KNOW-HOW TRANSFER IN CONSTRUCTION INDUSTRY: SOCIAL AND ECONOMICS FACTORS

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The importance of managing knowledge in organizations for competitive advantage has received an amount of attention in recently years. In construction industry, the transfer of tacit, non-proprietary technological knowledge often referred as know-how is critical in making knowledge actionable and operational in construction industry. The research investigates the importance of social and economics aspects in knowledge transfer. By using the concept of reciprocity, the research analyzes the economic and social perspectives on exchange, and discusses how the socio-economic context influences know-how transfer decisions within the same firm and across firm boundaries. Drawing upon a questionnaire-based survey on the construction industry, the research aims to examine the significance of social and economics factors in enhancing the capabilities of know-how transfer in such an environment. The main finding from the research is that processes of know-how transfer in project settings rely very heavily upon social and economic patterns, practices and processes. In particular, the value and importance of recognizing the dual impact of social relationships and competition is crucial to know-how transfer behaviour.

Keywords: know-how, reciprocity, socio-economic, tacit knowledge.

INTRODUCTION

Increasingly, the importance of social and economics aspects of knowledge transfer has been emphasized in the literature on managing knowledge, with the recognition that knowledge is often tacit and embedded within particular groups and situations. Knowledge and notably tacit knowledge is an organization's most strategically significant resource (Grant 1996).

Construction industry is a knowledge-based industry. The main motivation for knowledge management is also being recognized as a vehicle through which the industry can address its need for innovation, quality, business performance, efficiency of project delivery, and client satisfaction, rather than to gain competitive advantage or to create new knowledge (Egan 1998; Egbu *et al.* 1999, Love, *et al.* 2003). Egbu (2000) stressed that knowledge management is vital for efficient working in projects and for improving organizational competitiveness. An enormous volume of experience-based and tacit knowledge is generated during the phases of design, plan, construction, maintenance and decommission of a facility. This type of knowledge is often referred as know-how or expertise. Designers, engineers and builders are the premier knowledge workers and key sources (and recipients) of technical expertise and know-how. They are involved in projects and regularly receive requests for know-how from others, both from inside their own firm and across firm boundaries. The

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transfer of know-how is critical in making knowledge actionable and operational in construction industry. Due to the one-off nature of project work and the many resulting discontinuities in methods of organization and flows of personnel, materials and information, the transfer of know-how in such a context faces many challenges. One important consequence is that social and economic considerations potentially play an important part in know-how transfer.

A deeper understanding of difficult associated with transferring know-how, needs to be obtained for organizations to realize the social and economics factors of tacit knowledge. The goal of this study is to better understand the factors influencing an project individual's knowledge transfer behavior, both within and across firm boundaries; specifically the transfer of tacit knowledge. By using the concept of reciprocity, this research analyzes the economic and social perspectives on exchange, and examines how differences in the social and economic context affect project individual's decisions to transfer know-how.

KNOWLEDGE TRANSFER

A crucial aspect within knowledge management is the transfer of knowledge from one set of individuals to another (Nonaka 1994). Szulanski (1996) argued that knowledge transfer is extremely important especially in the current age where the organizations have to continually learn and innovate to remain competitive. Knowledge transfer is characterized as the process where a "complex, causally ambiguous set of routines" is "recreated and maintained" in a "new setting" (Szulanski 2000). Li and Gao (2003) stress that the competitiveness of a company is improved not mainly via knowledge creating processes, but via continuous learning and knowledge transfer as shown in Figure 1. Alavi (2000) highlights the importance of knowledge transfer that knowledge generation by itself cannot lead to superior performance of a social entity. Rather, the companies have to create value by using that knowledge, and knowledge can only be utilized if it is transferred successfully.

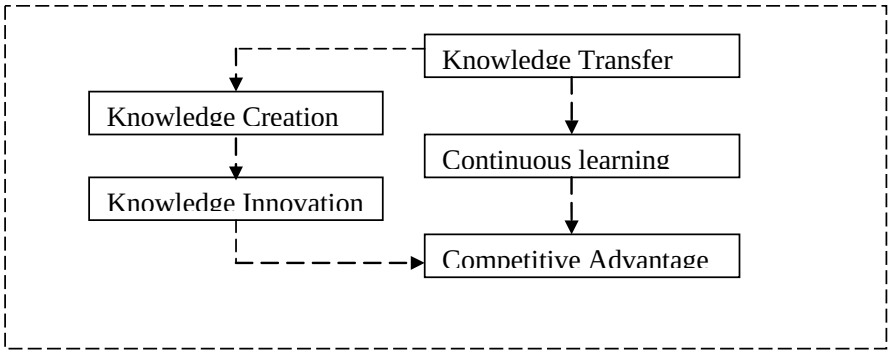

Figure 1 Knowledge transfer and competitive advantage (Li and Gao, 2003)

Whilst codified explicit knowledge may lead itself easily to transfer and share, tacit knowledge is argued to be of a more complex nature. Based on the literature review, there are several different schools of thought regarding transfer and codification of tacit knowledge. Nonaka *et al.* (1997) proposed that it is both necessary and possible to capture tacit knowledge by transforming it into explicit knowledge. Nonaka and Takeuchi (1995) insisted that a process of transfer tacit knowledge lies in the socialization, where tacit knowledge is articulated to explicit knowledge through dialog and listening as indicated in the SECI-model. However, converting the

tacitness of one's knowing to explicit knowledge isn't easy according to Polanyi (1958) who views that tacit knowledge diffusion seems to be impossible only through personal experience, where as others (Leonard and Sensiper 1998, Zack 1999; Holthouse 1998) consider transferring tacit knowledge as very difficult. To make all knowledge explicit and eliminate the tacit personal elements in it could even be destructive to all knowledge (Polanyi 1966). It is difficult to diffuse tacit knowledge to other forms of codified knowledge and render the strategic nature of the tacit over the explicit knowledge.

KNOW-HOW TRANSFER PERSPECTIVES

Nonaka and Takeuchi (1995) suggested that tacit knowledge has two dimensions: technical (represented by know-how in skill application) and cognitive (represented by personal perceptions). Tacit knowledge is difficult to codify (Schrader 1991) and is based upon individual know-how, often referred as a skill or craft (Hansen 1999, Polanyi 1966). Know-how is the ability to apply the basic knowledge that individuals can acquire and accumulate through extensive training to complex real-world problems. Know-how as an essential resource enables an organization to achieve sustainable competitive advantage by encompassing potentials, which is specific to the organization, and perhaps, even unique as it is the product of every individual, for a give period of time and which is difficult for competitors to inmate.

Know-how transfer has been studied from two largely different perspectives: economic and social. From the economic perspective, researchers argued that the decision to transfer know- how is predominantly affected by the degree of competition between the parties involved. This group focuses primarily on transfer between individuals from different firms (Appleyard 1996, Schrader 1991). Researchers with a social perspective argued that relationships between individuals are central to the know-how transfer decision. Such investigators focus primarily on transfer between individuals within the same firm (Hansen 1999, Szulanski 1996, Tsai and Ghoshal 1998). However, a few more recent, socially based research studies examined transfer behavior between individuals from different firms (Melin 2000). Currently, the most effective way of accessing and using know-how is if know-how contributor participates in organizational processes.

Granovetter (1985) recognized the social embedness of many exchange behaviors. Yet few empirical studies have attempted to bring together the economic and social factors affecting the transfer of know-how. Bouty (2000) established that the decision to transfer knowledge was a function of "…acquaintance, mutual trust, and competition…" Inherent in these findings are mixed social and economic motives for knowledge exchange. These studies suggested that considering the social and economic factors as separate and distinct explanations for know-how transfer is an oversimplification (Hausler, Hohn and Lutz 1994, Scarbrough 1995). In fact, know-how transfer is dynamic, because every individual is in a constant state or evolution and know-how continues to evolve within the individual. Know-how can be continually extended and/ or refined as a result of new knowledge and information, which is received and integrated by the individual outside or within the organization (Blackmore 2004). The decision to transfer know-how is not exclusively explained by either economic or social perspective. To understand know-how transfer more completely, it must understand ways in which the economic drivers interact with the social drivers. Most know-how transfer decisions are economically and socially

embedded. They are made within, and influenced by, an exchange context with both social and economic components.

This research addresses the following question: How does the socio-economic context of know-how exchange affect the transfer decision/behavior; both between firms and within a firm? To address this question, it needs a concept which is capable of unifying the economic and social perspectives of exchange behavior. That integrative concept is reciprocity. By employing this concept we develop a theory bridging the social and economic perspectives which are benefit to explore social and economic factors interact to influence know-how transfer decision.

THE CONCEPT OF RECIPROCITY

Tacit knowledge is used at different level of organization in different contexts by different types of know-how contributor. Every member of an organization is a know-how contributor and a process participant, who is a unique individual with certain common interest characteristics. When a project individual participates in knowledge transfer, s/he develops expectations of the recipient. These expectations are related to reciprocity. The role of reciprocity to transfer and exchange of resources is fundamental, which is central to both economic and social exchanges. Reciprocity as primarily a give and get process is the mechanism by which exchange occurs and exchange relationships develop. Reciprocity from an economic or social perspective refers as the fulfilment of expectations by the people who have interacted with another (Axelrod 1984, Gouldner 1960, Sahlins 1978). Though economic and social exchanges appear to have different purposes, both types of exchange rely on the mechanism of reciprocity. When reciprocity is absent, exchange relationships do not function. Therefore, the expectation of reciprocity is essential to the transfer of know-how.

AN EXPLORATORY AND FINDINGS

The research is based on a going questionnaire survey on knowledge management in construction industry. The survey is built on the theory on knowledge management (Demarest 1997, Brown and Duguid 2001) and findings from previous studies (Bresnen *et al.* 2003, Sun and Scott 2005). The survey consists of about sixty questions to different areas of knowledge management. The respondents' average rating for each of the factors using a rating scale from (1) least important to (5) most important

Many large and medium sized Chinese and UK construction companies are included in the study. The projects include housing, commercial, service, and infrastructure projects. In total, more than 400 questionnaires were distributed. To date, 103 project individuals answered the questionnaire. This paper presents a subset of the total study and focuses on know-how transfer.

There are findings regarding the relationship of socio-economic context and know-how transfer decisions within the same firm and across firm boundaries.

- The stronger the reciprocal exchange context, the higher the quality of know-how transferred.
- For inter-firm know-how requests, the stronger the reciprocal exchange context the higher the quality of know-how transferred

- For inter-group know-how requests, the stronger the reciprocal exchange context, the higher the quality of know-how transferred.
- For inter-firm know-how requests, when the reciprocal exchange context is equivocal, the quality of know-how transferred will be intermediate between a high and low quality of know-how, but significantly different from both.
- For inter-group know-how requests, when the reciprocal exchange context is equivocal, the quality of know-how transferred will be intermediate between a high and low quality of know-how, but significantly different from both.
- The relative strength of social relationships and competition inside the firm will evoke expectations of reciprocity in the same direction as the relative strength of social relationships and competition across firm boundaries.
- The quality of know-how transferred between project individual from the same firm will be higher than the quality of know-how transferred between project individual from different firms.

DISCUSSION

Knowledge transfer involves two actions, transmission (sending or presenting knowledge to a recipient) and absorption by that recipient. If the knowledge is not absorbed, it has not been transferred. Knowledge transfer can occur when knowledge is diffused among entities spanning multiple levels, that is, among individuals, groups, and organizations (Argote and Ingram 2000, Inkpen and Dinur 1998). Blackmore (2004) outlined a spectrum of know-how contribution and divided the types of know-how contributor along this spectrum between the two poles of extroverted and introverted contribution as shown in Figure 2.

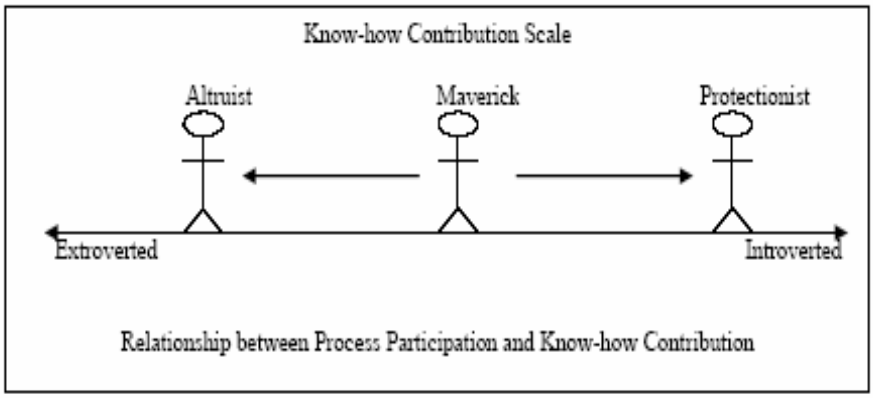

Figure 2: A spectrum of Know-how contribution (Blackmore, 2004)

Reciprocity and Competition

This research has focused on providing empirical support for a general theory of reciprocity, specifically as it relates to know-how transfer in construction projects. When a project individual (source) receives a request for know-how from another project individual (recipient) from a different firm, the presence or absence of inter-firm and competition affects the expectation of future reciprocity (Schrader 1991). Similarly, when the source and the recipient belong to different project groups inside the same firm and these groups compete internally for resources, the degree of competition affects the expectation of future reciprocity. When a project individual (source) receives a request for knowledge from another project individual (recipient)

and the level of inter-firm or inter-group competition is high, reciprocity and competition are negatively correlated. When the level of competition between the source and the recipient is high, know-how sharing is less likely as there are significant concerns related to competitive advantage and reciprocity. When the potential result of sharing know-how is the improvement of the recipient's competitive position relative to the source's position, it is reasonable to assume that know-how will typically not be shared (Schrader 1991; Von Hippel 1987).

Reciprocity and Social Relationships

Strong social relationships between the source and the recipient are likely to increase the source's expectation for future reciprocity from the recipient. Two project individuals with a strong social relationship will trust one another; consider each other friends and be part of each other's social network. Bouty (2000), Hansen (1999), and Melin (2000) found that knowledge is more likely to be transferred between sources and recipients with strong social relationships. Strong social relationships are associated with reciprocal arrangements that ensure the forth and back flow of advice and assistance. A strong social relationship increases the expectation of reciprocity and is an important mechanism governing knowledge transfer inside and outside the construction firm.

Reciprocity in a Socio-economic Exchange Context

Knowledge transfer occurs in socio-economic exchange contexts. They are simultaneously affected by economic and social factors (Davern 1997; Granovetter 1985; Uzzi 1997). As both social and competitive aspects of exchange context carry with them different expectations of reciprocity, a project individual's response for know-how request will be affected by the expectation of reciprocity which will be based on the strength of the social relationships relative to the level of competition surrounding the exchange. Strong social relationships evoke a positive expectation of future reciprocity; high levels of competition evoke a negative expectation. Therefore, when the strength of social relationship relative to the level of competition in any given exchange is high, the exchange context evokes positive expectations of future reciprocity.

Managerial Implications

The knowledge that the socio-economic context influences know-how transfer behavior between project individuals provides project managers with insight to help affect the flow of know-how. Across their firm's boundaries, project managers want to be selective, encouraging know-how transfers that are advantageous for their firm. Transfers that span firm boundaries are problematic because there is the potential for disadvantageous know-how leakage to competitive firms. The research suggests that project individuals are unlikely to transfer know-how to individuals at competing firms with whom they do not have a strong social relationship. Similarly, they are likely to exchange know-how with other individuals they have at strong relationship with at non-competing firms. In both these situations, Project individuals generally behave in the best interests of their firm. It is in equivocal situations where project managers should focus their attention and may need to assume a more active role in monitoring and managing the flow of know-how across their firm's boundaries. Indeed project managers may want to reduce the range of this equivocality by communicating to their project individuals. Project individuals could also be encouraged to develop relationships with project individuals at other firms that are not competitive

Within their firms project managers generally want to encourage more know-how transfers; more is better. However, when project individuals perceive project groups as competing for internal resources it reduces the likelihood of know-how transfer. If project managers want to foster sharing, they should focus on designing an internal resource allocation process that reduces the level of perceived competition between project groups. For example, when access to resources is such that project individuals feel that one group's success means another group's failure, project groups inside the firm are less likely to share know-how. This is the situation occurs when the allocation of resources is centralized (Pierce and White 1999). On the other hand, if resources are more distributed and divided up along different categories, and project groups are made to feel that one group's success does not impede their group's success, then the resource allocation context would facilitate know-how sharing amongst project groups. By altering the configuration of internal resources project managers can decrease the level of perceived competition between project groups, positively affect expectations of future reciprocity, and encourage know-how transfer behaviour. Project Managers can also work on the social side of the exchange calculus by fostering strong social relationships that span different internal project groups. How projects are staffed; where offices are located; more opportunities for informal social gatherings are all tools project managers can employ to have project groups whose members have social relationships spanning the different groups with their firm. Whether inside their firm or between their firm and other firms, project managers need to recognize the dual impact of social relationships and competition when devising ways to influence know-how transfer behaviour.

CONCLUSIONS

The research sets out to explore the relationships between social and economic exchange along with a attempt at synthesizing these divergent perspectives, which can improve the understanding of the know-how exchange phenomenon in construction industry. The empirical and theoretical contributions of this research are important because exchanging knowledge is a significant way in which knowledge workers contribute to their firms' performance. If project managers can develop insight regarding ways in which individuals exchange know-how, they can begin to unravel the complexities for a key determinant of firm performance, such as innovation and sustained competitive advantage. Independently both sociology and economics have made contributions to explain the aspects of knowledge exchange. Utilizing the concept of reciprocity, this research unifies social and economic thinking about know-how exchange. To improve know how transfer, these integrated perspectives will prove more valuable than just the sum of the parts.

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