Differences Between Inter- and Intra- Group Dynamics in Knowledge Transfer Processes

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ABSTRACT

Knowledge transfer processes are important for sustaining competitive advantages. Prior research often treats these processes as firm-level capabilities. We argue this view ignores differences between inter-group and intra-group knowledge transfer processes within a firm, identifying mechanisms that facilitate and inhibit knowledge transfer. Using survey data from a large Japanese electronics company, we find that mechanisms such as accessibility, density, and collective teaching all help in transferring knowledge, while tacit properties inhibit transfers. Effects vary depending on whether knowledge transfer occurs across group boundaries. This study demonstrates that not all knowledge transfer processes are equal.

INTRODUCTION

Within the knowledge-based view of the firm, organizations are characterized as communities specializing in knowledge creation and transfer (Kogut and Zander 1996) which may provide a source of competitive advantage (Kogut and Zander 1992, Kane, 2010). This characterization focuses on the social aspects of knowledge; for knowledge to be valuable at an organizational level it must be shared and held across multiple units or individuals. Tsai and Ghoshal (1998) proposed modeling the social structure of knowledge transfer as a process incorporating social interaction and dyadic trust as antecedents to the production of knowledge conducive to value creation. Levin and Cross (2004) introduced trust as both a mitigating and moderating factor for explaining relations between network structure and the transfer of useful knowledge. As the number of factors known to influence the processes of knowledge transfer has expanded, so has the depiction of the structure through which knowledge transfer occurs. Reagans and Zuckerman (2001) argue that network structures have two distinct characteristics--the relationships within a given team and the relationships across teams. This view spans both individual- and team-levels of analysis. Individual relations are still treated as dyadic, the team remains a collection of individual networks. However, this view assumes that knowledge transfer occurs through dyadic network relations which can be treated as uniform, and that there is little difference between the dynamics of within-group transfer and between-group transfer.

We contend that this assumption may not be valid and that knowledge transfer across group boundaries may differ substantially from knowledge transfer within a group. Cohen and Levinthal (1990) note that absorptive capacity depends on transfers of knowledge across and within organizational sub-units just as much as the interface between the organization and the

external environment. Lawrence and Lorsch (1967) point out that departments often become differentiated from each other in terms of their knowledge base, goals, formal structure, interpersonal interactions, and even economic performance. Subunit differences can encompass the types of information deemed useful and the approach towards the acquisition of information. Hansen (1999), for example, pointed out that a subunit that is a potential source of important knowledge may be unwilling to share that knowledge with another subunit for a variety of reasons, including intraorganziational competition or a subunit culture of secrecy.

We believe that by focusing on organizational boundaries we contribute better to the understanding of the individual knowledge transfer mechanisms. By emphasizing organizational boundaries, we contribute to the literature by arguing and empirically demonstrating that some knowledge transfer mechanisms can and should perform better depending on whether they are used locally (within a group) or boundary spanning. We identify multiple mechanisms that facilitate and inhibit knowledge transfer within a firm, and we offer and test hypotheses for how each mechanism affects knowledge transfer across sub-unit boundaries compared to knowledge transfer within a sub-unit. By emphasizing the organizational boundaries, this study attempts to shift the discussion from simple identification of knowledge transfer mechanisms to a more dynamic view of knowledge processes.

We argue that differing mechanisms vary systematically in their ability to facilitate knowledge transfer. Understanding the conditions in which a particular knowledge management mechanism works has practical value for managers who can adjust practices to encourage or regulate knowledge transfer.

Going with the Flow: Predicting Effective Knowledge Transfer Processes

We consider a variety of factors that may aid or inhibit knowledge transfer. For each factors studied, the "a" hypothesis predicts the impact of the factors on the knowledge transfer process generally (e.g. tacit properties inhibit knowledge transfer, while trustworthiness between individuals aids it), while the "b" hypothesis then discusses how the predicted effect would differ depending on whether the knowledge transfer process occurred within or between groups.

H1a: Knowledge transfer is negatively associated with the extent to which the knowledge is tacit.
H1b: The negative association between tacit knowledge properties and knowledge transfer is larger for transfers across groups than for transfers within groups.

H2a: Knowledge transfer is positively associated with knowledge seeker's perception of competence of the individual knowledge source.

H2b: The positive association between perception of competence and knowledge transfer is larger for transfers within groups than for transfers between groups.

H3a: Knowledge transfer is positively associated with the knowledge source's commitment to collective teaching.
H3b: The positive association between collective teaching and knowledge transfer is larger for transfers between groups than for transfers within groups.

As noted above, the first four mechanisms emphasize relational processes, such as individual perceptions. The next four mechanisms differ in that they emphasize structural elements of an organization.

H4a: Knowledge transfer is positively associated with the accessibility of the knowledge source.
H4b: The positive association between accessibility and knowledge transfer is larger for transfers within groups than for transfers between groups.

H5a: Knowledge transfer is positively associated with the technical knowledge of the knowledge seeker.
H5b: The positive association between technical knowledge and knowledge transfer is smaller for transfers between groups than for transfers within groups.

H6a: Knowledge transfer is positively associated with the density of an individual's ties.
H6b: The positive association between density and knowledge transfer is larger for transfers between groups than for transfers within groups.

H7a: Knowledge transfer is positively associated with the strength of an individual's ties.
H7b: The positive association between tie strength and knowledge transfer is smaller for transfers between groups than for transfers within groups.

METHODS

Sample

We surveyed all professional employees in software development for multifunctional peripheral (printing) devices in a large Japanese electronics company. Participants were involved in the design and development of advanced process software which typically required communication with other departments within the company. The first portion of the survey was sent to all 188 employees in software development in early December of 2010. Senior managers sent three reminders to complete the survey, with the final collection occurring in mid-January 2011. A total of 137 respondents completed the survey (response rate = 72.9%). We asked respondents to nominate up to 7 co-workers as critical sources of knowledge within the past year and a half. On average, respondents reported on 4.4 specific relationships. Using standard egocentric network survey technics, this yielded a total of 609 observations (Burt 1992).

Variables

We adapted nearly all of our survey items from pre-existing scales in the literature. Unless otherwise noted, all measures are based on a 7-point Likert scale. We checked for common method bias using Harman's one-factor test. Multiple factors were detected, and the variance did not merely stem from the first factors (Podsakoff and Organ 1986). In fact, the independent variables included in the model form several factors with eigenvalues higher than one. These factors accounted for 87.1 percent of the variance and the first factor captures 26.7% of the total variance. Since no single factor emerged as dominant, common method bias is unlikely to be a serious problem in the data (Podsakoff and Organ 1986).

The dependent variable perceived receipt of *Useful Knowledge* defines useful knowledge as the "perceived receipt of information… that has a positive impact on a knowledge seeker's work." It is operationalized using eight survey items adapted from Hansen (1999), Hansen and Haas (2001), and Szulanski (1996). Independent variables include: *Different Department* is a binary variable that is zero when from the same department and one otherwise. *Tacit Knowledge* is a measure of how difficult it is to document the knowledge being transferred. *Perceived Competence* captures perceptions that the person approaches his or her job with professionalism and competence. *Collective Teaching* is the amount of group involvement engaged in. *Accessibility* is a measure of the speed and willingness to participate in the knowledge transfer process. *Technical Knowledge* is a measure of the respondent's familiarity with his or her functional area of expertise. *Density* reflects the number of ties of each individual in the network. In addition, we control for several factors including: *Rank* is a binary variable equal to 1 if the respondent is a project manager and zero otherwise. *Tenure* is a count of the months of employment. *Friendship* measures the willingness to spend free time. *Education* level is coded on a scale from 1 to 4 to indicate completion of high school, bachelor's degree, master's degree, or PhD respectively. *Trust Worthiness* is the belief that a person can be relied on. *Expertise overlap* incorporates specific reported data regarding respondents' areas of expertise.

Analysis

The critical variable in our model is the binary variable Different Department (DD). We utilize OLS regression, interacting all our independent variables with Different Department. Thus, when DD equals zero, all of the interactions drop, and the variable main effects represent the impact of the independent variables on knowledge transfer processes within group. When DD equals one, the joint test of the main *and* interaction variable represents the impact of the independent variable on the knowledge transfer process between groups.

RESULTS

Table 1 presents the full model, with all independent variables having main effects and interactions with the binary variable Different Department. In each case, the "a" hypothesis assumes that the factor will have the same directional impact on knowledge transfer both within and between groups. In six of the seven cases, we find support for our hypothesized directional effects for within-group knowledge transfer ($p < 0.01$). Thus, we find support for hypotheses 1a, 2a, 4a, 5a, and 7a. We find strong support for hypothesis 3a. The "b" hypotheses 1-7 predict that the magnitude of impact differs depending on whether the knowledge transfer process occurs within an organizational subgroup or between groups. In six of the seven cases, we find evidence that knowledge transfer processes differs. We find the strongest support for H2b, that the importance of perceived competence is larger within groups than between groups ($F = 23.15$, $p < 0.001$). There is also support for H5b and H6b (density and technical knowledge, $p < 0.01$), and modest support for H4b (accessibility, $p < 0.05$). Overall, we find fairly broad empirical support that knowledge transfer processes differ significantly within organizations, and that differences occur in systematic ways.

TABLE 1
Assessing the Transfer of Useful Knowledge Within and Between Departments

VARIABLES	COEF.	S.E.	Joint F-Test (1, 587)
Rank	-0.207*	(0.096)	
Tenure	0.170***	(0.036)	
Friendship	-0.012	(0.036)	
Education	0.322***	(0.062)	
Trustworthiness (Benevolence)	0.112**	(0.032)	
Expertise Overlap	0.030	(0.022)	
Tacit Knowledge	-0.071**	(0.027)	
Perceived Competence	0.150***	(0.031)	
Collective Teaching	0.131***	(0.023)	
Accessibility	0.101***	(0.022)	
Technical Knowledge	0.076**	(0.030)	
Density	-0.014	(0.171)	
Tie Strength	0.056**	(0.022)	
Different Department (DD)	0.364***	(0.092)	
Tacit Knowledge*DD	0.076	(0.079)	0.00
Perceived Competence *DD	-0.218**	(0.063)	0.75
Collective Teaching *DD	0.034	(0.056)	10.23**
Accessibility *DD	-0.050	(0.059)	0.83
Technical Knowledge*DD	-0.144*	(0.067)	1.20
Density*DD	1.123**	(0.364)	14.22***
Tie Strength*DD	-0.027	(0.054)	0.36
Constant	3.348***	(0.277)	
R-squared	0.324	N	609

*** $p<0.001$, ** $p<0.01$, * $p<0.05$, + <0.1

DISCUSSION & CONCULSIONS

This study demonstrates that inter-group knowledge transfer processes are distinct from intra-group knowledge transfer, and that the majority of factors shown to impact knowledge transfer processes in prior research only do so for intra-group transfers. Our results show that group boundaries are an important component of knowledge transfer dynamics. One key exception to our finding that knowledge transfer processes differed depending on whether transfer was within groups or between them is our result relating to Collective Teaching. We find that knowledge providers that specifically emphasize inclusiveness in their efforts to transfer knowledge can improve knowledge transfer regardless of internal boundaries.

Our study has direct implications for managerial practice. First, managers who rely on effective knowledge transfer need to consider internal boundaries when they are deploying tools and strategies for facilitating knowledge flows. The tools and strategies that help facilitate knowledge flow in one case may not have the desired effect in the other. By emphasizing

specific knowledge transfer mechanisms above others managers can create highly effective methods of transmitting specific knowledge to target audiences.

Overall, this work contributes to the knowledge transfer literature by demonstrating how multiple factors for facilitating knowledge transfer vary depending on whether knowledge transfers within or between organizational groups. By focusing on these distinct and different knowledge transfer processes, this paper takes the first step toward emphasizing the context of knowledge itself within the knowledge transfer process, in hopes of building a fully comprehensive model of such processes.

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