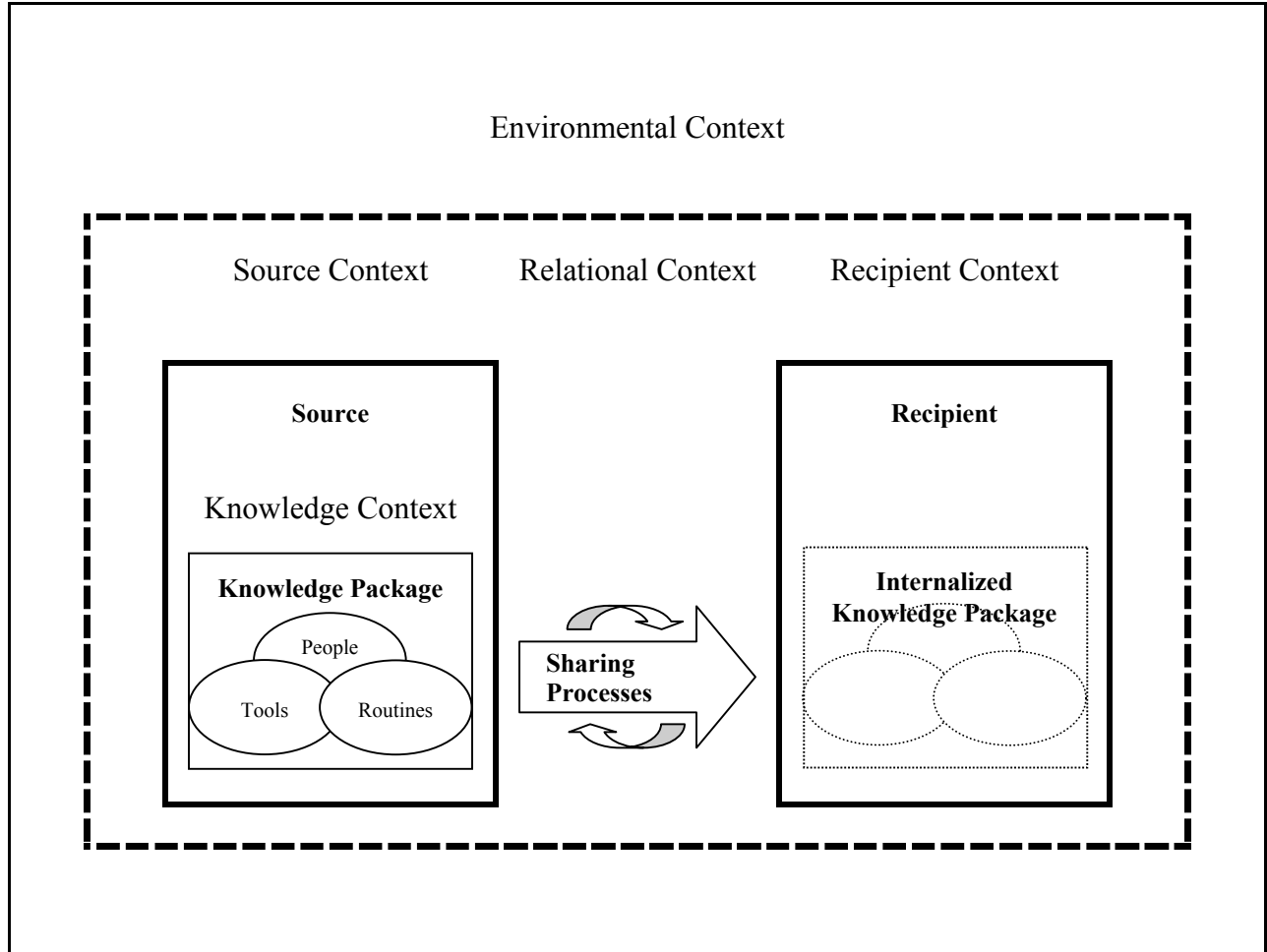
4. *To what extent does the Bank use the "knowledge-repository map" (discussed in point 1 of the knowledge assessment section) to devise plans that accommodate gaining access to or acquiring all of the components of the knowledge necessary to allow its successful sharing?* Again, the activities undertaken to transfer knowledge need to consider both the form and location of the knowledge if the transfer is to occur successfully.

Conclusion

A successful knowledge-sharing effort requires a focus on more than simply the transfer of the specific knowledge. Instead, many of the activities to be undertaken need to focus on structuring and implementing the arrangement in a way that bridges both existing and potential relationship issues, and examining the form and location of the knowledge to ensure its complete transfer. In other words, while the activities used to share knowledge, such as document exchanges, presentations, job rotations, etc., are important, overcoming the factors that can impede, complicate and even harm knowledge internalization are equally important in determining the ultimate results of a knowledge-sharing effort. Accordingly, any evaluations of the Bank's knowledge-sharing efforts need to incorporate assessments of its use of activities related to understanding the form and embeddedness of the knowledge, establishing and managing appropriate administrative structures, and facilitating the transfer of the knowledge.

Figure 1. Five Contexts of Knowledge Sharing

Environmental Context

Source Context   Relational Context   Recipient Context

Source

Knowledge Context

Knowledge Package

People

Tools   Routines

Sharing Processes

Recipient

Internalized Knowledge Package

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