



Revisiting knowledge transfer: Effects of knowledge characteristics on organizational effort for knowledge transfer

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ABSTRACT

This study analyzes the effects of knowledge characteristics on the extent of organizational effort for knowledge transfer. In this paper, three knowledge characteristics that affect organizational behavior for knowledge transfer are identified based on knowledge-based views and organizational learning theory: tacitness, difficulty, and the importance of knowledge. We establish three hypotheses on the effects of these three knowledge characteristics on the extent of effort for knowledge transfer (i.e., the frequency of contact with knowledge source), and provide empirical tests employing the dataset from project teams in a multinational consulting firm via the OLS model. Results show that tacitness, difficulty, and importance have positive effects on the frequency of contact with knowledge sources. This implies that firms exert more effort to acquire the knowledge when the knowledge is tacit, difficult, or important.

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1. Introduction

Knowledge is a critical resource for organizations' competitive advantage (Grant, 1996a; Kogut & Zander, 1992). Organizations have to create new knowledge continuously to maintain their competitive advantage in rapidly changing environments. However, knowledge creation is not a process that necessarily creates completely new knowledge but an operation that recombines and reorganizes existing knowledge. The knowledge that transfers from knowledge sources becomes the raw material in knowledge creation for a recipient organization, and successful knowledge transfer is an important driving force in knowledge creation.

With the emphasis on the importance of knowledge transfer for knowledge creation and sustainable competitive advantage, various research topics have been explored such as knowledge sourcing, methods of knowledge transfer, and the effect of knowledge transfer on innovation (Grant, 1996a,b; Lane & Lubatkin, 1998; Lord & Ranft, 1998; Powell, Koput, & Smith-Doerr, 1996; Szulanski, 1996; Zander & Kogut, 1995). In particular, the effects of knowledge characteristics on knowledge transfer has been studied extensively (Inkpen & Dinur, 1998; Lord & Ranft, 1998; Zander & Kogut, 1995).

However, previous research on the relationships between knowledge characteristics and knowledge transfer focuses on the

topics that analyze the effects of knowledge characteristics on the speed or performance of knowledge transfer. The effects of knowledge characteristics on organizational effort have not been sufficiently explored despite their theoretical and practical importance. Therefore, the present study analyzes the effects of knowledge characteristics on the extent of organizational effort to achieve knowledge transfer.

In this study, we suggest that the frequency of contact with a knowledge source represents the extent of organizational effort required for knowledge transfer. We empirically analyze the effects of important knowledge characteristics such as tacitness, difficulty, and importance on the frequency of contact with knowledge sources. This study employs the survey dataset gathered through face-to-face interviews with project managers in a large multinational consulting firm with many business divisions.

This paper aims to overcome the limitations of previous research which only analyzed the effects of knowledge characteristics on the speed or performance of knowledge transfer and this paper provides a deeper insight into the effects of knowledge characteristics on organizations' behavior. Strategic implications are also provided to firms to help them manage the knowledge transfer process.

2. Theory and hypotheses

2.1. Knowledge characteristics and knowledge transfer

Knowledge is the most important strategic resource to a firm and has enormous effects on organizations' competitive advantage.

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Thus acquiring, integrating, storing, and sharing knowledge are critical capabilities to sustain an organization's competitive advantage (Grant, 1996b; Kogut & Zander, 1992; Penrose, 1959; Spender, 1994; Teece, Pisano, & Shuen, 1997; Winter, 1987; Zack, 1999). In particular, the ability to transfer knowledge from external knowledge sources to a recipient's organizational boundary is a critical factor that determines an organization's competitive advantage in a fast changing environment. Therefore, many researchers have explored the effects of knowledge on management. Various research streams such as knowledge sourcing (Grant, 1996b; Henderson & Cockburn, 1994; Henderson & Cockburn, 1996; Liebeskind, Oliver, Zucker, & Brewer, 1996; Powell et al., 1996), internal knowledge transfer (Athanassiou & Nigh, 1999; Lord & Ranft, 1998; Szulanski, 1996; Zander & Kogut, 1995), and external knowledge transfer (Inkpen & Dinur, 1998; Lane & Lubatkin, 1998; Mowery, Oxley, & Silverman, 1996; Simonin, 1999) have been explored in the area of knowledge management.

Knowledge transfer is considered a core factor in the creation of new knowledge and the maximization of value of knowledge. Thus, there have been many research topics focused on knowledge transfer, such as methods of knowledge transfer and the relationship between knowledge transfer and the innovation, along with the effects of knowledge characteristics on knowledge transfer have been explored in depth (Inkpen & Dinur, 1998; Kogut & Zander, 1992; Lord & Ranft, 1998). In the research that analyzed the Swedish manufacturing firms, Zander and Kogut (1995) examined the effect of knowledge characteristics such as codifiability, teachability, complexity, system dependency, and product observability by competitors on the speed of internal knowledge transfer and external knowledge imitation. Lord and Ranft (1998) prove that tacitness of knowledge and organizational structure, and communication mechanisms have important effects on knowledge transfer.

However, previous research does not consider the reaction of organizations to knowledge characteristics, in spite of the importance of the organizational effort for successful knowledge transfer. The characteristics of knowledge that the organization intends to transfer can initiate diversified organizational reactions such as reinforcement, retention, and an abandonment of effort to engage in knowledge transfer. These different organizational reactions affect the speed and performance of knowledge transfer. Therefore it is important to study how the organization reacts to each knowledge property. This research identifies three important knowledge characteristics that affect knowledge transfer: tacitness, difficulty, and importance. We establish and examine three hypotheses on the relationships between these three knowledge characteristics and the extent of the organizational effort for knowledge transfer.

2.2. Tacitness of knowledge and effort for knowledge transfer

Previous literatures consider knowledge as a resource that is possessed by individuals or organizations (Alavi & Leidner, 1999; Blackler, 1995; Nonaka & Takeuchi, 1995). The resource-based view insists that the resources that determine and maintain firms' competitive advantage have characteristics such as specialty and inimitability (Amit & Schoemaker, 1993; Peteraf & Bergen, 1993; Rumelt, 1984; Wernerfelt, 1984). Tacit knowledge that tends to be inherent in an individual is difficult to describe, and sometimes cannot be explained precisely (Polanyi, 1962). Tacit knowledge is internalized in a constituent or organization, has unique characteristics, cannot be drawn up in documents, shows less mobility than explicit knowledge and is very difficult to imitate. In other words, tacit knowledge has the characteristics of the valuable resources that determine and maintain firms' competitive advantage (Grant,

1996a). Therefore, tacit knowledge plays an important role for firms' sustainable competitive advantage.

However, knowledge by itself is not a useful resource that creates value and competitive advantage until it can be shared and transferred within the organization. Thus, it is necessary to externalize and integrate the tacit knowledge for organizations' sustainable competitive advantage. When new knowledge is created, the knowledge is strongly tacit. This tacit knowledge is gradually transformed into codified and explicit knowledge (Nonaka & Takeuchi, 1995) by social coordination processes (Lam, 2000; Tsoukas & Vladimirou, 2001) because the more explicit the knowledge is, the more the organization can easily share and transfer the knowledge. Therefore, the effort to codify tacit knowledge, such as frequent contact with the knowledge source, is extremely significant for organizations which attempt to transfer tacit knowledge from the knowledge sources.

Empirical research that explores the relationship between the tacitness of knowledge and the knowledge transfer process focus on the effect of tacitness on the speed and performance of knowledge transfer and the method for successful transfer of tacit knowledge. Zander and Kogut (1995) show that highly codified knowledge transfers faster than tacit knowledge. Thus, firms should decrease the tacitness of their knowledge through an intensive effort to push for codification. Inkpen and Dinur (1998) prove the negative relationship between the tacitness of knowledge and efficiency of knowledge transfer. Lord and Ranft (1998) also show that the tacitness of knowledge has a negative effect on the effectiveness of knowledge transfer.

Previous studies focus on the effect of decreasing tacitness of knowledge on speed and performance of knowledge transfer. However, they pass over the organizational reaction to knowledge characteristics. Each organization selects different strategic behaviors, such as increase of the effort for knowledge transfer, or abandonment of knowledge transfer altogether. Thus in this paper, we study the relationship between the perception of tacitness of knowledge and organizations' behavior to acquire that knowledge.

Because tacit knowledge can be learned and transferred through observations and doing (Eisenhardt & Santos, 2002), frequent interactions between knowledge sources and recipients are strongly required to transfer tacit knowledge. Inkpen and Dinur (1998) insist that high-level interactions, such as regular meetings between involved parties, human resource exchanges, and frequent visits to manufacturing facilities are required for the successful transfer of tacit knowledge. Lam (2000) suggests that tacit knowledge can be acquired and transferred through practical experiences executed in the relevant context. Carlile (2004) proposes that a common lexicon is required to successful knowledge transfer, and sufficient time and abundant interactions are needed to build up the common lexicon. Therefore, organizations increase their effort for knowledge transfer and frequently interact with knowledge sources when the knowledge is highly tacit. Thus, we suggest the following hypothesis:

Hypothesis 1. When the perceived tacitness of knowledge is high, organizations are more inclined to frequently contact knowledge sources.

2.3. Difficulty of knowledge and effort for knowledge transfer

In the organizational learning perspective, the difficulty of knowledge is an important factor that affects an organization's effort for knowledge transfer. Because knowledge transfer is fundamentally accomplished by interactions between knowledge sources and recipients, even though knowledge sources can precisely codify their knowledge and can teach knowledge recipients

well, it is still hard for recipients to learn that knowledge because of its complexity and unfamiliarity.

Even if the knowledge is well codified and explicit, it could be complex because it is composed of various interdependent components. Complex knowledge is difficult for recipients to understand and requires much effort to transfer (Hansen, 1999; Teece, 1986; Winter, 1987). Because a less complex and a more comprehensible knowledge is easier to transfer, an unsophisticated technology improves knowledge recipients' productivity more quickly (Galbraith, 1990). This implies that more complex knowledge requires more effort for knowledge transfer. Complexity of knowledge increases the difficulty of knowledge transfer, generates more frequent face-to-face interaction, and consolidates the relationship between knowledge sources and recipients (Hansen, 1999). Mowery et al. (1996) suggest that the more complex the knowledge, the stronger the relationship between knowledge sources and recipients.

Also, if some knowledge is strange and unfamiliar to recipient organizations, then they perceive that knowledge as difficult and so must exert more effort to successfully transfer that knowledge. The organizational efforts for transferring difficult knowledge result in the increase of interactions and the consolidation of relationships between senders and recipients. Therefore in this study, we propose a second hypothesis:

Hypothesis 2. When the perceived difficulty of knowledge is high, organizations are more inclined to frequently contact knowledge sources.

2.4. Importance of knowledge and effort for knowledge transfer

The last property of knowledge that affects the recipient's organizational behavior for knowledge transfer is the perceived importance of knowledge. Organizations make more effort to transfer knowledge that they perceive to be more strategically valuable (Eisenhardt & Galunic, 2000; Gupta & Govindarajan, 2000).

Concentration of the organizational effort on transferring strategically important knowledge under the condition of limited resources and capabilities has a positive effect on an organization's performance. Gupta and Govindarajan (2000) insist that the strategic value of knowledge has a positive effect on knowledge transfer. Brown and Eisenhardt (1998) suggest that strategically important knowledge plays an essential role in enhancing a firm's performance. Liu and Chen (2005) propose that whether or not the knowledge is valuable is an important determinant of knowledge sharing.

Previous studies commonly insist that organizations should focus their efforts on the transfer of strategically valuable knowledge. Thus, organizations should concentrate on the transfer of strategically important knowledge for efficient knowledge transfer under the condition of limited resources. When the perceived strategic importance of knowledge is high, organizations reinforce the effort to transfer that knowledge and increase the frequency of contact with the knowledge source. Therefore, we establish the last hypothesis that examines the relationship between the importance of knowledge and organization's behavior to transfer that knowledge.

Hypothesis 3. When the perceived importance of knowledge is high, organizations are more inclined to frequently contact knowledge sources.

3. Methodology

3.1. Data collection and research site

Data for this study were gathered through personal interviews based on responses to a structured survey. Project managers of a

multi-departmental consulting firm based in the United States were interviewed to answer questions regarding knowledge characteristics, and the frequency of contact with knowledge sources. Prior to the interviews, pre-tests were given to a smaller sample within the population. Then the survey was revised and interview technique refined based on the pre-test results. The survey embeds rules and guidelines recommended by previous interview researchers (e.g., Corcoran & Fischer, 1987; Cronbach, 1984; Diesing, 1972; Nunnally, 1978; Sundberg, 1977).

For the survey interviews, top managers of project teams of the firm were picked as respondents because the project managers are the ones who are 'in the thick of things' (Hansen, 1999), and most involved with the team activity and operations. This company in particular gave strong autonomy to project managers, who are given responsibility to choose and pick their own team members. The company site was a large, multi-departmental and multinational consulting company (hereafter called 'the firm' or 'the company'). The company, which has annual revenues of more than \$5 million, develops, plans, and sells a range of consulting analyses. The company has been profitable and has continued to grow in the past years. The company is structured into autonomous departments that are each responsible for its business. These departments are organized by their product-market segments or industries, such as medicine, education, and heavy industries. Within each department are project teams, ad-hoc formed for each new project by a pre-designated project manager. The project manager then has the option of selecting team members based on the needs and objectives of the project which may span years of data collection and multinational collaboration.

3.2. Model

A simple ordinary linear regression (OLS) was used to analyze the survey data collected from the personal interviews. OLS was chosen because often times, it is the simplest model that offers most insight and understanding of a phenomenon. In the model, the contribution of a knowledge element i of project j to frequency of contact with knowledge sources is given by:

$$\begin{aligned} \text{Frequency}_{ij} = & \beta_0 + \beta_1 \text{TACITNESS}_{ij} + \beta_2 \text{DIFFICULTY}_{ij} \\ & + \beta_3 \text{IMPORTANCE}_{ij} + \beta_4 \text{DURATION}_{ij} \\ & + \beta_5 \text{CLOSENESS}_{ij} + \beta_6 \text{SIZE}_{ij} + \beta_7 \text{INTERNAL}_{ij} \end{aligned}$$

3.3. Variables

3.3.1. Dependent variable

The purpose of the present study is to analyze the effect of various characteristics of knowledge on the organizational effort for knowledge transfer. The more the organization pursues knowledge transfer, the more the organization contact with knowledge sources. Therefore, this study employs the frequency of contact with knowledge sources (FREQUENCY) as the measurement of the organizational effort for knowledge transfer.

The FREQUENCY variable refers to the frequency of contact with knowledge sources. Respondents are asked to choose the frequency of contact with knowledge sources amongst the following alternatives: 1 = less than once a month, 2 = twice a month, 3 = thrice a month, 4 = once a week, 5 = twice a week, 6 = thrice a week, 7 = essentially every working day. In other words, the higher the beta coefficient, the higher the frequency of contact with knowledge sources.

3.3.2. Independent variables

The TACITNESS variable refers to the tacitness of the knowledge element. The respondents are asked to indicate the tacitness of the

knowledge element from a continuous scale: from 1 = mainly reports manuals documents self-explanatory software, etc., 4 = half know-how and half reports or documents, to 7 = mainly personal practical know-how, trick-of-trade. The higher the beta coefficient, the higher the tacit nature of the knowledge element.

The DIFFICULTY variable refers to the degree of difficulty of the knowledge element. The respondents are asked to indicate difficulty of the knowledge element using a continuous scale of: from 1 = not at all difficult, 4 = moderately difficult, to 7 = very difficult.

The IMPORTANCE variable captures the degree of the knowledge element's contribution to project performance. After identifying and listing knowledge elements for a project, respondents were then asked to rank-order the knowledge elements based on their importance to the project's success. The rankings were then converted to a fraction. This is for a number of reasons: The number of knowledge elements often varies from project to project. This variance may distort the relative importance of knowledge elements in projects with fewer knowledge elements to those with more knowledge elements. Thus the rankings were converted as: $[(\text{number of knowledge element in the project} - \text{ranking} + 1) / \text{number of knowledge element in the project}]$ or where k th ranked element of n elements is $(n - k + 1) / n$. The resulting number, which is a fraction greater than 0 and equal to or less than 1, is referred to as the IMPORTANCE variable.

3.3.3. Control variables

When the duration of a project is long, organizations can successfully transfer knowledge even though the frequency of contact with knowledge sources is low. The duration of the project affects FREQUENCY, which represents the extent of organizational effort for knowledge transfer. Thus we employ the duration of project (DURATION) as a control variable. DURATION is measured by the total number of months from the beginning to the end of the project.

Perception of closeness to knowledge sources can also affect the extent of organizational effort for knowledge transfer. Because organizations easily access familiar knowledge sources, perceptions of closeness can increase the frequency of contact with knowledge sources. However at the same time, because it is hard to acquire new knowledge from familiar knowledge sources, perceptions of closeness can also decrease the frequency of contact with knowledge sources. Considering the effect of closeness to knowledge sources, we employ the perception on closeness (CLOSENESS) to knowledge sources as a control variable. The CLOSENESS variable refers to the psychological closeness of contact with knowledge sources. Respondents are asked to indicate the closeness to knowledge sources in a continuous scale where 1 = not at all close, 4 = moderately close, and 7 = very close. Thus the higher the beta coefficient, the closer the source of the knowledge element is to the respondent.

The scale of a project affects the extent of organizational effort for knowledge transfer. Because organizations treat a large-scale project more importantly than a small-scale project, organizations

exert greater effort for knowledge transfer when they work on a large-scale project. We employ the number of participants in a project (SIZE) to control the effect of the project scale.

Whether or not the knowledge source is near the organization can affect the extent of effort for knowledge transfer. If the knowledge sources are in the organizational boundary, it is relatively easy to transfer knowledge and the frequency of contact with knowledge sources decreases. Thus, we employ the distance between knowledge sources and recipient (DISTANCE) as a control variable. The DISTANCE variable refers to the organizational, and quite often geographical distance with the knowledge sources. Respondents were asked to identify the source of knowledge from amongst the following alternatives: 1 = from outside of the firm, 2 = distantly located department, 3 = from unrelated department, 4 = from related department, 5 = from the team, 6 = from a team member, 7 = personal knowledge. Thus the higher the beta coefficient, the more internal or 'personal' is the source of the knowledge element.

4. Results

Table 1 contains descriptive statistics and correlations. Because the correlation values between independent and control variables are very low, there is no multicollinearity problem. Correlation between the DIFFICULTY and IMPORTANCE variables is relatively high compared with other relationships. This implies that important knowledge is more likely to be difficult. Correlation between the DURATION and the SIZE variables is also relatively high. This implies that it requires a long time to finish a large-scale project because a large-scale project is composed of various knowledge components and is highly complex.

Table 2 contains the result of five ordinary linear regression models that analyze the effects of three knowledge characteristics on the extent of organizational effort for knowledge transfer. Each model contains control variables such as SIZE, DURATION, CLOSENESS, and DISTANCE. Model 1 contains only the control variables. In models 2–4, each model analyzes the effect of a single knowledge property. Model 5 is full model that contains all variables.

When the TACITNESS variable is inserted into the basic regression model, the adjusted R -squares increase as much as 0.0165. Addition of the DIFFICULTY variable into the basic model increases the adjusted R -squares as much as 0.137. Model 3 shows that the input of the IMPORTANCE variable into the basic model increases the adjusted R -squares as much as 0.106. The addition of the DIFFICULTY variable makes the largest change of the adjusted R -squares. It means that the DIFFICULTY variable has the greatest influence on FREQUENCY.

Model 5 shows that the parameter for TACITNESS is positive and significant ($p < 0.1$). Thus, Hypothesis 1 asserting a positive relationship between the tacitness of knowledge and the effort for knowledge transfer is weakly supported. Model 5 also shows that there is a positive and significant ($p < 0.01$) effect of DIFFICULTY on FREQUENCY. Therefore, Hypothesis 2 asserting that the difficulty of knowledge has positive effect on the effort for knowledge

Table 1
Descriptive statistics and correlations.

Variables	Mean	Std dev.	1	2	3	4	5	6
1. TACITNESS	3.246	1.901	1					
2. DIFFICULTY	3.882	1.650	-0.013	1				
3. IMPORTANCE	0.566	0.287	0.091	0.407	1			
4. DURATION	32.882	18.285	-0.014	0.103	-0.004	1		
5. CLOSENESS	4.189	2.019	-0.082	-0.062	0.148	-0.226	1	
6. SIZE	5.447	2.180	-0.111	0.042	-0.017	0.421	-0.046	1
7. INTERNAL	2.377	1.570	0.125	-0.066	0.010	-0.071	-0.088	-0.060

Table 2
OLS regression models, explaining relationships between knowledge characteristics and contact frequency.

Model Dep. var	1 FREQUENCY		2 FREQUENCY		3 FREQUENCY		4 FREQUENCY		5 FREQUENCY	
	Coef.	S.E.	Coef.	S.E.	Coef.	S.E.	Coef.	S.E.	Coef.	S.E.
TACITNESS			0.128*	0.066					0.103*	0.619
DIFFICULTY					0.346***	0.073			0.218***	0.078
IMPORTANCE							2.362***	0.413	1.758***	0.451
DURATION	-0.004	.0078	-0.005	0.008	-0.007	0.007	-0.006	0.007	-0.008	0.007
CLOSENESS	0.094	0.064	0.103	0.064	0.108	0.061*	0.041	0.061	0.070	0.060
SIZE	0.004	0.063	0.174	0.063	0.004	0.061	0.012	0.0593	0.021	0.059
INTERNAL	-0.123	0.080	-0.140*	-0.0800	-0.100	0.077	-0.134*	0.075	-0.131*	0.075
Adj R-square	0.025		0.0415		0.162		0.131		0.188	
F-value	1.45		1.92*		7.27***		7.85***		7.27***	
No. of obs	228		228		228		228		228	

* $p < 0.10$.

** $p < 0.05$.

*** $p < 0.01$.

transfer is strongly supported. Result shows that the beta coefficient of IMPORTANCE variable is positive and significant ($p < 0.01$). Thus, Hypothesis 3 that suggest a positive relationship between the importance of knowledge and the effort for knowledge transfer is strongly supported. The parameter of the control variable DISTANCE is significant in model 2, 4, and 5.

5. Discussion

The result shows that the hypothesis asserting that the tacitness of knowledge has a positive effect on the effort for knowledge transfer is weakly supported. Because tacit knowledge is unique and relatively less mobile, it becomes the basis of organizations' competitive advantage (Grant, 1996a). It is difficult to imitate and transfer tacit knowledge and thus hard to transfer and acquire. However, if organizations successfully transfer the tacit knowledge once through sufficient effort, then it plays an important role in building and sustaining organizations' competitive advantage.

It requires a large effort and long time to transform the tacit knowledge into explicit knowledge for successful transfer of tacit knowledge (Carlile, 2004; Nonaka & Takeuchi, 1995). Thus, the more tacit the knowledge is, the more effort is required by recipients to secure the transfer of knowledge. Particularly, because organizations that work intensively on projects that create new knowledge have strong incentive to transfer and acquire knowledge, they exert their effort to transfer and acquire knowledge even though its perceived tacitness is strong.

However, if organizations perceive that the knowledge they desire to obtain is too tacit and the effort required to acquire the knowledge is larger than the benefit from that knowledge, organizations can abandon acquiring the knowledge and decrease their effort to secure knowledge transfer. In this research, which reflects the conflicting reaction of organizations to the tacitness of knowledge, the relationship between the tacitness of knowledge and the effort for knowledge transfer is not supported strongly.

The hypothesis asserting that the difficulty of knowledge has a positive effect on the effort for knowledge transfer is strongly supported. When the knowledge itself is difficult, it requires much effort to learn the knowledge even if the knowledge is described explicitly. The solution for acquiring difficult knowledge is frequent and repeated contact with the knowledge sources. It is similar to the process of individual learning, where a person understands a something difficult through repeated study.

The subjects of this study are project teams in a large, knowledge-intensive consulting firm with clear motives for knowledge transfer. Thus, they do not give up transferring the knowledge that is not ambiguous but just difficult. They make more effort and

spend more time to accomplish successful transfer of the difficulty knowledge. Therefore, with the increase in the difficulty of knowledge, the frequency of contact with knowledge sources increase. With repeated learning, organizations can divide difficult and complex knowledge into simpler and easier knowledge components, and thus understand and acquire that knowledge more easily.

The last hypothesis asserting that the importance of knowledge has a positive effect on the effort for knowledge transfer is also strongly supported. The subjects of this research, teams in a large consulting firm, set relative importance among components of their projects and make more effort to transfer the more important components for an efficient use of resources. Likewise, there is relative importance between knowledge that organizations want to acquire, and thus organizations make more effort to transfer the more important knowledge.

The result also shows that the parameter for DISTANCE is negative and significant in all regression models. This implies that, if the distance between knowledge source and recipient is small then the effort for knowledge transfer decreases; otherwise, the effort for knowledge transfer increases. This organizational reaction to distance has an important implication to the recent trend of research (Chesbrough, 2003; Katila & Ahuja, 2002; Keil, 2002; Laursen & Salter, 2006). They assert that firms should accelerate innovation through external knowledge sourcing. In fast changing environments, organizations and firms try to innovate by active utilization of external knowledge. However, it requires more effort to innovate through utilization of external knowledge than a recombination of internal knowledge. Within the framework of exploration and exploitation (March, 1991), distant knowledge sources are likely to have new and unfamiliar knowledge that recipient organizations do not have, and thus knowledge sourcing from distant sources tend to be in the area of exploration. Organizations have to make more effort in exploring new and unfamiliar knowledge than in exploiting already existing knowledge.

However, this research has a limitation because the data for the present research was gathered from the consulting industry. Because consulting project teams are highly motivated to create new knowledge, the relationship between knowledge characteristics and the effort for knowledge transfer can be distorted. Organizations that are highly motivated to create new knowledge reinforce their effort for knowledge transfer when they are faced with obstacles such as tacitness and difficulty of knowledge. However, organizations that are not motivated to create new knowledge easily abandon knowledge transfer when they encounter obstacles. Therefore, in future research, data gathered from various types of organizations that are motivated at different levels should be analyzed.

6. Conclusions

Knowledge can be copied and reproduced without a loss in value, and knowledge transfer is a device to maximize the benefit from knowledge. Although to some organizations, knowledge may be of little value or even rendered useless, it can be valuable to other organizations. Thus, knowledge transfer plays an important role in creating value from knowledge. Because innovations are generated by a recombination of knowledge, it can be a driving force of innovation to acquire new knowledge from knowledge sources. Thus, research on the factors that affect knowledge transfer is a matter of consequence in knowledge management and companies.

Previous research has focused on the relationship between knowledge characteristics and the performance of knowledge transfer. However, this research analyzes the effect of knowledge characteristics such as tacitness, difficulty and importance of knowledge on the organizational reaction to the knowledge characteristics. We prove that knowledge that is more tacit, difficult, or important requires more effort to transfer. This research has significant implication for organizational behavior that is treated lightly in previous research on knowledge transfer. It is strongly expected that this research can broaden the understanding of the knowledge transfer process.

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