NEW KNOWLEDGE CREATION IN U.S. AND JAPANESE FIRMS IN THE UNITED STATES: AN EMPIRICAL TEST OF PROJECT-LEVEL INTEGRATIVE MECHANISMS

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Abstract

This paper integrates the knowledge-based view of the firm and new product development team literature to examine how firms develop the capability to create new knowledge. The results indicate that project-level internal and external knowledge sharing and common knowledge support a wide range of outcomes of this capability: product innovation, efficiency in terms of resources used, speed-to-market, and customer satisfaction. Among the integrative mechanisms, project team development has a larger impact than reward on capability outcomes by facilitating their internal and external knowledge sharing. Project membership selection based on company tenure better predicts common knowledge on project team. [98]

Key words: Knowledge-based view, Integrative mechanisms, New knowledge creation

INTRODUCTION

The capability to create new knowledge in firms is critical for competitive advantage, but we still do not know how to develop it. In practice, when in 1993 the inability of Ford Motor, the US carmaker to create new knowledge using customer feedback from their customer service centers in Venezuela, Saudi Arabia, and in the United States about the Ford Explorer rollover problem costs them dearly in the year 2000 (Economist, 2000). Ford Explorer, which was a best-selling sports utility vehicle in the United States before the year 2000 had a body that was based on the body of the Ford Bronco, which had problems with rollover. This rollover problem led Ford Motor to a drop in stock price and put its brand in jeopardy. However, when Ford Motor finally created new knowledge for the innovation of the Ford Explorer 2002 model customer satisfaction and stock price increased (Kouky, 2002). The new knowledge created led to an innovation to the previous models of the Ford Explorer that includes a boxed frame that is different from the Ford Bronco, independent rear suspension, power-train enhancements, and a new safety canopy with rollover capability. Meanwhile, Honda and Toyota Motor, which have the capability to continuously create new knowledge for their product innovation, came out on top especially with its Honda Accord and Toyota Camry (Davis, 2002).

However, despite extensive debate about the value of firms' capability to mobilize or move knowledge around in organization for the creation of new knowledge such as for product innovation, there is still limited understanding of "how" companies develop it. We still lack knowledge about the key factors and management practices that firms can use to develop this capability when organizing specifically to create new knowledge such as for product innovation. As Wernerfelt (1997) states: We have made progress in discussing resources in terms of their effects but we do not know what they are . . . Many resources are only known indirectly. A good

example of this is ‘group resources’. What exactly is it that makes one group of people better at doing something than another? (p. XVIII)

While the level of analysis of the capability literature is the organization, the unit of analysis is the project team, with members coming together to share knowledge and create new knowledge such as for product innovation (Kogut & Zander, 1992; Teece et al., 1997; Leonard-Barton, 1995; Nonaka & Takeuchi, 1995). Therefore, the overarching research question of this paper is, What are the project team factors and management practices that facilitate new knowledge creation such as for product innovation? In answering this question, I link and integrate the theoretical approaches of the knowledge-based view of the firm, specifically the literature on organizational capabilities (Grant, 1996a, 1996b; Kogut & Zander, 1992; Leonard-Barton, 1995; Prahalad & Hamel, 1990; Tsoukas, 1996) and the product development team literature (Ancona & Caldwell, 1992a, 1992b; Clark & Wheelwright, 1992; Griffin & Hauser, 1992; Keller, 2001).

The rest of the paper is organized as follows: in section 2, I discuss the theory and hypotheses. In section 3, I present the research design. In section 4 I provide the results, and in section 5 the discussion and conclusions are presented.

THEORY AND HYPOTHESES

This paper draws on two bodies of literature in understanding factors and management practices that facilitate the development of the capability to create new knowledge. The literature on capabilities based in the knowledge-based view of the firm explains why capabilities are important for competition and the new product development team literature, which is about new knowledge creation for product innovation, provides some explanation about the factors and management practices that support outcomes of this capability.

The knowledge-based view of the firm views the firm as a distributed knowledge system (Tsoukas, 1996) and that the capability to mobilize knowledge or move knowledge from various parts and use it to create new knowledge that meets the demands of the external market is critical for competitive advantage. Therefore, one of the most important organizational capabilities is the capability to combine different types of knowledge, especially firm-specific knowledge embodied in firms' employees, to create new knowledge that enable firms to achieve and sustain their competitive advantage. This particular organizational capability is viewed as a type of strategic resource (Foss, 1997; Foss, Knudsen, & Montgomery, 1995), because it is rare, valuable, inimitable, non-tradable, and non-substitutable (Barney, 1991) and subject to time compression for development.

The Capability to Create New Knowledge

The capability to create new knowledge has been studied previously in two related camps: one that discusses in detail the capability to mobilize knowledge, which is knowledge transfer, sharing, or use (Grant, 1996a, 1996b; Szulanski, 1996; Hansen, 1999; Tsai, 2002). Another camp describes the capability to create new knowledge (Leonard-Barton, 1995; Nonaka & Takeuchi, 1995; Von Krogh, Ichijo, & Nonaka, 2000).

Researchers who emphasize knowledge mobilization (Grant, 1996b; Szulanski, 1996; Hansen, 1999; Tsai, 2002) tend to view motivation of individuals to interact to share knowledge as problematic. Therefore, they suggest that individuals should be managed to build social ties (Hansen, 1999; Tsai, 2002) or directly provide them with economic incentives for knowledge sharing (Milgrom & Roberts, 1992; Teece, Pisano, & Shuen, 1997).

Researchers who examine knowledge creation (Leonard-Barton, 1995; Nonaka & Takeuchi, 1995; Von Krogh, Ichijo, & Nonaka, 2000) describe in detail the process of knowledge creation, paying less attention to the drivers of knowledge mobilization. Nonaka and

Takeuchi (1995) present a comprehensive model of the way in which new knowledge, particularly for product innovation, is created in organizations. Their model involves two main processes, the mobilization of individual knowledge and the conversion of individual knowledge into organizational knowledge that comes in the form of product innovations. Leonard-Barton's (1995) model of knowledge creation for innovation is viewed as a shared problem-solving activity (1995: 61; Leonard & Sensiper, 1998), and the author suggests that the facilitators of knowledge creation are more than just incentives. Common knowledge or the overlapping knowledge among team members plays a large role in new knowledge creation. The knowledge that individuals have in common with each other enable them to understand and use the knowledge being shared and convert that into new organizational knowledge such as the innovation of the Ford Explorer that better satisfies the external market. These researchers suggest that individuals in organization perhaps should be managed to have some common knowledge with each other.

Moreover, the organizational capability literature based in the knowledge-based view deals with the organization as its level of analysis; however, its unit of analysis is clearly a group of individuals or project team coming together to share knowledge and create knowledge for a specific task such as new knowledge creation for the innovation of the Ford Explorer 2002 (Kogut & Zander, 1992; Leonard-Barton, 1995; Nonaka & Takeuchi, 1995; Teece et al., 1997). Specifically, project teams are mechanisms for knowledge mobilization and conversion into organizational knowledge that embodied in products and services that the firms provide for the market. Therefore, some organizational capability theorists suggest that the main driver behind this capability is how well small groups of carriers of core competence or project teams can mobilize and convert their individual knowledge into organizational knowledge in the form of

product and/or process innovation (Kogut & Zander, 1992; Leonard-Barton, 1995; Nonaka & Takeuchi, 1995; Prahalad & Hamel, 1990; Teece et al., 1997). In the knowledge creation model (Nonaka & Takeuchi, 1995), the level of analysis is clearly the company; however, the unit of analysis is the project team organized to create new knowledge for product innovation. Leonard-Barton (1995) also discusses core capability at the company level (business unit), but her unit of analysis is clearly a project team consisting of members coming together to share their knowledge to create new knowledge resulting in new products. By focusing on the organization level of analysis, the literature does not provide an explanation of what organizations do when organizing specifically to share knowledge and create knowledge for product innovation. This limitation in the knowledge-based view can be addressed by linking it to the new product development team literature (Ancona & Caldwell, 1992; Clark & Wheelwright, 1992; Dougherty, 1992; Griffin & Hauser, 1992; Keller, 2001; Subramaniam & Venkatraman, 2001). This stream of literature, which is about new knowledge creation for product innovation, analyzes project team processes and characteristics, and how they explain their outcomes and thus providing us with some understanding of how this capability may be developed by using project team integrative mechanisms.

Determinants of the Capability to Create New Knowledge

The capability to create new knowledge and its benefit for sustaining the firm's competitive advantage has previously been studied in the resource-based view and innovation literature under different names. It has been called the "combinative capability" (Kogut and Zander, 1992), that is, the firm's ability to combine different types of individual knowledge situated in different parts of the organization. It has also been related to "core competence" (Prahalad and Hamel, 1990), or the firm's ability to coordinate and integrate production skills

and streams of technologies. Moreover, it has been associated with "dynamic capability" (Teece et al., 1997), or the subset of competence/capabilities that allows the firm to create new products and processes and respond to changing market circumstances. All these concepts have in common the ability of a firm to continuously mobilize knowledge from its external environment into the firm and combine it with internal knowledge located in different parts of the firm to create new knowledge that meets the demands of external markets. Thus, the basis for this capability is the interactions among employees in different parts of the firm, such as design engineering, manufacturing, sales and marketing, or customer service.

However, due to specialization, it is often the case that the different knowledge sets that individuals have, which need to be integrated to create something new such as a new product, are dispersed in diverse parts of the distributed knowledge system, the firm. Thus, the creation of new knowledge in the firm requires the promotion of interactions among individuals, particularly those with different knowledge sets, through the use of project teams. First, the interaction and sharing of knowledge among individuals facilitates new knowledge creation because it enables the exchange and transformation of the individuals' existing knowledge (Nonaka and Takeuchi, 1995, p. 61). Although a single individual can develop new knowledge, the scale of a task such as product innovation requires, in many cases, the use of multiple individuals to achieve a degree of economies of scale in knowledge. Their interaction facilitates the creation of knowledge in two ways: by creating new knowledge that is the result of the combination of the knowledge of the individuals involved in the process, and by expanding the knowledge set of each individual through interaction with others with different knowledge sets.

Second, the creation of new knowledge for innovation is better facilitated by interaction among individuals with different knowledge sets than by interaction among individuals with

similar knowledge sets. The complexity of the environment and task, that is, product innovation that meets the demands of the external markets, requires diverse knowledge sets (Leonard-Barton, 1995; Nonaka and Takeuchi, 1995). In the case of the development of a particular product, an individual might initiate an idea. However, in order for this idea to become a product innovation that generates value for the firm, it has to be combined with other types of knowledge such as design engineering, manufacturing, marketing, and customer services, in order to ensure that it suits the demands of the external markets. Therefore, the possibility of exchanging knowledge and recombining existing knowledge in order to create new knowledge is greater when the people involved have diverse knowledge sets; in this way a degree of economies of scope in knowledge is achieved.

Third, the interaction among individuals for knowledge creation requires the use of teams rather than the organization as a whole. In contrast to pure knowledge mobilization or transfer (Szulanski, 1996; Tsai, 2002; Zander and Kogut, 1995), which can be performed unidirectionally from source to recipient, such as when diffusing practices across sub-units of the firm, knowledge creation requires multidirectional interaction among people with diverse knowledge sets. This multidirectional interaction is especially important, as it is not only the transfer of explicit knowledge that is involved, but also that of tacit knowledge, which can only be acquired through personal interaction (Nonaka, 1994; Nonaka and Takeuchi, 1995). This multidirectional interaction is facilitated by the use of teams with a limited number of people; this enables members to become both sources and recipients of knowledge.

The interaction among individuals in project teams with different sets of knowledge that are exchanged and transformed to create new knowledge has two prerequisites: the willingness of these individuals situated in different parts of the distributed knowledge system to exchange

knowledge in order to create new knowledge, and understanding among the individuals who exchange knowledge. First, individuals need to be willing to establish interactions and share their knowledge sets to create new knowledge; that is, they need to be provided with incentives, which can be economic (Hansen and Haas, 2001; Kerr, 1975; Milgrom and Roberts, 1992) and/or social (Hansen, 1999; Nahapiet and Ghoshal, 1998). Second, the interaction and exchange of knowledge among individuals with different knowledge sets requires an understanding among them that facilitates their interaction; that is, they need a common code (Arrow, 1974), common knowledge (Grant, 1996), or overlapping knowledge (Leonard-Barton, 1995; Nonaka and Takeuchi, 1995). Each of these factors is necessary but insufficient on its own. Without willingness on the part of the individuals to interact, there is little exchange of knowledge among them. Without understanding among individuals, knowledge cannot be exchanged in a meaningful manner, because misunderstanding could occur (Tsoukas, 1996, p. 16). Only when the two coexist are mobilization and subsequent new knowledge creation possible.

In summary, in this study I link the concept of knowledge mobilization and creation and argue that in the case of product innovation that requires the integration of knowledge from different functions, knowledge sharing from different functions of the organization is a necessary but insufficient condition for creation. Moreover, since the level of analysis of organizational capability is the organization and its unit of analysis is the substructures such as project teams, I link this stream of literature to the new product development team literature. One reason is that product development team literature provides us with some understanding about the factors and practices that explain new knowledge creation particularly for product innovation. Moreover, product innovation is a measurable outcome of new knowledge creation in organization (Godfrey & Hill, 1995).

Project Team Integrative Processes, Characteristics, and New Knowledge Creation

New product development team literature that focuses on the outcomes of knowledge mobilization and creation, specifically product innovation and other outcomes related to the projects, such as efficiency in terms of resources used (Clark & Fujimoto, 1991; Clark & Wheelwright, 1992), quality of the product innovation in terms of customer satisfaction with the innovation (Takeishi, 2001), technological innovativeness of the innovation (Ancona & Caldwell, 1992; Keller, 2001; Takeishi, 2001), deals specifically with the time at which firms organize their employees into project teams specifically to generate product innovation. It suggests that team-level processes such as communication among team members (e.g., Allen, 1970; Allen, 1977; Dougherty, 1987; Griffin & Hauser, 1992; Souder, 1987; Takeishi, 2001) and between team members and their external relations (Ancona & Caldwell, 1992a; Ancona & Caldwell, 1992b; Keller, 2001) are critical for project outcomes. Without any empirical tests, these researchers suggest that these team processes are facilitated by a set of project team management practices such as team leadership (Clark & Fujimoto, 1991; Clark & Wheelwright, 1992), development (Roth & Kleiner, 1996), reward for team performance (Ancona & Caldwell, 1999), and selection for common knowledge among members (Madhaven & Grover, 1998).

In this study I analyze three main project team-level integrative factors, which I argue are supporters of project outcomes and therefore the basis for organization's capability to create new knowledge. Unlike previous studies, which views communication as knowledge sharing, I analyze (1) internal knowledge sharing frequency, which is the frequency of knowledge sharing among team members; (2) external knowledge sharing frequency between team members and their external relations who are not team members, and (3) their common knowledge, which is the knowledge that team members have in common with each other. The main reason for the

distinction between communication and knowledge sharing is that not all communication among team members is knowledge sharing relevant for project performance. For example, we can imagine that when a team member calls each other up to say "hello" and ask about each other's well being, because of their friendship ties, communication occurs and knowledge sharing about each other's well being happens, however, this knowledge that is being shared is irrelevant for project performance. In other words, communication is a necessary but insufficient condition for knowledge sharing and creation for product innovation that creates value for the company. Therefore, I expand on the analysis of the effect of communication on team performance to analyze knowledge sharing among team members about the project, which is internal knowledge sharing, and knowledge sharing between team members and their external relations outside the team, which is external knowledge sharing. Moreover, common knowledge is the knowledge sets that team members have in common with each other. For example, if an R& D engineering team member has worked in the sales/marketing function, this team member has some knowledge in common with team members that represent the sales/market function. I propose that these factors are key determinants of team performance and that these factors are facilitated by a set of project team integrative practices such as development, reward, and selection.

Internal knowledge sharing. Knowledge sharing frequency between project team members situated in different functions has a positive effect on team performance. The main reason is that because of specialization of individual's daily tasks and his or her training and education, especially in the United States (Aoki, 1988; Milgrom & Roberts, 1992; Schein, 1996), an individual in a particular function, i.e., engineering or production, does not have the ability to develop a new product by him or herself, manufacture it, put in on the market that meets the demands of the external markets. Therefore, product innovation that are successful in the market

place requires knowledge sharing among a group of individuals that are based in R&D and engineering, customer services, marketing, and manufacturing (Dougherty, 1992). Individuals in customer services and marketing need to understand technological capabilities and constraints in terms of design and production, and both R&D and production need to understand market demands. Individuals in charge of designing the product not only need to incorporate customer demands but also need to understand the manufacturing capabilities of their product design. Because of task specialization and lack of incentives for knowledge sharing among these individuals on a day-to-day basis in organizations, especially in firms located in the United States (Aoki, 1988; Leonard-Barton, 1995; Milgrom & Roberts, 1992; Schein, 1996), I argue that successful projects experience higher frequency of knowledge sharing among project team members, while unsuccessful projects are those that had lower frequency of inter-functional knowledge sharing. This leads me to hypothesize that:

H1a. Project team-internal knowledge sharing frequency is positively related to team performance in terms of product innovation, as an outcome of the capability to mobilize and create knowledge.

External knowledge sharing frequency. External knowledge sharing frequency between team members and their external relations outside the team also has a positive effect on team performance. Based on the argument that individuals are hired into an organization to perform a specialized task with their highly specialized education, especially in the United States (Aoki, 1988; Milgrom & Roberts, 1992; Schein, 1996), in performing the task that requires the integration of knowledge from different functions, such as product innovation, the higher the frequency of knowledge sharing the better for team performance especially external knowledge sharing coming from within the same functional area. The main reason is that a task such as

product innovation not only requires inter-functional knowledge sharing but also deep knowledge and expertise from each functional area (Ancona & Caldwell, 1992b; Leonard-Barton, 1995; Nonaka & Takeuchi, 1995). This leads us to the hypothesis that:

H1b. Project team external knowledge sharing frequency is positively related team performance in terms of product innovation, as an outcome of the capability to mobilize and create knowledge.

Common knowledge. The knowledge that the team members based in different functions have in common supports project performance. This common knowledge is similar to the idea of overlapping knowledge or redundant knowledge (Nonaka, 1994; Nonaka & Takeuchi, 1995). The common knowledge among team members enables them to take the perspective of other team members in the process of knowledge sharing and convert that knowledge into new knowledge resulting in product innovation. Additionally, the knowledge that they have in common provides them with the absorptive capacity for other types of knowledge present on the team. For example, if an engineer has been trained or worked in marketing, when sharing knowledge with team members that represent the marketing function, he or she is more likely to understand and absorb knowledge about marketing that is being shared than an engineer who does not have any marketing knowledge. This common knowledge facilitates the conversion and integration of different types of knowledge shared in the team to create and achieve product innovation and accomplish it more quickly and efficiently. The underlying logic is that this common knowledge provides team members with the cognitive resources to combine insights synergistically from multiple knowledge sets. In the context of cross-functional project teams, the common knowledge of team members plays an especially important role in maintaining a disciplinary vision that integrates multiple perspectives and manages conflicting technical trade-

off. The cognitive skills to handle such integration and trade-off, gained through the process of integrating two disparate areas, will help the team leader craft a unifying vision that does justice to all the disciplines represented. However, while the common knowledge enhances the sharing and integration process, up to a point, the lack of diversity of deep functional knowledge and expertise hinders project team performance that requires diverse knowledge sets as it decreases the creative abrasion that is also critical for product innovation (Leonard-Barton, 1995; Nonaka & Takeuchi, 1995). This leads me to hypothesize that:

H1c. The amount of common knowledge among team members and team performance in terms of product innovation, have an inverted U-shaped relationship.

Project Team Integrative Management Practices and their Integrative Processes and Characteristics

Project team integrative practices affect project team performance by affecting their processes and characteristics that support their outcomes. The factors that facilitate knowledge sharing and creation are: (1) reward, (2) development, and (3) membership selection.

Rewards and knowledge sharing frequency. The reward for team performance also has an impact on team performance because it affects knowledge sharing among team members. It has been argued that employees working on teams in Japanese firms are more willing to share knowledge than employees in US organizations, in part because they are rewarded for these behaviors (Aoki, 1988; Milgrom & Roberts, 1992). Wageman and Baker (1997) studied the relationships between team reward and team outcomes in a laboratory setting, and found that team reward has a positive effect on observed cooperation. Menon et al. (1997) studied cross-functional product development teams, and found that rewarding project team performance increases interdepartmental communication. Following these theories of motivation, I argue that

project teams that receive a reward for their performance are likely to share knowledge more frequently to enhance task performance than teams that do not receive a reward. Moreover, project teams that receive a reward for their performance are more likely to experience higher frequency of knowledge sharing outside the team to search for resources that enhance task performance. These discussions lead to the hypotheses that:

H2a. Project team rewards for a particular project team task performance are positively related to project team-internal knowledge sharing frequency.

H2b. Project team rewards for a particular project team task performance are positively related to project team-external knowledge sharing frequency.

Project team development also facilitates team performance by affecting project internal and external knowledge sharing frequency. Based on Roth and Kleiner (1996) and (2002), I define project team development as team building or training, a process of taking a collection of individuals with different departmental objectives, functional backgrounds, and expertise, and transforming them into an integrated, effective work unit by building consensus on the objectives for the team, on the schedule for team to meet to work on the project, process of dealing with conflict among team members, and how to find resources that are necessary to conduct the project successfully. Since project team development is a process by which knowledge sharing among team members are facilitated by organizing their work processes such as setting the agenda for meetings to share knowledge among team members to work on the project, task allocation and suggestions about the resources needed, and where to find additional knowledge outside the team to accomplish the project, I predict that:

H2c. Project team development is positively related to project-internal knowledge sharing frequency.

H2d. Project team development is positively related to project-external knowledge sharing frequency.

Project team membership selection. Project team membership selection influences the knowledge creation process and therefore project performance. The underlying logic is that common knowledge among team members does not occur automatically on project teams, since the pool of human resources in the organization contains different knowledge sets (Iansiti, 1998; Leonard-Barton, 1995; Nonaka & Takeuchi, 1995). Even in Japanese firms, common knowledge on a team is not automatic, since not all members have the same knowledge sets, due to the fact that such sets are not developed in the same way at any given point in time. Therefore, in order to ensure some common knowledge on project teams, members are selected based in part on this factor (Nonaka & Takeuchi, 1995: 77). I argue that for firms located in the United States, because of specialization of education and task in organization and that deep expertise rather than breath of functional knowledge is valued (Leonard-Barton, 1995), the better predictor of common knowledge among team members is the employees' length of tenure with the company. Though empirical tests are limited, it has been argued that in the United States, there is little incentive on both the part of the employers and employees to acquire cross-functional overlapping knowledge (Leonard-Barton, 1995). For the employers, the investment in employees to have some cross-functional overlapping knowledge is viewed as risky, because employees might leave the company before the investment is recovered (Aoki, 1988; Milgrom & Roberts, 1992). For the employees, since they are rewarded for depth rather than breadth of functional expertise, they are motivated to develop only their functional expertise. However, Leonard-Barton (1995: 76) suggests that there are some individuals in the company that have some breadth of knowledge. However, she did not explain why. (2002), which is an in-depth analysis

of two U. S. companies based in the United States and a Japanese company located in Japan, indicates that in the U.S. companies, employees who have been with the companies at least fifteen years tend to have job experiences in multiple functional areas. However, unlike the Japanese company in Japan, these employees took the initiatives to acquire this knowledge rather than systematically developed by the company through a formal career development. The same study indicates that the longer employees stay with the company, the more likely they explore job options in other functional areas, because their preferences in terms of jobs have changed from when they first started working for the company. In particular, the study shows that for some engineers they move to customer services function working as technical support staff dealing with technical issues of the products raised by the external customers. Some engineers enter sales/marketing jobs working as technical experts on the functionality of the products. Therefore, membership selection based on common knowledge among team members does not ensure the availability of this knowledge on team. Since individuals that have the cross-functional overlapping knowledge are not developed systematically and U.S. companies lack the system of tracking their employees' knowledge (Prahalad & Hamel, 1990), managers in charge of organizing employees into project teams to create knowledge such as for product innovation may not have accurate information about who knows what outside of the positions they currently hold. Therefore, this leads us to hypothesize that:

H2e. Project team membership selection based on their length of tenure with the company rather selection for common knowledge among team members is positively related to common knowledge on project team.

In summary, the study proposes that the capability to mobilize and create new knowledge is facilitated by project team factors specifically project team-internal knowledge sharing

frequency, project team-external knowledge sharing frequency, and project team common knowledge. Moreover, these factors are supported by project team integrative practices -team development, reward, and membership selection.

RESEARCH DESIGN

The empirical test is performed on data from a survey of 99 cross-functional knowledge creation teams involving 495 team members of 33 organizations of large US and Japanese multinational firms in the divisions in which they manufacture computer, photo imaging, and automobile industries operating in the United States.

We selected the industries based on their different innovation cycles –short in the computer industry, medium-sized in the photo imaging industry, and long in the automobile industry– that affect the time pressure on gathering and processing different types of knowledge for innovation (Lawrence & Lorsch, 1967).

I chose firms that met two criteria. First, they were the largest in their respective industries based on revenue as reported in the Hoover's HandBook of World Business (1999). Second, they had customer service centers in the USA and Japan dealing with similar products within the same division. This requirement was necessary because this study is part of a larger one that compares sources of knowledge creation for product innovation of US and Japanese multinationals in both the United States and Japan, and how they mobilize knowledge across operations located in different countries and generate product innovation. With these requirements, I draw our sample from a population of 43 firms, which gives us a response rate of 76.7%.

Based on the analysis of knowledge creation of the Ford Explorer 2002 model, for each company, I selected the largest customer service center in terms of employees located in the

USA. I identified these centers using the Directory of Corporate Affiliations (1998). I chose the customer service organization because it is the gatekeeper linking firm's external markets and internal knowledge and activities. As in the case of new knowledge creation for innovation of the Ford Explorer 2002, smaller customer service centers based in Venezuela, Saudi Arabia, and in the United States provide knowledge about the preferences of their customers to the largest customer service center located in Dearborn, Michigan. The center then shares this knowledge with R&D, production, and sales marketing to create new knowledge. The organizations in this study had at least three functions represented: sales/marketing, customer service, and engineering linking to the R&D and manufacturing organizations.

In each customer service center, I randomly selected a set of cross-functional project teams. These teams had to meet two criteria. First, at least three functions were represented: customer service, engineering (e.g. R&D or manufacturing) and sales/marketing or manufacturing. Second, the project team's main objective was to transform specific external customer feedback obtained from the firm's worldwide operations about their products into an innovation. For example, one project team in a photo imaging firm worked on developing a new camera that had been loosing $8mn per year for the last 8 years, another team in an automobile company redesigned a compact car after finding out that though this product sells in Europe it underperformed in the South American market, while another team in a computer company dealt with developing a new model of personal computers because of it underperform in the academic market.

Data Collection

I followed three steps in our data collection. In the first step, I conducted in depth comparative case studies through field interviews, observations and phone interviews of 24

project teams belonging to three companies involving 110 individuals to ensure a deep understanding of the phenomenon. For the comparative case studies, which is available upon request, two years were spent observing the organizational contexts of these companies, how they organize their work force for product innovation, and how they manage the whole process to achieve it. We followed these teams from the beginning to end. Moreover, I observed what happened in terms of resources used in achieving the product innovation, customer satisfaction with the innovation, and speed-to-market of that innovation. In the second step, I conducted a pilot study to test the variables and measures and survey instruments. Finally, the surveys were conducted. The three companies used for comparative case studies are not included in the large sample study.

The team-level independent variables were collected from the project team leaders and members, and for the dependent variables, data were collected from the project managers. I approached the company through the vice presidents of customer services and/or sales/marketing who identified and introduced me to the project managers. For each company the project manager was then asked to provide a list of names of projects and the team leaders that supervised them. The list contained both successful and unsuccessful projects. Successful projects were those that generated new knowledge and completed their tasks. Moreover, the quality of their completed projects vary in quality, in terms of customer satisfaction with the innovation, speed-to-market of that innovation, and efficiency in terms of resources used. For unsuccessful projects, they ranged from those that did not complete the project and the team dissolved due to complication with the lack of knowledge sharing and misunderstanding, to those that completed the project but the innovation did not satisfy customers, and/or, speed-to-market was not quickly enough as scheduled, and the use of resources was well above what was

budgeted by top management. Based on this list, we randomly selected five team leaders to take a survey. On each survey the name of the project was labeled so that they knew which project they were answering the questions about. Prior to this, we conducted a short survey on team members of the 24 projects in the case studies to examine the consistency between answers provided by the team leaders and team members. When we averaged the answers of individual team members to obtain the average answers of the team, a procedure used by team researchers (e.g., Ancona & Caldwell, 1992; Keller, 2001), we found consistency between these averaged answers of the team and answers of the team leaders. Out of 190 project-team leaders sampled, we received 182 responses giving us a response rate of 95.8%. However, after collecting data on the rest of the team members for these projects, only 99 teams completed the surveys. Therefore, the response rate went down to 60%. In order to minimize team response bias about their projects, project managers were asked to evaluate the outcomes of these projects, which is consistent with team effectiveness research (Ancona & Caldwell, 1992, Keller, 2001).

Variables and Measures

Dependent variables. The capability to create new knowledge is represented by its outcomes, or team performance, since capability is an intangible that is not measurable directly but only through its effects (Godfrey & Hill, 1995). Of the four outcomes analyzed, three (product innovation, speed-to-market, and customer satisfaction) are based on a five-point Likert scale. For variables consisting of multiple measures, I used factor analysis and report their reliability scores indicated by the cronbach's alpha. All variables have cronbach's alpha >0.70, thus providing adequate reliability for predictor tests and hypothesized measures of a construct (Nunnally, 1978). Product innovation is measured by the extent to which projects using customer feedback led to new product development and/or modification ($\alpha = 0.87$). These measures were

used because not all teams completed their projects. Some teams dissolved without creating new knowledge to complete the task. Speed-to-market is measured by the extent to which the innovation was delivered quickly according to schedule. Efficiency was measured by the deviation from the amount of staff hours and financial resources used (excluding staff hours) as expected by management at the beginning of the project in completing the project on a three-point Likert type scale (α = 0.70). All the measures are averaged by the organization. The questions used in our surveys are available upon request.

Project team processes and characteristics. Internal knowledge sharing frequency is measured by eight items (α = 0.83) on interaction frequency among team members specifically to share knowledge about the project using (1a) face-to-face meetings, (1b), the extent to which in these meetings knowledge shared was useful in project accomplishment; (2a) face-to-face meetings informally with only certain team members, (2b), the extent to which knowledge shared in these meetings was useful for project accomplishment; (3a) phone conversations, (3b) the extent to which these conversations were useful for project accomplishment; (4a) electronic mail, (4b) the extent to which knowledge that was shared by team members was useful for project accomplishment. The scale is (5=daily, 4=More than once a week, 3=Once every 1-2 weeks, 2=Once every 2-3 weeks, 1=Once every 3-4 weeks). External knowledge sharing frequency is measured by how frequently team members interacted with people outside the team specifically to share knowledge about the project using (1a) face-to-face meetings (5=daily, 4=More than once a week, 3=Once every 1-2 weeks, 2=Once every 2-3 weeks, 1=Once every 3-4 weeks), and (1b) the extent to which knowledge exchanged in these meetings were useful for project accomplishment (5 = most useful, 4 = very useful, 3 = useful, 2 = somewhat useful; 1 = not useful); (2a) phone conversations, and (2b) the extent to which these conversations were

useful for project accomplishment; (3a) electronic mail, and (3b) the extent to which these email messages were useful for project accomplishment. The cronbach's alpha for this composite is 0.77. Common knowledge among team members is measured by the total amount of overlapping knowledge among core engineering team members, based on their past and current work experience. The reason is that field study suggests that firms in the United States that provides any cross-functional training and development tend to do so informally and unsystematically, and only with some of their engineers. One of the reasons is that it is easier for engineers to acquire knowledge in sales/marketing, customer services, and even production, but not the other way around. For each overlapping, a value of 1 was given.

Project team integrative management practices. Development is measured using a 5-point Likert scale on the extent to which the team agreed that they received training specifically for working on the project as an initial step to their teamwork. Project team reward is measured by the extent to which team members agree that project team outcome had any impact on team members' salary increase, bonus payment, promotion, and job assignment (α = 0.78). Membership selection based on length of tenure was measured using a 5-point scale on the extent to which team members were selected based on how long they have been with the company.

Control variables. The control variables are team membership selection based on overlapping knowledge (Madhaven and Grover, 1998). Functional diversity is controlled by research design (Ancona & Caldwell, 1992b; Keller, 2001). National diversity of team members was controlled for using the entropy-based diversity index (Teachman, 1980). Tenure diversity was measured by taking the standard variation and divided it by the mean of each team. Moreover, management support for the project is also controlled as previous studies (e.g. Clark

& Wheelwright, 1992), despite the lack of empirical support, has an impact on project outcomes. Consistent with the new product development team research, I controlled for team size and prior shared experience working on team. Size ranges from 5-12 members. However, for each team we collected data only from five core team members, defined as those who were involved with the project from beginning to end. There were team members that played minor role. For example, many companies in the sample had legal experts on all of their project teams. However, the team leaders did not consider them as core members in the creation of the product. They act as legal advisors for product liability. This study also controlled for organizational context by using company dummies.

Methods of Analysis

I use both the canonical correlation and the ordinary least squares regression analyses to test the hypotheses. The canonical correlation is used, because it can assess the relationship between two sets of variables. It is appropriate when any single criterion variable taken in isolation is at best indicative of only a part of the overall relationship (Bolch and Huang, 1974; Lambert and Durand, 1975; Wherry, 1984). For the ordinary least squares regression, hypotheses H1a to H1c are tested using the following model:

$$\textit{Project team performance} = \alpha + \beta_1 * \textit{Internal Knowledge sharing} + \beta_2 * \textit{External Knowledge sharing} + \beta_3 * \textit{Common Knowledge} + \beta_4 * \textit{Common Knowledge}^2 + \beta_5 * \textit{Selection on tenure} + \beta_6 * \textit{C-Tenure diversity} + \beta_7 * \textit{C-National diversity} + \beta_8 * \textit{C-Size} + \beta_9 * \textit{C-Prior Shared Experience} + \beta_{10} * \textit{C-Management Support} + \beta_K * \textit{C-Company} + \varepsilon$$

To test the effect of project team integrative practices on project team-level processes and characteristics (H2a-H2d), the following models are used:

*For H2a: Internal Knowledge sharing = $\alpha + \beta_1$ * Development + β_2 * Reward + β_3 * Selection on tenure + β_4 C-Selection on common knowledge + β_5 * C-National diversity + β_6 * C-Size + β_7 * C-Prior Shared Experience + β_8 * C-Management Support + β_K * Company + ε*

For H2b: External Knowledge sharing = $\alpha + \beta_1$ Development + β_2 * Reward + β_3 * Selection on tenure + β_4 * C-Selection on common knowledge + β_5 * C-National diversity + β_6 * C-Size + β_7 * C-Prior Shared Experience + β_8 * C-Management Support + β_K * Company +ε*

*For H2e: Common Knowledge = $\alpha + \beta_1$ * Selection on tenure + β_2 * C-selection on common knowledge + β_3 * C-National diversity + β_4 * C-Size + + β_5 * C-Prior Shared Experience + β_6 * C-Management Support + β_K * Company + ε*

ANALYSIS AND RESULTS

Table 1 presents the descriptive statistics and correlation analysis. The correlation between internal and external knowledge sharing is $r = 0.43$, $p < 0.43$. The correlation between internal and external knowledge sharing with common knowledge, is relatively low, $r = 0.31$, $p < 0.05$ and $r = 0.26$, $p < 0.05$, respectively. The relatively small correlation coefficients between the independent variables suggest they are distinct from one another; thus, they will be treated independently in this analysis.

****
Insert Table 1 about here
****

Among the dependent variables, we see that customer satisfaction and speed-to-market are relatively highly correlated ($r = 0.55$, $p < 0.01$). Because both variables are dependent variables, a canonical analysis helps us establish that the predictors as a set are able to explain a significant amount of variation in these outcomes of capability simultaneously as a criterion set. If the predictors are unable to explain a significant amount of variation in these dependent

variables as a set, subsequent analyses of each dependent variable are not permitted. This protects against explaining repeatedly the same variation shared by correlated dependent variables.

Table 2 presents a canonical analysis of the variation explained in the outcomes of the capability to mobilize and create knowledge simultaneously as a set. The predictors explain 56.25% (the canonical correlation squared) of the variation in the combined set of dependent variables. The slightly larger canonical weight for product innovation than for the other outcomes indicates that a somewhat stronger relationship exists between the two strategies and product innovation. The strength and significance of the relationship between the two strategies and the relatively equal canonical coefficients for the outcomes of capability indicate that the two strategies are able to explain variation in each dependent variable unrelated to the other and that the ordinary least squares regression analyses are appropriate.

****
Insert Table 2 about here
****

Table 3 presents the results from testing the project team-level factors, hypotheses H1a-H1c. The results show that H1a, H1b, and H1c are supported. Project team-level internal and external knowledge sharing frequency, and common knowledge support different outcomes of team capability. Model 2 shows that internal knowledge sharing frequency, external knowledge sharing frequency, and team common knowledge has a positive effect on product innovation. Common knowledge, however, seems to have stronger effect followed by internal knowledge sharing frequency and external knowledge sharing frequency. For efficiency in terms of resources used, I find similar effects. Tenure diversity, however, seems to have a negative impact on efficiency. For speed-to-market of the innovation, similar factors facilitate this outcome, however, internal knowledge sharing frequency seems to be a stronger predictor than

common knowledge followed by external knowledge sharing. For customer satisfaction, external knowledge sharing seems to be a stronger supporter, followed internal knowledge sharing. The results are unclear about the effect of common knowledge on this outcome. Although common knowledge among team members seem to be strong supporter of product innovation, efficiency, and speed-to-market, there is a decreasing return, which means that up to a point, common knowledge has a negative effect on these outcomes. One explanation is that for this type of task, product innovation, it requires a diverse set of deep functional knowledge and expertise as well as some knowledge in common.

****
Insert Table 3 about here
****

Table 4 presents the results from testing hypotheses H2a-H2e. The results show that all hypotheses are supported. Team development facilitates internal and external knowledge sharing frequency. Project teams that receive project team development are also more likely to engage in knowledge sharing that is both internal and external to the team than project teams that do not receive the development. Interestingly, project team reward lead to higher internal or external knowledge sharing frequency as theory of motivation suggests, however, lower than team development, which is a team socialization process. What is even more interesting is that team membership selection based on cross-functional common knowledge does not ensure common knowledge among team members. One possible explanation for this could be that project team leaders or managers who select team members do not have accurate information about the knowledge sets based on job experiences of individuals they select. Selection on tenure diversity better predicts common knowledge among team members. However, the control, team size, also predicts common knowledge among team members.

****
Insert Table 4 about here
****

The results show that the different factors support different outcomes of team capability. Among the project team factors, project team-internal knowledge sharing frequency facilitates product innovation and efficiency in terms of resources used in creating new knowledge for product innovation. External knowledge sharing frequency supports new knowledge creation for product innovation and customer satisfaction with the innovation. Common knowledge between manufacturing and R&D engineering team members has a decreasing return on product innovation and speed-to-market, but has a positive effect on efficiency. This finding suggests that creative abrasion (Leonard-Barton, 1995) is important for product innovation. This finding also suggests that although overlapping knowledge facilitates knowledge conversion, up to a point, it minimizes the creative abrasion that is also necessary for product innovation.

Among the project team management practices, team development facilitates the development of project team internal and external knowledge sharing more so than reward for team performance. This difference may be explained by the fact that previous studies did not study team initial socialization, which is development, and reward together. Project team membership selection based on tenure diversity rather than overlapping knowledge among team members, better ensures common knowledge team members. One of the explanations for this finding could be that companies in the United States where they do not systematically develop their employees to have some overlapping knowledge managers or team leaders that formed the teams did not have accurate information about team members' prior job experiences. One way to ensure some common knowledge is to select members based on tenure with the company.

DISCUSSION AND CONCLUSIONS

In this study I take the view that firms are distributed knowledge systems and empirically explain the factors that facilitate new knowledge creation in firms, which has been lacking (Foss, 1997). The paper accomplishes by integrating the knowledge-based view of the firm to the new product development team literature, because this literature is about new knowledge creation for product innovation, Moreover, it provides us with some explanation about the factors that facilitate new knowledge creation. This study indicates that in developing the capability to create new knowledge, knowledge mobilization and knowledge creation should be considered separately as they are supported by different project team integrative mechanisms. Team-internal and external knowledge sharing and common knowledge support a wide range of outcomes of this capability: product innovation, efficiency in terms of resources used, speed-to-market, and customer satisfaction. Surprisingly, among the project team integrative mechanisms, team development has a larger impact than reward on team performance by facilitating their internal and external knowledge sharing. Moreover, team membership selection based on company tenure better predicts common knowledge sets among team members than selection based on common knowledge sets.

This paper makes contribution to both theory and practice. First, it shows how the capability to create new knowledge is developed. Second, the paper makes the distinction between knowledge mobilization and new knowledge creation and suggesting which factors facilitate each process. While knowledge mobilization or sharing requires individuals' willingness to interact to share knowledge through the building of social ties (Hansen, 1999; Tsai, 2002) or the use of economic incentives (Milgrom and Roberts, 1992), new knowledge creation also requires individuals' understanding of each other's knowledge (Tsoukas, 1996. Third, it clarifies the level and unit of analysis but suggesting that much of the literature on

organizational capabilities based in the knowledge-based view considers firm as the level of analysis and the substructures, especially project teams as the unit of analysis. This is useful, because perhaps we can manage the substructures, in this case project teams, in order to develop the capability to create new knowledge.

In terms of practice, this study suggests that firms that compete on new knowledge creation for product innovation may need to focus on the factors that facilitate both knowledge mobilization and creation because each process is facilitated by different factors. The factors that facilitate knowledge mobilization are internal and external knowledge sharing frequency. Facilitator of knowledge creation is the common knowledge that team members have with each other. At the same time, too much common knowledge reduces knowledge diversity, which may also hurt product innovation. Second, project team development rather than reward affects a wider range of outcomes of this capability. This practice entails teaching employees how to communicate with people from outside their functions and how to organize their teamwork processes. Third, common knowledge between manufacturing and R&D employees supports many outcomes of this capability. Therefore, some employees may need to be developed at the organization level prior to team participation, so that they have some overlapping knowledge between these two parts of the organization. Moreover, organizations may also need to track employees' job experience, and in the process of project team formation, the team leader or managers in charge of selection should use this information.

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TABLES AND FIGURES

TABLE 1

Descriptive statistics and correlation analysis

Variables	*Mean*	*Stdev.*	*1*	*2*	*3*	*4*	*5*	*6*	*7*	*8*	*9*	*10*	*11*	*12*	*13*	*14*	*15*
1. Product innovation	*2.74*	*1.50*	--														
2. Efficiency	*1.75*	*0.64*	0.22	--													
3. Speed-to-market	*3.32*	*1.02*	0.01	0.14	--												
4. Customer satisfaction	*3.73*	*0.93*	0.04	0.13	0.55***	--											
5. Internal knowledge sharing	*3.29*	*1.01*	0.44**	0.43**	0.05	0.14	--										
6. External knowledge sharing	*2.26*	*1.36*	0.51***	-0.03	0.10	0.35*	0.43**	--									
7. Common knowledge	*3.46*	*3.36*	0.47**	0.44**	0.45**	-0.24	0.31*	0.26*	--								
8. Development	*2.87*	*1.31*	0.38*	0.03	0.46**	0.26	0.40**	0.42**	-0.08	--							
9. Reward	*4.32*	*4.07*	0.17	0.45**	-0.05	0.64***	-0.15	0.20	0.64***	0.33**	--						
10. Selection on tenure	*3.06*	*1.80*	0.22	-0.12	-0.17	-0.11	-0.04	-0.16	0.43**	0.07	0.25*	--					
11. C-Selection on common knowledge	*2.78*	*1.03*	-0.18	0.08	-0.41**	-0.31*	0.10	0.11	0.12	0.30*	0.27	0.15	--				
12. C-National diversity	*0.57*	*0.42*	0.68 ***	-0.36	-0.52***	0.42**	0.19	0.27*	0.16	0.22	0.28	0.12	0.12	--			
13. C-Tenure diversity	7.40	4.27	0.33 *	-0.18	-0.15	-0.18	-0.29	-0.21	-0.36*	-0.26*	-0.21	0.42 ***	0.45**	0.47**	--		
14. C-Size	*9.32*	*3.06*	-0.15	-0.04	-0.41**	0.13	-0.09	-0.06	0.44**	-0.10	0.10	-0.06	-0.06	0.14	0.37*	--	
15. C-Prior shared experience	*0.14*	*0.38*	-0.38**	-0.13	-0.30*	0.00	-0.08	-0.03	0.01	0.07	0.08	-0.09	-0.02	0.18	0.29 *	-0.06	--
16. C-Management support	*4.57*	*0.68*	0.03	-0.05	0.13	0.04	0.04	-0.01	-0.10	0.03	-0.10	0.05	0.07	0.11	0.38 *	0.02	0.00

Note: N= 99 (project teams).

* $p < 0.05$

** $p < 0.01$

*** $p < 0.001$

TABLE 2

Canonical Analysis

Variable	Standardized canonical coefficients
Capability	
Product innovation	0.48
Speed-to-market	0. 37
Customer satisfaction	0.45
Efficiency	0.44
Team process and characteristics	
Internal knowledge sharing	0.39
External knowledge sharing	0.38
Common knowledge	0.42
Canonical correlation	0.75
Df	6/338
F-ratio	17.65***

*** $p < 0.001$

TABLE 3

The effect of project team factors on team's capability to mobilize and create knowledge (N = 99)

	Product innovation		**Efficiency**		**Speed-to-market**		**Customer satisfaction**	
Model	Model 1	Model 2	Model 1	Model 2	Model 1	Model 2	Model 1	Model 2
Internal knowledge sharing frequency	--	0.56 ** (0.19)	--	0.68 *** (0.22)	--	0.82 *** (0.11)	--	0.49 ** (0.15)
External knowledge sharing frequency	--	0.42 *** (0.12)	--	0.51 * (0.23)	--	0.46 ** (0.10)	--	0.61 *** (0.14)
Common knowledge	--	0.82 *** (0.11)	--	0.69 *** (0.19)	--	0.75 *** (0.11)	--	0.47 * (0.16)
Common knowledge ^{2}	--	-0.84 *** (0.19)	--	-0.43 * (0.18)	--	-0.44 * (0.07)	--	0.23 † (0.12)
Selection on tenure	--	0.36 ** (0.14)	--	-0.58 * (0.23)	--	0.25 * (0.12)	--	0.73 *** (0.19)
C-Selection on functional common knowledge	0.24 (0.25)	0.16 (0.09)	0.22 (0.14)	0.31 (0.29)	0.29 (0.61)	0.21 (0.13)	0.42 * (0.19)	0.16 (0.18)
C-National diversity	0.61 * (0.23)	0.36 * (0.15)	0.39 (0.48)	0.35 (0.22)	0.64 (0.53)	0.42 (0.39)	0.49 ** (0.11)	0.42 * (0.18)
C-Size	0.55 ** (0.11)	-0.16 (0.65)	-0.12 (0.32)	0.35 (0.38)	0.22 (0.21)	-0.39 *** (0.08)	0.18 (0.11)	0.19 (0.12)
C-Prior shared team experience	-0.34 * (0.07)	-0.22 ** (0.07)	-0.18 (0.14)	-0.22 (0.18)	0.55 ** (0.21)	-0.19 * (0.07)	0.41 ** (0.13)	-0.14 (0.12)
C-Management support	-0.15 (0.22)	0.02 (0.07)	0.27 (0.31)	0.63 * (0.29)	0.44 ** (0.07)	0.02 (0.08)	0.38 * (0.17)	0.57 ** (0.12)
C-Company (dummies)	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
F	1.78	5.96***	1.68	5.23**	2.73	5.88***	1.96	4.78**
R^2	0.09	0.36	0.11	0.33	0.15	0.29	0.10	0.41
Adjusted R^2	--	0.28	--	0.23	--	0.26	--	0.32

Note: Standard errors in parentheses. Significance: ***0.001, **0.01, *.05, †0.1.

TABLE 4

The effects of project team management practices on knowledge sharing and functional common knowledge (N = 99)

	Internal knowledge sharing frequency		**External knowledge Sharing Frequency**		**Common knowledge**	
Model	Model 1	Model 2	Model 1	Model 2	Model 1	Model 2
Development	--	0.89 *** (0.27)	--	0.67 *** (0.15)	--	-
Reward	--	0.26 ** (0.08)	--	0.44 * (0.17)	--	-
Selection on tenure	--	-0.16 (0.11)	--	0.54 ** (0.21)	--	0.88 *** (0.24)
C-Selection on common knowledge	0.42 (0.35)	0.57 (0.62)	0.21 (0.28)	0.19 (0.09)	0.33 (0.25)	0.31 (0.29)
C-National diversity	0.27 (0.22)	0.76 (0.51)	0.72 ** (0.28)	0.69 *** (0.17)	0.42 (0.23)	0.53 (0.35)
C-Size	-0.31 ** (0.10)	-0.32 (0.17)	0.53 (0.36)	0.42 *** (0.08)	0.41 *** (0.10)	0.51 *** (0.19)
C-Prior shared team experience	0.26 (0.19)	0.42 ** (0.07)	0.27 (0.16)	0.03 (0.07)	0.10 (0.09)	0.10 (0.09)
C-Management support	0.44 * (0.19)	-0.17 (0.15)	-0.19 (0.11)	0.09 (0.08)	-0.14 (0.09)	-0.14 (0.09)
C-Company (dummies)	Yes	Yes	Yes	Yes	Yes	Yes
F	4.96 *	5.89 **	2.66	5.43 **	3.11 *	5.64 **
R^2	0.11	0.33	0.09	0.29	0.17	0.31
Adjusted R^2	--	0.28	--	0.31	--	0.29

Note: Standard errors in parentheses. Significance: ***0.001, **0.01, *.05, †0.1.