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Towards a Unified Framework on Knowledge Sharing: An Organizational Knowledge Management Perspective

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ABSTRACT

Knowledge transfer in organization is the process through which one organizational unit is affected by the experience of another. Transferring knowledge, whether at the individual, group, product line, department, or division level, is usually a laborious, time consuming, and difficult task to achieve. The determinants of successful knowledge transfer, which in turn leads to higher organization performance has been the subject of many empirical studies employing various theories and concepts. This paper analyzes twenty such empirical studies and proposes a staged model to summarize their work. The results show the determinants that impact on each stage of the knowledge transfer process and the stages where more studies are needed.

Keywords

knowledge management, knowledge sharing, knowledge transfer process.

INTRODUCTION

Increasingly, knowledge has been recognized as an important resource that distinguishes a successful firm from others. The focus of mainstream strategic and organizational analysis has gradually shifted from Porter's classical industrial analysis to how firms manage their knowledge so as to achieve sustainable competitive advantage. Knowledge represents intangible assets, operational routines and innovative processes that are hard to imitate. How knowledge and best practices are identified and transferred to other units within the firm, but at the same time restrained from leaking out of the firm is a subject of interest to management researchers and practitioners.

Knowledge transfer in organization is the process through which one unit (e.g. group, department, or division) is affected by the experience of another (Argote 1999). Though the transfer usually occurs at the individual level, the issues of knowledge transfer in organization transcend the individual level to include the group, product line, department, and division levels. For example, a franchise of pizza-delivery business may learn from another franchise in pizza production process so as to reduce their production costs. Yet, experience shows that transferring knowledge at all levels is usually a laborious, time consuming, and difficult task to achieve. The determinants of a successful transfer, which in turn could lead to higher organization performance, has been studied by many but the conclusions are not yet definite.

In this paper, we review twenty recent empirical studies on knowledge transfer in an attempt to develop a conceptual framework that serves to summarize and organize the constructs and findings of the researches, hoping to shed light on the determinants of knowledge transfer in organizations and guide future research in that arena. These papers were selected using the following procedure. First, papers on knowledge sharing were scanned from four sources: (1) a knowledge management bibliography (Tiwana & Kankanhalli 2002), (2) keyword searches on Proquest ABI-INFORM online database, (2) Special Issues on knowledge management from the journals Decision Support Systems, Journal of MIS, Organization Science, Strategic Management Journal, and Academy of Management Review, and (4) reference sections of relevant papers and books. This resulted in 126 papers and 11 books on knowledge transfer. From this set, we selected papers that report *empirical* research on the *determinants* of *intra-organizational* knowledge transfer. This resulted in the final set of twenty papers as listed in Table 1.

Authors	Description of Study	Research Method	Sample	Level of Analysis
Bock & Kim (2002)	Major determinants of the individual's attitude towards knowledge sharing	Questionnaire survey	Employees of four large public organizations in Korea	Individual
Constant et al (1994)	A study of attitudes about information sharing	Laboratory experiment	Boston University's School of Management	Individual
Constant et al (1996)	The usefulness of electronic weak ties for technical advice	Field work	Tandem Computers Inc.	Individual
Darr & Kurtzberg (2000)	An investigation of partner similarity dimensions on knowledge transfer	Field work	Pizza-delivery franchise	Team or unit (franchise)
Dixon (2000)	An in-depth study of a number of exemplary organizations in knowledge sharing to reveal their underlying principles	Field work	Exemplary organizations in knowledge sharing (including Ford, BP, TI, Ernst & Young, Buckman Labs, Lockheed Martin, U.S. Army, and The World Bank)	Individual & Team or unit
Fraser et al (2000)	Identify the perceptions of and main motivations for knowledge sharing	Field work	A major international oil and gas company	Individual
Galbraith (1990)	Test the effects of technology characteristics, communication, organizational commitment, transfer experience, pre-transfer efforts, and post-transfer management on the successfulness of intrafirm technology transfer.	Field work	Eight U.S.-based corporations	Team or unit
Gupta & Govindarajan (2000)	Examine the effects of the value of the knowledge, motivation, richness of transmission channels, and the absorptive capacity on the knowledge flows between subsidiaries	Questionnaire survey	Heads of subsidiaries of multinational corporations headquartered in the U.S.	Team or unit (subsidiaries of multinational corporations)
Hall (2002)	Investigate the effects of both hard and soft rewards on knowledge sharing	Field work	A large, distributed, information-intensive, multinational company in UK	Team or unit
Hansen (1999)	An investigation of the effects of the strength of social ties and the knowledge complexity on the search and transfer problems of knowledge	Archival and questionnaire survey	A multinational electronics and computer company	Team or unit

Table 1: Summary of recent empirical researches on knowledge sharing

Authors	Description of Study	Research Method	Sample	Level of Analysis
Hansen (2002)	The development of the “knowledge network” model that based on relatedness in knowledge contents and lateral relations, which explains knowledge sharing effectiveness.	Archival and questionnaire survey	A multinational electronics and computer company	Team or unit
Jarvenpaa & Staples (2000)	An investigation of individual perception of factors that underlie the use of collaborative electronic media for information sharing	Questionnaire survey	An Australian university	Individual
Jarvenpaa & Staples (2001)	Exploring perceptions of organizational ownership of information and expertise	Questionnaire survey	One Australian and one Canadian university	Individual
McDermott & O’Dell (2001)	Cultural barriers to knowledge sharing	Field work	Five large companies that felt knowledge sharing was a natural part of the organizational culture	Individual
Swart & Kinnie (2003)	A detail study of the ways in which HR policies and processes contribute to overcoming the barriers to sharing knowledge	Field work	A knowledge intensive firm in the south-west of England	Individual
Szulanski (1996)	Exploring internal stickiness of the transfer of best practice within firms	Questionnaire survey	Eight firms that had strong incentives to transfer best practices	Team or unit
Szulanski (2000)	Analyzing internal stickiness in stages of knowledge transfer process	Questionnaire survey	Eight firms that had strong incentives to transfer best practices	Team or unit
Tsai (2001)	Examine the effects of network position and absorptive capacity on knowledge transfer	Questionnaire survey	Two large U.S. multinational corporations.	Team or unit
Tsai (2002)	An investigation of the effectiveness of coordinated mechanisms on knowledge sharing amongst “coopetitive” organization subunits.	Questionnaire surveys in 1996 and 1998	A diverse multiunit company.	Team or unit
Wasko & Faraj (2000)	Why people participate and help others in electronic communities of practice	Questionnaire survey	Three technical Usenet newsgroup	Team or unit

Table 1 (continued): Summary of recent empirical researches on knowledge sharing

THE STAGES OF KNOWLEDGE SHARING

In most of the papers reviewed, knowledge transfer has been treated as a ‘black box’. A process view emphasizes the sequence of events and provides insights on the nature of the inner workings of the implementation. However, few researchers have explicitly suggested a process model for knowledge transfer. Szulanski (1996, 2000) put forward a model that includes four stages: initiation, implementation, ramp-up and integration. We have developed a similar model to organize and summarize the twenty papers that we have selected. Our proposed model differs from Szulanski’s model in: (1) The new model splits the initiation stage into motivation and matching stages, which have significantly different determinants and

driving forces. (2) The new model combines the implementation and ramp-up stages into a single transfer stage as the two former stages are actually highly iterative and practically inseparable in real life situation. Also, the determinants of these two former stages are also very similar. (3) The last stage is re-labeled 'retention' in order to explain the phenomenon of knowledge depreciation (Argote 1999) and to reflect the importance of achieving sustainable organization performance through knowledge sharing. (4) The new model caters for iterations between stages that more closely describe the actually knowledge sharing process occurred in practice. Figure 1 shows the model. The stages are described below.

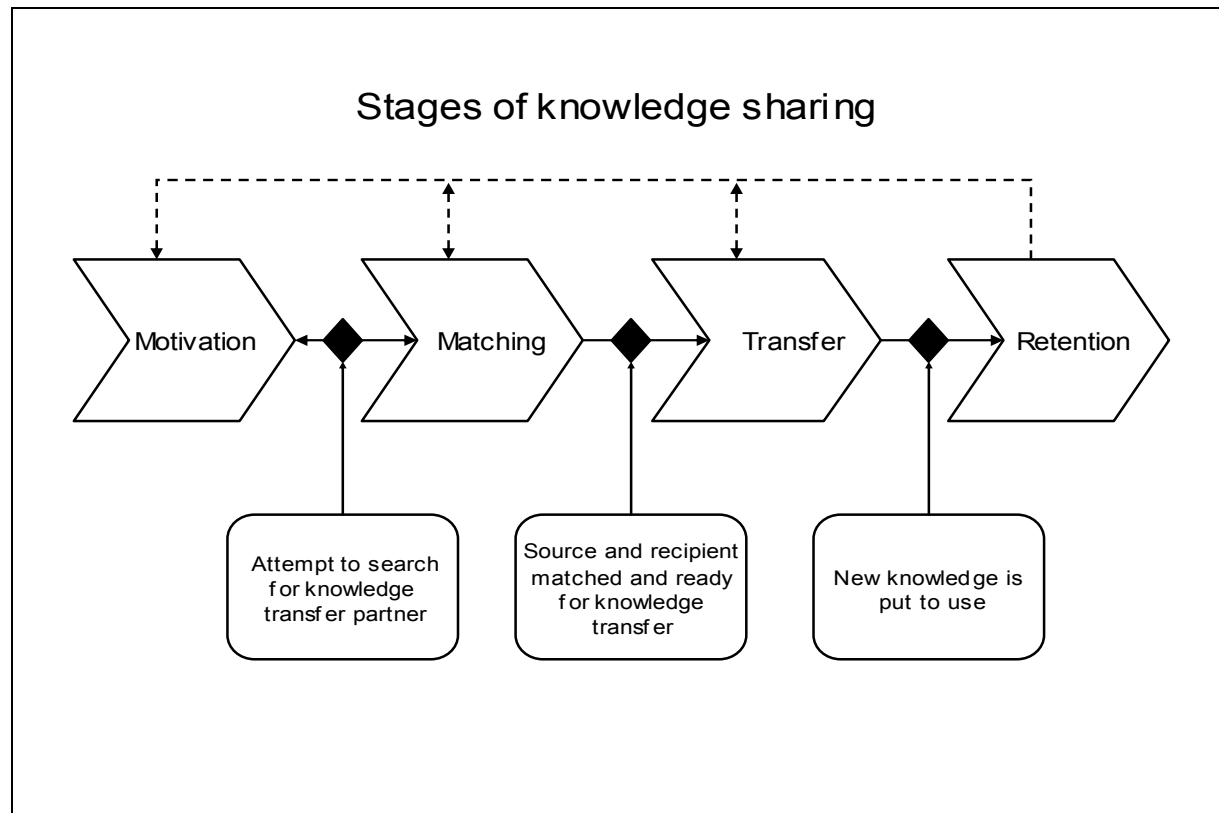


Figure 1: The stages of knowledge transfer

Motivation

This stage comprises all events that lead to the attempt to initiate a knowledge transfer. It begins with the identification of a gap between the existing knowledge and the target knowledge needed to accomplish a task or to achieve a certain performance level. However, the discovery of such a gap does not necessarily trigger a search for potential solutions. Possible reasons include the 'not invented here' syndrome (Katz and Allen 1982); organizational culture (McDermott and O'Dell 2001); the 'crowding-out' effect (Osterloh and Frey 2000); and the perceived ownership of the knowledge (Jarvenpaa and Staples 2000, 2001). The attempt to seek knowledge transfer may be initiated by the source or by the recipient. Their corresponding partner is then identified and the attempt to transfer is cultivated in the matching stage. Once the suitable partner is identified, the motivation stage is revisited on the partner side. Thus the motivation and the matching stages actually form an iterative loop. If both the source and the recipient (and all the necessary actors) in the knowledge transfer process are motivated and the transfer is ready to proceed, the motivation-matching iteration is completed and the process moves to the transfer stage.

Matching

The matching stage begins with an attempt to search for a suitable transfer partner(s). In searching for the appropriate partner(s), not only the characteristics of the required knowledge are influencing the successful matching, but other factors such as the organizational context (Szulanski 1996), the perceived reliability of the partner (Szulanski 1996), the competitive relationship between the partners (Tsai 2002), the similarity between the partner (Darr & Kurtzberg 2000), and strength of social ties between the partners (Constant et al 1996, Hansen 1999) may also play a part. Successful matching would not

automatically trigger the actual transfer of knowledge. The matched partner has to be willing to share or learn the knowledge in question. The motivation-matching iteration would only exit, if ever, when all key partners of the knowledge transfer process have been identified, motivated and committed. Only then could the actual transfer of knowledge occur.

Transfer

During this stage, resources flow between the recipient and the source. Depending on the level of knowledge complexity (or causal ambiguity of the knowledge), transfer-specific social ties between the source and the recipient are established and the transferred practice is often adapted to suit the anticipated needs of the recipient. The ability of the recipient to assimilate and apply the resource obtained from the source is referred to as the 'absorptive capacity'. It is largely a function of the individual's or group's level of prior related knowledge (Cohen and Levinthal 1990). The transfer process is considered completed when the recipient starts using the transferred knowledge. However, as the recipient is likely to use the new knowledge ineffectively at first, the transfer process is usually an iterative process until the performance reaches a satisfactory level.

Retention

The retention stage begins after the recipient achieves satisfactory results with the transferred knowledge. The new practices become institutionalized and they progressively lose their novelty and become part of the objective, taken-for-granted reality of the recipient organization. However, to maintain the initial performance gain, the recipient needs to retain the knowledge in an organizational repository and be able to retrieve and apply it effectively when the need arises again in the future. Argote, Beckman and Epple (1990) shows that knowledge depreciation in a production environment occurs rapidly even if labor turnover is controlled.

TOWARDS A UNIFIED FRAMEWORK ON KNOWLEDGE SHARING

We found that the conceptual models and frameworks employed in the knowledge transfer literature are diverse and based on theories from various disciplines (See Table 2). Studies that focused on the motivation and matching stages often established their conceptual frameworks on theories from social psychology and sociology, such as theory of reasoned action (Fishbein & Azjen 1975), the theory of planned behavior (Azjen 1991), diffusion of innovations theory (Rogers 1983), and social cognitive theory (Bandura 1986). In particular, Constant et al (1994) uses social cognitive theory to demonstrate the power of self-expression as a motivational force; Jarvenpaa & Staples (2000; 2001) uses social exchange theory (Blau 1967) and social identity theory (Jenkins 1996) to explain the difference between sharing behavior on information and expertise; and Bock & Kim (2002) use economic exchange theory (Kelley & Thibaut 1978), social exchange theory, and social cognitive theory to establish the determinants of attitude towards knowledge sharing attitude, which is based on theory of reasoned action. Studies that focused on matching stage employed theories mainly from sociology. Examples are various studies that investigate the effects of the strength of social ties (Constant et al 1996; Hansen 1999), which are based on the theory of 'the strength of weak ties' (Granovetter 1973). Darr & Kurtzberg (2000) focused on partner similarity, which is based on the social psychology theory on positive relationship between similarity and attraction.

Motivation	Matching	Transfer	Retention
Theory of reasoned action	Strength of social ties	Causal ambiguity	Retentive capacity
Social exchange theory	Partner similarity	Absorptive capacity	Causal ambiguity
Economic exchange theory	Positions in social networks		
Social cognitive theory			

Table 2: Major concepts and theories employed by researches on knowledge sharing

Causal ambiguity and absorptive capacity are two major concepts first proposed by Szulanski (1996) as the barriers and determinants of knowledge sharing. The concept causal ambiguity was originally used by Lippman and Rumelt (1982) to describe the phenomenon surrounding business actions and outcomes that makes it difficult for competitors to emulate strategies. Absorptive capacity was originally described by Cohen and Levinthal (1990) as the collective abilities to recognize the value of new information, assimilate it, and apply it to commercial ends.

Interestingly, different streams of research may produce different conclusions. One example, as pointed out by Hansen (1999), is the apparent contradictory findings of social network scholars and product innovation researchers on the effects of the strength of social tie on knowledge sharing. Researches based on social network approach show that distant and infrequent relationships (i.e. weak ties) are efficient for knowledge sharing whilst the literature on product innovation argues that close and frequent interactions (i.e. strong ties) between research and development and other functions lead to project effectiveness. This apparent contradiction can be resolved by looking closer to the process of knowledge sharing. By establishing weak ties with a large number of parties, the chance of obtaining non-redundant knowledge during the matching stage (termed by Hansen as ‘search’) is increased. On the other hand, the actual transfer of knowledge, especially tacit knowledge, often requires strong ties to be established between the source and the recipient. Thus, by framing the determinants against a unified framework, we can clarify past research findings and also frame and position future work in the context of prior research. We developed such a framework by mapping the determinants studied in the twenty selected papers to our proposed stage model. Figure 2 shows the framework.

In the next section, we describe the determinants studied in each paper. Then Table 3 lists the papers that studied the constructs mapped to each stage of knowledge transfer according to our framework.

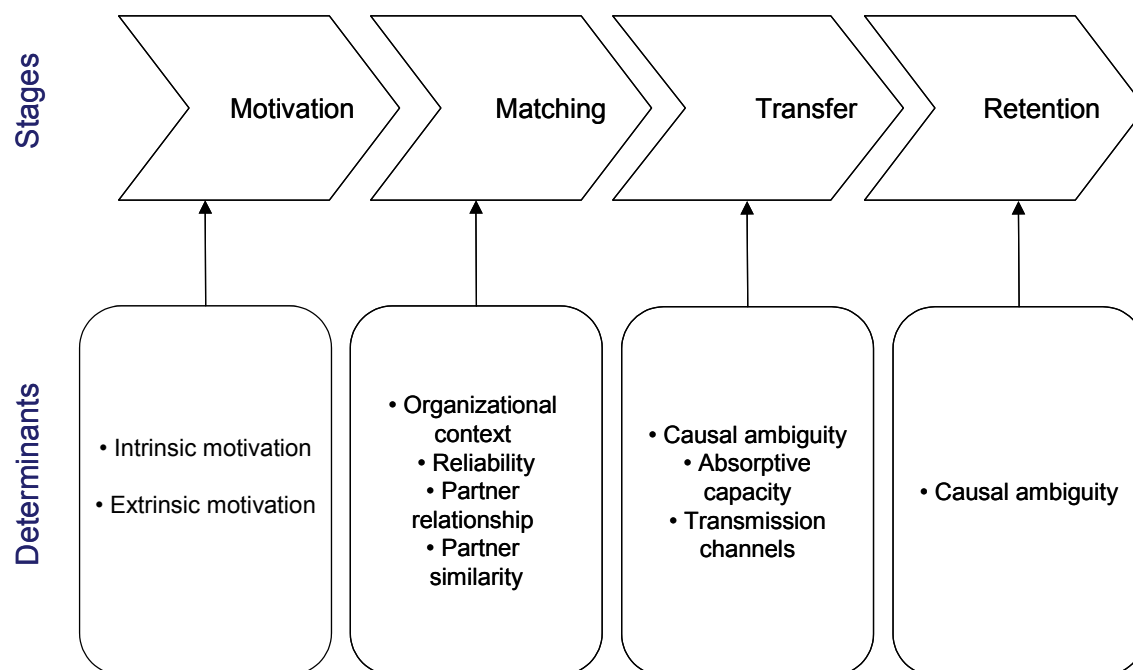


Figure 2: A theoretical framework for knowledge transfer research

ANALYSIS OF RESEARCH CONSTRUCTS

In terms of the theoretical constructs for knowledge sharing, Szulanski (1996, 2000) probably covers the most comprehensive set of determinants. He grouped them into four categories: (1) Characteristics of knowledge transferred; (2) characteristics of the source of knowledge; (3) characteristics of the recipient of knowledge; and (4) characteristics of the context. Almost all the papers identified (as listed in Table 1) studied the motivation of the source and recipient of knowledge, i.e., categories (2) and (3).

Two major constructs that are adopted and proved by Szulanski as determinants of effective knowledge transfer are *casual ambiguity* of the knowledge being transferred and *absorptive capacity* of the recipient. *Absorptive capacity* was coined by Cohen and Levinthal (1990) as “the ability of a firm to recognize the value of new, external information, assimilate it, and apply it to commercial ends”. They argued that *absorptive capacity* is critical to the firm’s innovative capabilities and is largely a function of the firm’s prior related knowledge. *Absorptive capacity* is not only a firm level construct. Cohen and Levinthal (1990) posit that an organization’s *absorptive capacity* will depend on the *absorptive capacity* of its individual members. However, a firm’s *absorptive capacity* is not simply the sum of the *absorptive capacities* of its employees. It also

depends on how well knowledge is transferred and utilized across and within organizational subunits. Building also on the concepts of absorptive capacity, Tsai (2001) includes network position as an additional independent variable. He hypothesizes that the centrality of an organizational unit's network position is positively related to its innovation.

Constant et al. (1994; 1996) studied organizational ownership as a mediator to the motivation of knowledge sharing. They argue that when people feel inclined to engage in prosocial transformations, that is, when they wish for good outcomes not only for themselves but also for other employees or for the organization more generally, they are more likely to share information. The authors support the widespread norm that could contribute to information sharing is the idea that organizations own the labor of their employees. This norm implies that an information outcome of work such as an idea, process, invention, document, or computer program that an employee creates or acquires at work or using organizational resources actually belongs to the employer rather than to the employee. They further suggest that organizational ownership is learned as people begin to acquire work experience and professional training. They predict and show in their research that the more work experience or work training people have, the more organizational ownership they will attribute to any employee's information, which in turn lead to attitudes favoring information sharing with another employee.

Jarvenpaa and Staples (2000; 2001) further develop the model of Constant et al. by suggesting six additional constructs that are correlated with organizational ownership. These constructs are: (1) Self-ownership, (2) propensity to share, (3) organizational culture, (4) information culture, (5) task interdependences, and (6) demographics. One important finding of Jarvenpaa and Staples' research is that in contrast to the common view that organizational ownership and self-ownership are a zero sum game (that is, more self-ownership implies less organizational ownership), their research reveals that self-ownership actually co-exists with organizational ownership. The more the individuals believe in self-ownership, the more they believe in organizational ownership. Also counterintuitive is that the study did not find any effect of task interdependence on organizational ownership. The original hypothesis was based on rational self-interest that greater interdependence in one's job would create a higher need for information from others and information that was owned by the organization would presumably be more reliably and freely available.

Darr and Kurtzberg (2000) also focus on the motivation and relationship dimensions of the determinants. They examine how partner similarity influence knowledge transfer. They hypothesize that greater similarity in business strategy, customer base and proximity will lead to greater knowledge transfer. However, the results of their research suggest only business strategy similarity creates a context favorable to knowledge transfer.

Also focusing on the motivation and attitude dimensions, Bock & Kim (2002) borrow classical sociology theories in an attempt to model the attitude that leads to knowledge sharing. They propose that expected rewards, expected association, and expected contribution are three determinants of the individual's attitude toward knowledge sharing.

Hansen (1999; 2002) are the only other papers, besides Szulanski, that attempt to model the knowledge sharing process and cover constructs in the transfer stage. Hansen divides the knowledge into two stages: namely search and transfer stages. He also includes independent variables (noncodified and dependent knowledge) as factors to explain the effectiveness of the knowledge transfer process.

McDermott & O'Dell (2001) focuses both on the motivation and organizational context parts in the framework set down by Szulanski. They suggest that practitioners should adapt their knowledge management approach to fit the existing culture of the organization rather than trying to change the culture. Their main findings are: (1) there is a visible link between sharing knowledge and solving practical business; (2) the approach, tools and structures to support knowledge sharing match the overall style of the organization; and (3) reward and recognition systems support sharing knowledge.

Tsai (2002) brings the concept of 'co-opetition', which was a well-researched topic in inter-organizational environment, into the arena of intra-organizational knowledge sharing between company subunits. The theoretical constructs Tsai employed can be mapped onto the matching stage in our framework, which mainly measure the organization context and the partner relationship between the subunits.

Wasko and Faraj (2000) perform exploratory research to determine why people participate in helping others in Usenet newsgroups. They did not propose any hypothesis beforehand but ask open-end questions on what motivate the individual to participate in the discussion of the newsgroups. The answers are then categorized by contents analysis. Their findings are in line with the prosocial and community ownership propositions of Constant et al. and Jarvenpaa and Staples' research.

Gupta and Govindarajan (2000) studied the impact of motivational disposition and absorptive capacity on knowledge transfer between subsidiaries in multinationals. In addition, they found that knowledge flows are positively associated with richness of transmission channels.

Construct	Motivation	Matching	Transfer	Retention
Intrinsic motivation (expected associations & contributions, personal benefits, perceived ownership, expected reciprocal sharing, propensity to share, individual difference, tangible & intangible returns)	Constant et al (1994, 1996); Bock & Kim (2002); Jarvenpaa & Staples (2000, 2001); Hall (2002); Fraser et al (2000); Wasko & Faraj (2000)			
Extrinsic motivation (organizational motivation, organizational benefits, incentive focus, hard and soft rewards, task dependence, organizational culture, shared values, reward system, HR policies for commitment to share, community interests)	Jarvenpaa & Staples (2000); McDermott & O'Dell (2001); Hall (2002); Gupta & Govindarajan (2000); Fraser et al (2000); Swart & Kinnie (2003); Wasko & Faraj (2000)			
Organizational context (level of centralization, HR policies for social support)		Tsai (2002); Swart & Kinnie (2003)		
Reliability		Wasko & Faraj (2000)		
Partner relationship (physical distance, co-production, strength of tie, path length in knowledge network, direct relation, network position, social interaction)		Galbraith (1990); Szulanski (1996, 2000); Tsai (2001, 2002); Hansen (1999, 2002); Wasko & Faraj (2000)		
Partner similarity (overlapping of knowledge, relative size and economic level, homogeneity, business strategy, task and context)		Darr & Kurtzberg (2000); Dixon (2000); Gupta & Govindarajan (2000); Swart & Kinnie (2003)		
Causal ambiguity (complexity, non-codified)			Szulanski (1996, 2000); Galbraith (1990); Dixon (2000); Hansen (1999, 2002)	Szulanski (1996, 2000);
Absorptive capacity (prior experience)			Galbraith (1990); Dixon (2000); Tsai (2001); Szulanski (1996, 2000); Gupta & Govindarajan (2000)	
Transmission channels (on-the-job training, documentation)			Galbraith (1990); Gupta & Govindarajan (2000)	

Table 3: Summary of constructs applied for each stage of knowledge transfer in recent research publications

IMPLICATIONS FOR FUTURE RESEARCH

Our analysis showed that much research has focused on investigating the determinants at the motivation and matching stages of knowledge transfer. There are relatively few that investigate the last two stages, i.e., transfer and retention. Without the effective implementation of the last two stages, the recipient's performance level will not improve and the organization is not likely to achieve competitive advantage through knowledge sharing. Also, research in knowledge depreciation and organization forgetting (Argote 1999) showed that the retention stage is essential for the organization to sustain the initial performance gain. Thus, future research should focus more on the determinants of the transfer and retention stage of knowledge sharing.

Determinants suggested here in the proposed framework are few and relatively high level. In order to perform meaningful research, we need to operationalize the high level constructs such as causal ambiguity, absorptive capacity, and retentive capacity. The possibility of multidimensionality of these constructs should also be carefully investigated.

The majority of studies examined in this paper are based on the questionnaire survey method, which is weak in establishing causal relationship. The only experimental study is done in an academic setting, which leads to weak external validity. More exploratory case studies in industrial setting should be done in order to supplement the literature on knowledge sharing.

Finally, the four-staged knowledge transfer process framework should be validated through a rigorous case study.

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