Expertise Dissimilarity and Creativity: Can Sharing Tacit and Explicit Knowledge Enhance Creativity?

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ABSTRACT

This paper investigated whether knowledge sharing may moderate the effect of functional specialization dissimilarity on individual creative behaviors in project teams. Functional specialization dissimilarity is defined here as the extent to which a member is different from, or dissimilar to, other members in terms of the functional departments they belong to and their professional responsibilities. Multilevel analyses on data collected from 200 members of 40 project teams in three research institutes of a telecommunication company revealed that members who are functionally dissimilar to others are more creative when the team has higher levels of tacit knowledge sharing rather than explicit knowledge sharing. By contrast, members who are functionally similar to others are more creative when the team has higher levels of explicit knowledge sharing rather than tacit knowledge sharing.

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One of the key competitive advantages of firms lies in their ability to innovate (Gilson, Mathieu, Shalley, & Ruddy 2005; Somech 2006; Sundstrom 1999). Cross-functional project teams have spearheaded innovation for firms across industries and nations. Researchers from various research areas such as team diversity (e.g., Bantel & Jackson, 1989; Ely & Thomas 2001; Jehn, Northcraft, & Neale 1999), knowledge management (e.g., Massey, Montoya-Weiss, & O'Driscoll 2002; Nonaka & Takeuchi 1995), creativity and innovation (e.g., Gilson et al. 2005; Sternberg & O'Hara 2000), organizational communications (e.g., Fischer 1981; Katz & Te'eni 2007), and decision making in small groups (e.g., Brodbeck, Kerschreiter, Mojzisch, & Schulz-Hardt 2007; Stasser, Stewart, & Wittenbaum 1995; Stasser & Titus 1985) have generally shared the "value-in-diversity" assumption, i.e. diverse expertise of cross-functional teams can bring in different kinds of knowledge and perspectives that can facilitate creation of new knowledge. Empirical studies have also shown that knowledge sharing and cross-fertilization of ideas make important mechanisms through which diverse information and knowledge can be synthesized to improve team effectiveness and innovation (e.g., Bunderson & Sutcliffe 2002; Dahlin, Weingart, & Hinds 2005; De Dreu 2007; Gibson & Gibbs 2006; Homan, van Knippenberg, Van Kleef, & De Dreu 2007; Sawyer, Houlette, & Yeagley 2006; Srivastava, Bartol, & Locke 2006; Van der Vegt & Bunderson 2005; Wilson, Goodman, & Cronnin 2007).

However, there is growing recognition of the view that knowledge sharing in teams with heterogeneous knowledge and expertise does not necessarily lead to better decision making and innovation, especially when the members simply share with others the knowledge or information already known to the team, and fail to put forth their unique viewpoints or "hidden profiles" to the group (e.g., Stasser et al. 1995; Stasser & Titus 1985, 1987, 2003). When only shallow and less critical information, rather than deeper and critical perspectives are processed in the group (Chaiken & Trope 1999; De Dreu 2007; Homan et al. 2007), the shared knowledge or information cannot enhance recipients' understanding and meaningful interpretation of the tasks or the expertise of those sharing the information (Boland & Tenkasi 1995; Boland, Tenkasi, & Te'eni 1994; Katz & Te'eni 2007). Moreover, there is empirical evidence that, for teams composed of experts with homogeneous knowledge and expertise, sharing of hidden profiles and more elaborated information is not only redundant (Brodbeck et al. 2007; Homan et al. 2007), but can also be counterproductive (Katz & Te'eni 2007), because it may add no value to the group as a whole, slow down the work processes, and consume additional resources. In fact, productivity of homogeneous teams can be higher when members communicate with each other using simplified and less elaborated information (Katz & Te'eni 2007); perhaps sharing more codified information can speed up the work processes among homogeneous members given the high level of shared understanding among the members (cf. Haas & Hansen 2005, 2007). In short, these empirical findings seem to suggest that functionally heterogeneous teams require members to share with each other deep and unique information and knowledge, while homogeneous teams may require members to share with each other only simplified and less elaborated information and knowledge, to become innovative and effective.

In this paper, we attempt to extend and complement the "value-in-diversity" model by proposing and testing the idea that both heterogeneity and homogeneity can stimulate individual creativity, contingent upon the type of knowledge shared among a group of experts or knowledge workers. Two types of knowledge have been identified by Nonaka and his associates (Nonaka 1994; Nonaka & Takeuchi 1995): tacit knowledge and explicit knowledge. Tacit knowledge refers to knowledge that is tacit in nature, such as personal experiences. Explicit knowledge, on the other hand, refers to objective and codified knowledge that can be presented in an explicit manner, such as documents, reports, and models. We develop a theoretical model, which predicts that knowledge workers of functionally heterogeneous teams tend to exhibit more creative behaviors when the teams share tacit, rather than explicit knowledge, whereas knowledge workers of functionally homogeneous teams are more likely to engage in creative behaviors when the teams share explicit, rather than tacit knowledge.

This study may advance our knowledge in two ways. First, research on team diversity is primarily guided by the similarity attraction and social categorization theories, which posit that people tend to like and have positive interactions with those who share similar demographic characteristics and values with them (Byrne 1971), and who are perceived to belong to the same social categories (Hogg & Terry 2000; Tajfel & Turner 1979). However, we argue that research with this approach to diversity is inadequate to address what motivates individual knowledge workers to engage in creative behaviors in functionally heterogeneous or homogeneous teams. Specifically, when an individual member is similar, rather than dissimilar to other members, s/he tends to have higher levels of trust in his/her colleagues, to engage in more positive interactions with them, and to feel psychologically more safe (e.g., Reskin, McBrier, & Kmec 1999; Riordan 2000; Tsui & Gutek 1999; Tsui & O'Reilly 1989; Tsui, Xin, & Egan 1995). As a result, an individual employee who is similar to the rest of the team is more likely to propose new and novel ideas to the group. By contrast, being dissimilar rather than similar to other members of the team can also encourage individual members to exhibit creative behaviors, because people are motivated to learn from others who possess different knowledge (Augustinova, Oberlé, & Stasser 2005), and to develop novel ideas when they feel that they are unique (Janssen & Huang in press). Drawing from the "groups as information processors" perspective (Hinsz, Tindale, & Vollrath 1997), we propose that how knowledge and information are processed and shared among team members, rather than the similarity attraction effect or the social categorization processes, is the salient and determining force that drives creativity among knowledge workers. Based on this "groups as information processors" perspective, some researchers have shown that effective information processing and knowledge sharing in diverse teams tends to lead to better "team" decisions, innovation, and effectiveness (De Dreu 2007; Homan et al. 2007). Yet, little is known about how the knowledge sharing processes in a team are associated with work behaviors of individual members (cf Augustinova et al. 2005). We contribute to this stream of research by theorizing and examining the extent to which knowledge sharing in a team can influence when and how functional specialization dissimilarity—defined as the difference between a focal employee and his or her fellow team members in functional specialization (Van der Vegt, Van de Vliert, & Oosterhof 2003)—damages or enhances individual creativity.

Second, effective knowledge exchange occurs when members can share not only their explicit knowledge but also their tacit knowledge through social interactions (Boland & Tenkasi 1995; Boland et al. 1994; Nonaka & Takeuchi 1995). However, recent studies have suggested that knowledge sharing does not necessarily contribute to team effectiveness and innovation. Sharing of tacit or explicit knowledge may have benefits and cost. Whether the benefits can outweigh the costs is largely dependent on the specific needs of a team. For example, teams and individuals with less experience in certain areas can benefit more through obtaining tacit knowledge from experts in those areas, because they can learn a great deal about specific tasks through close interactions with the experts and obtaining more elaborated intelligence (Haas & Hansen 2005, 2007; Katz & Te'eni 2007). By contrast, teams and individuals with more similar experience in certain areas can benefit more through obtaining more explicit and codified knowledge; since these experts already assume the basic common understanding about the areas, explicit knowledge is adequate and sufficient for them to understand the issues and to speed up the knowledge creation processes. Hence, we propose that knowledge workers working in both functionally heterogeneous and homogeneous teams can be encouraged to exhibit creative behavior, depending on the type of knowledge (i.e., explicit knowledge or tacit knowledge) shared in the team. In functionally heterogeneous teams, when individual members are unfamiliar with the knowledge and perspectives of those from dissimilar functional areas, a climate of sharing tacit knowledge in the team can help them to get insightful and unique perspectives of those who are dissimilar. In functionally homogeneous teams, s individual members are familiar with the knowledge and perspectives of others because of functional similarity, obtaining explicit knowledge from other members can help them understand the issues quickly, making it easier to engage in knowledge creation processes. Therefore, we make a contribution by examining how tacit and explicit knowledge sharing in functionally heterogeneous and homogeneous teams can influence individual members' creativity.

CONCEPTUAL BACKGROUND AND HYPOTHESES

Tacit and Explicit Knowledge Sharing

Contemporary firms are increasingly relying on teams as a mechanism to integrate individual knowledge into collective knowledge pools and to contribute to productive organizational performance (Nelson & Cooprider 1996; Nonaka 1994; Thomas-Hunt, Ogden, & Neale 2003; Tsai 2001). In teams comprised of individuals with dissimilar specialized skills and competencies, knowledge sharing among team members can provide opportunities for mutual learning and cooperation that stimulate the creation of new knowledge and facilitate the teams' innovative and problem-solving capabilities (Haas & Hansen 2005; Tsai 2001; Zakaria, Amelinckx, & Wilemon 2004). Prior research has shown that exchanging and combining resources, including key information and expertise, actually contribute significantly to product innovations (Tsai 2001). A study of R&D teams (Massey et al. 2002) found that the success of teams critically depended on more effective and efficient use of their knowledge resources. Furthermore, (Tiwana & McLean 2005) reported that integration of individually held diverse ideas, expertise, perspectives, and domain knowledge can lead to high(er) levels of team creativity.

However, there is a growing recognition of the belief that, whether organizations and teams can benefit from knowledge sharing, is largely dependent on the type of knowledge being shared in different situations (Haas & Hansen 2005, 2007). Researchers have generally identified two types of knowledge that are shared in organizations and teams: tacit knowledge and explicit knowledge. Tacit knowledge is rooted in action and experience, and is embedded in the human brain and body. It is unspoken and subtle understanding, know-how, and skills embedded in a particular context. Therefore, it cannot be easily codified, articulated, or transferred (Alavi & Leidner 2001; Grover & Davenport 2001; Nonaka 1994; Subramaniam & Venkatraman 2001). Explicit knowledge, on the other hand, can be articulated, codified, and communicated in symbolic forms, such as manuals, reports, and other documented forms (Alavi & Leidner 2001; Nonaka & Takeuchi 1995). Thus, explicit knowledge is sometimes called codified knowledge (Edmondson, Winslow, Bohmer, & Pisano 2003).

When knowledge is explicit and codified, individuals can easily transfer it to others by passing them the reports, manuals, company documentation, or software. As explicit knowledge is codified in more simplified forms (e.g., standard operation procedures in manufacturing units) and relatively more self-explanatory, the recipients of such knowledge can often directly apply the knowledge to effective use (Edmondson et al. 2003; Hansen 1999; Markus 2001).

However, tacit knowledge, which is unstructured, intuitive, and unarticulated, is more difficult to transfer, than explicit knowledge (Argote, McEvily, & Reagans 2003; Hansen 1999). Sharing of tacit knowledge requires close interactions and shared understanding among members (Hansen 1999; Hansen, Mors, & Løvås 2005; Lam 2000). Examples of tacit knowledge include consultants' working papers or engineering drawings (Markus 2001), and the subtle judgments in medical practices (Edmondson et al. 2003). It is difficult for recipients to understand the documents containing tacit knowledge, because it requires pre-existence of some contextual information or intellectual background to meaningfully comprehend and accurately interpret the tacit knowledge. Other forms of tacit knowledge, such as the unspoken and subtle know-how, skills, and procedural knowledge usually need to be learned by doing and experiencing in person. Therefore, sharing of tacit knowledge requires physical proximity to see, understand, and practice the knowledge repetitively, before it can be put to use (Dhanaraj, Lyles, Steensma, & Tihanyi 2004; Edmondson et al. 2003; Lam 2000; Nonaka & Takeuchi 1995). It can become voluminous, if not impossible, for the knowledge source to provide sufficiently rich description of why the problem occurred, what different things meant, what was done, how and why things were done, and how this knowledge could be applied in other settings. Without pre-existence of substantive contextual information, tacit knowledge may not be fully understood by the recipients. This contextualization of information can be achieved through sharing of working experiences—such as in apprenticeship or internship—and intensive interactions. Shared experiences and intensive interactions can help individuals to develop some "interpretive schemes", which can provide the basis for formulation of implicit assumptions about the facts, and help them identify problems, thereby facilitating assimilation and interpretation of the tacit knowledge of dissimilar others (Dougherty 1992; Haas & Hansen 2005; Hansen 1999; Markus 2001).

Notably, in their recent thought provoking work, Haas and Hansen (2005, 2007) contend that sharing tacit and explicit knowledge can be beneficial, as well as detrimental, to the effectiveness of organizations and teams, depending on whether the benefits of knowledge sharing can outweigh the costs. Specifically, the obvious benefit of sharing tacit knowledge is that the recipients can get more insight and unique views about a particular know-how. But the cost of transference of such knowledge can be very high, as it requires intensive interactions and trusting relationships between the knowledge providers and recipients (Haas & Hansen 2005; Hansen 1999; Uzzi 1997). In contrast, explicit knowledge in forms of, for example, electronic documents allows the knowledge recipients to gain common understanding of the background information, and avoid repetitive efforts in reinventing the wheel, thereby speeding up the work processes. But this type of knowledge is usually superficial and cannot provide unique and contextualized views and perspectives to the recipients. Indeed, Haas and Hansen (2007) have shown that sharing tacit knowledge could enhance work performance but could slow down efficiency. Yet, sharing explicit knowledge has the advantage of saving time but has little benefit on the quality of works.

Furthermore, Haas and Hansen (2005) have argued that whether sharing tacit or explicit knowledge can benefit a team is also dependent on specific needs of the team, for task operation. The authors studied the effect of knowledge sharing among consultants' teams on the quality of the sales proposals they produced. The authors reported that when teams needed to develop innovative ideas to differentiate them from their competitors, tacit knowledge offered by some external experts who are dissimilar from the team members would be more helpful. However, when the teams did not have to compete with others by developing innovative ideas, using explicit knowledge stored in the company database was adequate for them to accomplish the tasks. More interestingly, they found that when teams lacked experience of writing sales proposals and, at the same time, were under competitive pressure to come up with innovative ideas, tacit knowledge received in the form of personal advice from external experts would be more crucial for them to develop better proposals. But, if the teams had already gained adequate experience of writing sales proposals in the past, even while facing intensive competition, obtaining tacit knowledge may not be more productive than simply relying on codified and explicit knowledge for developing sales proposals.

In general, by applying the aforementioned concepts of tacit and explicit knowledge to study creative behaviors in cross-functional teams, one can fill three gaps in the literature. First, in a recent review of team learning, Wilson et al. (2007) proposed that team learning can benefit from sharing tacit and explicit knowledge. Knowledge or routines that are primarily explicit can be stored in codified form. Knowledge or routines that are more tacit can be more easily stored and retrieved in human memory systems, which requirie more interactions among individuals. Yet, they point out, that researchers of team learning processes have considered "the types of knowledge that are largely explicit and concrete, rather than implicit or tacit" (Wilson et al., 2007: 1047). Second, thus far, the differences between impacts of sharing of tacit and explicit knowledge have only been studied at the team or unit level (Haas & Hansen 2005, 2007; Hansen & Løvås 2004; Tsai & Ghoshal 1998). We still do not know decisively whether sharing of tacit and explicit knowledge has differential effects on an individual's creativity and if yes, how different is the creativity function in the case of sharing of tacit knowledge, compared to sharing of explicit knowledge. Third, prior team diversity research treating knowledge sharing as a critical process of team performance has only focused on the global construct of knowledge sharing. No studies have taken into account the potentially differential effects of tacit and explicit knowledge sharing on heterogeneous and homogeneous teams. As we will argue in the next section, tacit knowledge sharing may foster creativity among members in functionally heterogeneous groups, whereas explicit knowledge sharing may encourage members in functionally homogeneous groups to engage in creative behaviors.

Joint Effects of Functional Dissimilarity and Knowledge Sharing on Creative Behaviors

Teams have become the building blocks of organizational effectiveness, and the core organizational units where new knowledge is created. A long held assumption among scholars and practitioners is the idea that groups with diverse members are more conducive to innovation and creativity. This view has its roots in the "value in diversity hypothesis", which postulates that diverse groups are able to translate their unique perspectives into exceptionally creative solutions to the problems they encounter (Jehn et al. 1999; Watson, Kumar, & Michaelsen 1993). However, real world experiences suggest that, in order to deal with specific problems and develop new ideas or products, firms may form task force teams which can be composed of members from either multiple disciplines or a single discipline, depending on the specific project objectives. To illustrate, we use hypothetical examples of project teams of the research institute of a telecommunication company, from whom we collected our data. To investigate the feasibility of offering cable TV services to their customers, the research institute may form a multi-disciplinary project team. Since the task is complex and needs diverse expertise and knowledge, the project team is composed of experts from different functional departments of the research institute, such as departments of product design, network planning, data transmission, information system, software support, and business development. However, when the company tries to solve a technical problem regarding data transmission quality, they may simply assign the task to the department of data transmission and form a team of a few data transmission experts to deal with the problem. In this case, members of both the multi-disciplinary team and the single-discipline team are required to actively engage in creative behaviors, in order to create new knowledge to deal with their respective problems. Prior research has primarily focused on creativity in cross-disciplinary teams. Little attention has been paid to creative behaviors in single-discipline teams. We argue that knowledge workers in functionally heterogeneous and homogeneous teams may need different intellectual resources, such as particular types of knowledge shared among the team members, to engage in creative processes.

While the operationalization of team learning in Van der Vegt and Bunderson's (2005) study consists of both information sharing and learning, De Dreu's (2007) more recent work attempted to differentiate between the effects of these two processes on team performance, when investigating how task reflexivity moderated the effect of "cooperative outcome interdependence" on team effectiveness. Task reflexivity was defined as the extent to which team members overtly reflect upon the group's objectives, strategies, and processes and adapt them to current or anticipated circumstances. Results based on experiences of 46 cross-functional teams showed that task reflexivity positively moderated the positive effect of cooperative outcome interdependence on information sharing, learning, and team effectiveness. Yet, learning rather than information sharing actually mediated the joint effect of cooperative outcome interdependence and task reflexivity on team effectiveness. Importantly, this finding suggests that the amount of information shared in cross-functional teams does not automatically enhance performance. Rather, the key lies in whether the information can be effectively used by the team members to generate new ideas and resolve problems (De Dreu 2007). In a similar vein, Wilson et al. (2007) contended that, in order to understand what facilitates team learning, researchers should distinguish the type of knowledge shared within teams and investigate the consequences of members' sharing tacit, as well as explicit knowledge.

We take the position that both tacit and explicit knowledge may facilitate individual learning and creative processes, contingent upon what types of teams the individuals work for. As mentioned earlier, members in both functionally heterogeneous and homogeneous teams may contribute to the creativity of the teams. And teams may differ in terms of types of knowledge shared among the members. Some teams may share more tacit knowledge; others may share more explicit knowledge. In the following sections, we develop a conceptual map depicting four situations under which individual members' creative behaviors may be enhanced or inhibited along two dimensions: high or low functional specialization dissimilarity, and tacit vs. explicit knowledge sharing (see Figure 1). Specifically, a member may work in four types of team situations: (1) tacit knowledge sharing and high functional specialization dissimilarity; (2) tacit knowledge sharing and low functional specialization dissimilarity; (3) explicit knowledge sharing and high functional specialization dissimilarity; (4) explicit knowledge sharing and low functional specialization dissimilarity. We develop predictions for individual creativity under each condition in the following sections.

Insert Figure 1 about here

Tacit knowledge sharing and high functional specialization dissimilarity. Brodbeck et al. (2007: 459) argued that "groups can be viewed as a vehicle for combining and integrating different knowledge, ideas, and perspectives into high-quality decision making and innovations." Individual members will become creative when cross-fertilization occurs in their teams. Cross-fertilization is achieved when members can meaningfully understand the knowledge, expertise, and perspectives held by other members of the team (Boland & Tenkasi 1995; Boland et al. 1994; Gibson & Gibbs 2006). Consequently, these members are more likely to be able to effectively make use of and integrate these newly learnt knowledge, expertise, and perspectives to generate novel ideas and new knowledge (Tiwana & McLean 2005). This is particularly true in a functionally heterogeneous team as every one has a unique point to offer (Harrison & Klein 2007). And the availability of ideas and information is relatively high in such groups (Nonaka 1994; Taylor & Greve 2006). The maximum diversity of functionally heterogeneous teams is characterized by the fact that each member of the team holds unique knowledge, expertise, and perspective that are different from others (Harrison & Klein 2007). Because of this uniqueness, members can only learn from each other when tacit knowledge is shared among them.

According to Nonaka (1994: 16), tacit knowledge has two key elements: the cognitive element and the technical element. The cognitive element refers to the mental models or schemas developed by individuals based on their experiences. These mental models or schemas form the viewpoints for the individuals to perceive, and make sense of, their world. The technical element of tacit knowledge involves concrete know-how, crafts, and skills that apply to specific contexts. Tacit knowledge is difficult to be codified in the forms of documents and reports; it relies on intensive social interactions for knowledge transfer (Nonaka & Takeuchi 1995). In order to fully understand the knowledge and expertise of other members, who possess dissimilar functional specializations, members in functionally heterogeneous teams need more elaborated explanations of the knowledge and expertise held by the other members. Such elaborated understanding can be achieved through sharing tacit knowledge. Experience sharing is one of the crucial processes of transmitting tacit knowledge to other members (Nonaka, 1994: 24)

"Direct understanding of other individuals relies on shared experience that enables team members to 'indwell' into others and to grasp their world from 'inside' ….. Shared experience also facilitates the creation of 'common perspectives,' which can be shared by team members as a part of their respective bodies of tacit knowledge. The dominant mode of knowledge conversion involved here is socialization. Various forms of tacit knowledge that are brought on the table by individual members are converted through co-experience among them, to form a common base for understanding".

Although no empirical studies have examined the effects of tacit knowledge sharing on the relationship between functional specialization dissimilarity and individual creativity, a recent study does suggest that tacit knowledge may facilitate functionally dissimilar members to understand each other, and improve their work performance and innovation. More particularly, in a controlled experiment, Katz and Te'eni (2007) found that, for dyads with different perspectives, contextualized communication (information sent to receiver with more elaborated explanation) through e-mails can facilitate understanding of the information and help improve work performance.

Tacit knowledge sharing and low functional specialization dissimilarity. In functionally homogeneous teams, members tend to have similar knowledge, expertise, and perspectives. We contend that tacit knowledge sharing may have a detrimental effect on individual creativity in functionally homogeneous teams for three reasons. First, in such teams, members do not need more elaborated knowledge sharing in order to understand the knowledge held by other members. Instead, more elaborated knowledge sharing becomes redundant in the process of theorizing group decision making under conditions of distributed knowledge. Brodbeck et al. (2007) argued that a laborious exchange of information cannot "pay off" with regard to decision quality when the information shared in the group is the same as the information held by individual members. In contrast, the authors argued that sharing of elaborate intelligence is particularly useful when group members have "hidden profiles" or unique information (Stasser & Titus 1985, 2003) that can contribute to high quality group decisions and innovation. When there are no hidden profiles, such as the case of functionally homogeneous teams, sharing of elaborated information is redundant.

Second, experts with similar knowledge and expertise may be able to generate more ideas when they have fewer interactions with others than when they engage in more social interactions with others. The findings of a study of the US comic book industry show that individuals were able to combine diverse knowledge more effectively than multi-member teams (Taylor & Greve 2006). This finding led the authors to conclude that although cross-fertilization of ideas in teams with members results in more creative outcomes, an individual creator working alone without much socialization can still combine diverse experiences on his/her own, with the advantage that the coordination or access problem that arises in teams is not there. In other words, an individual creator can have integrated, diverse knowledge without the potential interpersonal conflicts often present in teams. As a result, an individual creator who works alone is less likely to make compromises in the creative processes, and becomes more effective and innovative in generating new ideas than if s/he were working with other creators in teams.

Third, sharing tacit knowledge may even slow down the knowledge creation processes, because it consumes a lot of time and effort. Based on data collected from 182 sales teams in a management consulting company, Haas and Hansen (2007) found that although sharing personal advice by an expert with the team may help improve the quality of the work, it took extra time for the team to accomplish the task. Similarly, Katz and Te'eni (2007) also showed that using such socialization a contextualized communication among dyads with similar perspectives could have detrimental effect on work performance, because contextualization may overload the recipients with redundant information.

Taken together, using the example of the multi-disciplinary project team in the telecommunication company, an expert from the product design department is more likely to come up with innovative ideas to facilitate development of strategies to launch cable TV services, when s/he knows how this new service will influence the work processes of other departments. Such insights can be obtained more effectively through tacit knowledge sharing in the team. On the other hand, if the experts of the single-discipline team engage in intensive social interactions to share their tacit knowledge with each other, the experts in this team may not gain new and useful information through this process, and may even be disrupted by the potential conflicts in the team, as a result of more intensive social interactions; also, the team may spend too much time and put in too much effort, which can be counterproductive. Therefore, we hypothesize that:

Hypothesis 1: Tacit knowledge sharing at the team level moderates the relationship between functional specialization dissimilarity and individual creative behaviors; the dissimilarity-creative behaviors link is positive when a high level of tacit knowledge sharing is present; and the dissimilarity-creative behaviors link is negative when a low level of tacit knowledge sharing is present.

Explicit knowledge sharing and high functional specialization dissimilarity. Explicit knowledge refers to knowledge that can be expressed in formal and systematic languages and shared in the form of data, scientific formulae, specifications, and manuals and the like (Nonaka, Toyama, & Konno 2000: 7). This type of knowledge sharing can be detrimental to creative behaviors of members in functionally heterogeneous teams, because it may inhibit mutual understanding among functionally diverse members of the group. As each member of a functionally heterogeneous team possesses unique knowledge and expertise, sharing explicit knowledge in forms of documents, data, and formulae cannot help members to acquire the needed substantive contextual information or interpretive schemes that are essential for understanding other members' knowledge, expertise, and perspectives. Consequently, cross-fertilization is unlikely to happen. For example, a psychologist may not produce new ideas by reading the formulae provided by a mathematician, because the psychologist cannot even understand what the formulae mean and/or the assumptions behind the formulae. Moreover, Katz and Te'eni's (2007) study did show that when dyads with different perspectives communicated only through e-mails, using un-contextualized information (explicit knowledge), mutual understanding and work performance of both tended to be relatively low.

Explicit knowledge sharing and low functional specialization dissimilarity. Scholars have generally assumed that functionally homogeneous teams are inherently less innovative than heterogeneous teams. However, it is not beyond the realm of possibility that members of functionally homogeneous teams can also productively engage in knowledge creation processes when the teams share explicit rather than tacit knowledge, because shared explicit knowledge can facilitate two important processes of knowledge creation. First, it can accelerate the knowledge creation processes themselves. When two mathematicians work together to resolve a mathematical problem, they do not need to share their experiences in greater depth. Instead, simply sharing their ideas using mathematical formulae may be a more effective way for them to discuss the issues and produce new ideas. In fact, Katz and Te'eni's (2007) study did show that sharing un-contextualized information among dyads with similar perspectives tend to lead to relatively higher levels of mutual understanding and work performance.

Second, while tacit knowledge sharing requires intensive social interactions, explicit knowledge sharing does not. One advantage of explicit knowledge sharing in functionally homogeneous teams is that members can obtain ideas, information, and knowledge from other members without conflicts or arguments that often result during intensive social interactions (Harrison, Price, Gavin, & Florey 2002; Jehn et al. 1999). As all members share similar knowledge and expertise, exchange of explicit knowledge is adequate and sufficient for them to understand and integrate other members' ideas and perspectives to create new knowledge (Taylor & Greve 2006).

In short, taking the example of projects teams of the telecommunication company, when only explicit knowledge is shared in the cross-functional project team, an expert from the product design department is less likely to come up with innovative ideas to facilitate development of strategies to launch cable TV services, because s/he cannot fully comprehend, from the shared explicit knowledge, how this new service will influence the work processes of other departments. On the other hand, for the single-discipline project team of the telecommunication company, as all members of the team come from the department of data transmission, they share similar expertise, contextual knowledge, and interpretive schemes and have some thoughts about how to resolve the problem of data transmission quality. Members of the team can help each other generate new ideas to deal with the problem by sharing their ideas in codified forms, with less intensive social interactions. In doing so, members of the team can create new solutions more quickly and experience less interpersonal conflicts. Therefore, we hypothesize that:

Hypothesis 2: Explicit knowledge sharing at the team level moderates the relationship between functional specialization dissimilarity and individual creative behaviors; the dissimilarity-creative behaviors link is negative when a high level of explicit knowledge sharing is present and it is positive when the level of explicit knowledge sharing is low.

METHODOLOGY

Sample

Questionnaire data were collected from 200 members of 40 multidisciplinary teams which worked in one of the largest telecommunication enterprises in China. With 244,867 employees, the firm served 210 millions customers in China and recorded an annual revenue of US$21 billion in 2005. To fulfill its various kinds of needs, to cope with the constantly changing environment, and to respond to the ever-increasing customer demand, the firm established three research centers in three major cities in China. The respondents were randomly sampled through the three research centers. Confidentiality was guaranteed to all respondents. Furthermore, the supervisors of the respondents were asked to evaluate each team member's creativity. Supervisors were not covered in the samples for analysis.

All teams were assembled as task forces for various R&D projects. According to the needs of each project, team members were selected from different professional areas across different functional departments through out the three research institutes. Team sizes varied from 4 to 15 people ($\bar{x}$ _ 6.7, s.d. _2.8). The mean age was 30.5 years (s.d. _ 4.3), and mean tenure in the investigated firm was 4.2 years (s.d. _ 3.4). Sixty-four and thirty-six percent of the respondents were male and female, respectively. The respondents were from 44 different functional departments (e.g., Wireless Communication, Network Switching, Systems Integration, Security, Operational Support, Product Strategy, etc.) that constitute the three research centers**,** with no more than 9.5% of the subjects from a single functional unit. In terms of professional responsibility, these subjects represented eighteen different professional areas (e.g., human resources, finance, market analysis, software development, etc.), with no more than 18.5% of them from the same area. Consistent with prior dissimilarity research e.g., (Van der Vegt et al. 2003), these mutually exclusive functional departments and professional responsibilities were categorized by the authors and HR experts who were familiar with the firm's job terminology. The authors worked closely and carefully with the HR experts to ensure that, for each type of information dissimilarity, every category was qualitatively different from all other categories.

Measures

Informational dissimilarity. To define the items for information dissimilarity, we adopted the procedure suggested by (Tsui, Egan, & O'Reilly 1992), and applied by others (e.g., Van der Vegt et al., 2003), and calculated two individual level relational demographic scores for functional departments and professional responsibility. Every item was calculated as the square root of the sum of squared differences between a subject's value on a specific informational dimension (i.e., FD & PR) and the value on the same dimension for all other members in the same team, divided by the total number of respondents in the team. A higher value connotes a higher level of dissimilarity. For each of the two dimensions, the derived dissimilarity scores ranged from 0 to 0.94.

Knowledge sharing. We define this team-level knowledge sharing as the extent to which members of a team share their knowledge with other members. High scores reflect high levels of knowledge sharing within the team. Items for knowledge sharing were adapted from prior research (Bock, Zmud, Kim, & Lee 2005), to the context of investigation. While Bock et al. (2005) measured individuals' *intention* to share knowledge, we emphasized on their actual knowledge sharing behavior. Specifically, sharing explicit knowledge (SEK) was operationalized using two items: "I share my work reports and official documents with members in this team frequently", and "I provide my manuals, methodologies and models for members of this team." Sharing tacit knowledge (STK) was measured with three items: "I share my experience or know-how from work with members in this team frequently", "I always provide my know-where or know-whom at the request of other team members", and "I share my expertise from my education or training with other team members." The above two constructs were all measured on seven-point Likert scales, with anchors ranging from strongly disagree (1) to strongly agree (7).

Creativity. Thirteen items for creativity were adapted from Zhou and George (2001). A team leader assesses a specific team member's creativity in the team based on these thirteen items. Sample items include "Comes up with new and practical ideas to improve performance" and "Comes up with creative solutions to problems."

Control Variables

To safeguard against plausible alternative explanations, we specified several control variables for creativity. We first control the size of each project team (Van de Vegt et al. 2003) based on company records. Team members' age, gender, and tenure in the target firm were also controlled (Van de Vegt et al. 2003). In addition, since all teams were sampled from the firm's three research centers, which were located in different geographical areas in China, we used two dummy variables to represent the research center that a specific respondent was associated with.

RESULTS

Measurement Model Evaluation

The measurement model was first evaluated with confirmatory factor analysis (CFA) for multi-item construct (i.e. Sharing Explicit Knowledge, Sharing Tacit Knowledge, and Creativity), using AMOS 6.0, with the maximum likelihood method. The model was evaluated in terms of reliability, convergent validity, and discriminant validity. The resulting

CFA showed acceptable fit. Specifically, the χ^2 to degree of freedom (DF) ratio of 2.89 is smaller than the recommended 3 by Hair et al. (1998), TLI (0.921) higher than 0.9 (Teo, Wei, & Benbasat 2003), CFI (0.953) higher than 0.9 (Gefen, Karahanna, & Straub Jr. 2003), SRMR (0.0403) lower than 0.08 (Hu & Bentler 1999), and RMSEA (0.078) lower than 0.10 (Browne & Cudeck 1994).

Table 1 shows the descriptive statistics, correlations, reliabilities, and average variance extracted (AVE). For internal consistency, the values of Cronbach's alpha and composite reliabilities were all greater than the recommended 0.70 (Nunnally 1978). For discriminant validity, we first assessed whether the fit of all the one-, and two-factor models would perform better than the three-factor model. The fits of all the alternative models were significantly worse than those of the three-factor model ($p < 0.01$). We then evaluated if the value of AVE of every construct was higher than its squared correlations with other constructs (Fornell & Larcker 1981). The results of these three analyses jointly support the discriminant validity of the measurement model. Meanwhile, as our analysis involves testing interaction terms, the items for all the independent variables and moderators were standardized for the subsequent analyses in order to minimize the threat of multi-collinearity, if any, and facilitate the result interpretation (Aiken & West 1993).

Insert Table 1 about here

Aggregation to Team Level

We examined whether the scores of individual respondents on Sharing Explicit Knowledge (SEK) and Sharing Tacit Knowledge (STK) scales could be aggregated to the team level for analysis. We calculated the ICC(1) and ICC(2) for each construct (James 1982) and found scale values of 0.10 and 0.38, respectively, for SEK, and 0.11 and 0.42 for STK. This value was close to the median value of 0.12 in the organizational literature and represents a moderate ICC(1) value (Bliese 2000; Bliese & Hanges 2004). The values of ICC(2) were relatively low, but comparable to the median or recommended ICC(2) values of group-level constructs reported in the literature (Liao & Rupp 2005; Polzer, Milton, & Swann 2002; Richter, West, van Dick, & Dawson 2006; Schneider, White, & Paul 1998). The relatively low ICC(2) values suggested that it may be difficult to detect emergent relationships using group means (Bliese 2000); however, the aggregation should not be avoided if it is justified by theory and supported by a high $r_{wg(j)}$ and significant between-groups variance (Kozlowski & Hattrup 1992). Finally, we computed the *Rwg* for each construct, for each team. We found a mean value of 0.87 (SD = 0.12) for SEK, and a mean value of 0.85 (SD = 0.09) for STK, which were all higher than the recommended 0.707 (e.g. George 1990). These results suggest a convergence of Sharing Explicit Knowledge and Sharing Tacit Knowledge in each team. Taken together, the reliability and validity results suggest that the aggregation of these two variables to the level of the teams was justified.

Analysis – Multi-Level Regression Analysis

The research model and proposed hypotheses demand multi-level analyses across both team and individual levels. Statistically, integration of the two levels of analysis can be achieved by using hierarchical linear modeling (HLM). Data analyses were performed using Mlwin, which is a software package for HLM (Goldstein et al. 1998).

Table 2 lists the results of the multi-level analysis with improvement of model fit statistics for each step. We independently analyzed the effects of information dissimilarity for distinct information dimensions (i.e. Functional Department and Professional Responsibility). In Step 1, we input all of the individual-level and team-level control variables. Next in Step 2, we entered the dissimilarity scores in the model and found no relationship between information dissimilarities and creativity. In Step 3, we tested whether the links between the dissimilarity scores and creativity varied significantly across teams. The results revealed a marginally significant increase in model fit for dissimilarities in functional department (χ^2 = 3.04, *df* = 1, *p*=0.059 < 0.1) and a significant increase in professional responsibility ((χ^2 = 3.91, *df* = 1, *p* < 0.05), suggesting noteworthy variations in the slopes across teams. In other words, the relationships between informational dissimilarities and creativity may differ across different teams. In Step 4, we added the two factors representing the team-level knowledge sharing (i.e., sharing explicit knowledge (SEK) and sharing tacit knowledge (STK)) and examined their direct influence on the dependent variable. We found no direct impact from either SEK or STK.

Insert Table 2 about here

In Step 5, we tested the cross-level moderating effects of SEK and STK on the relationships between information dissimilarities and creativity. We also included the interaction term of SEK and STK to examine the two-way interaction effects more holistically. To begin with, there was no significant interaction effect between SEK and STK. In addition, we found significant positive interactive effects of STK and informational dissimilarities in both functional department (*b* = 0.27; *p* < 0.01) and professional responsibility (*b* = 0.17; *p* < 0.05), on creativity. Yet, we found significant negative interactive effects of SEK and dissimilarities in functional department (*b* = -0.30; *p* < 0.01), as well as in professional responsibility (*b* = -0.23; *p* < 0.01), on individual creativity. In the final step, we explored if there would be any three-way interaction between information dissimilarities and sharing explicit and tacit knowledge. The results revealed no significant three-way interactive effect.

The plots of the interactive effects are shown in Figures 2A, 2B, 2C, and 2D. To have a more nuanced understanding about the forms of the interactive effects, we tested the simple slopes of the links between information dissimilarities and creativity under four conditions: (1) high explicit knowledge sharing (one standard deviation lower), (2) low explicit knowledge sharing (one standard deviation higher), (3) higher tacit knowledge sharing (one standard deviation lower), and (4) low tacit knowledge sharing (one standard deviation higher). In teams with a high level of tacit knowledge sharing, dissimilarities in functional department ($b = 0.28$, $p < 0.01$) and professional responsibility ($b = 0.21$, $p < 0.01$) were positively associated with creativity. In teams with a low level of tacit knowledge sharing, while dissimilarity in functional department was negatively associated with creativity ($b = -0.27$, $p < 0.01$), dissimilarity in professional responsibility was not related to creativity ($b = 0.28$, n.s.). Hence, Hypothesis 1 was supported. Moreover, both functional department ($b = -0.29$, $p < 0.01$) and professional responsibility ($b = -0.20$, $p < 0.051$) were negatively associated with individual creativity in teams with a high level of explicit knowledge sharing. On the other hand, dissimilarities in functional department ($b = 0.30$, $p < 0.01$) and professional responsibility ($b = 0.27$, $p < 0.01$) were positively related to creativity in teams with a low level of explicit knowledge sharing. Thus, Hypothesis 2 was supported.

Insert Figure 2 about here

DISCUSSION

The findings of the current study have challenged two basic assumptions in the diversity and knowledge sharing literatures. First, members in both heterogeneous and homogeneous teams can be encouraged to display creative behaviors, depending on types of knowledge shared. More particularly, knowledge workers in heterogeneous teams are more likely to exhibit creative behaviors if their teams have a high level of tacit knowledge sharing. By contrast, knowledge workers in homogeneous teams are more likely to engage in creative processes when their teams have a high level of explicit knowledge sharing. Second, knowledge sharing may not always benefit the team and can even be detrimental to individual creativity. More precisely, a high level of explicit knowledge sharing may inhibit creativity of individual members in functionally heterogeneous teams, whereas a high level of tacit knowledge sharing may discourage individual members to exhibit creative behaviors.

Our results provide several implications for theory and practice. To begin with, creative ideas and new knowledge are formed in the minds of unique individuals (Boland et al. 1994; Janssen & Huang in press; Oldham & Cummings 1996) and the team-level innovation rests on the accumulation of the production of novel and useful ideas of individual employees (Hargadon & Bechky 2006; Taggar 2002). Central to the "value-in-diversity" assumption is the notion of cross-fertilization, a process through which individual members can make use of the diverse knowledge and perspectives of other team members to create knowledge. However, most empirical studies on the link between diversity and innovation were conducted at the team-level. This team-level analysis is insufficient to address the question why diversity can influence individual creativity. Our results complement the "value-in-diversity" assumption in two ways. First, we demonstrate that knowledge sharing in teams is a major mechanism that drives knowledge workers to engage in creative behaviors. An individual member is able to generate new knowledge when he/she can meaningfully integrate his/her own knowledge with that of other members'. This can only occur when members of the team share their knowledge with each other. Second, our findings suggest that knowledge workers in functionally homogeneous teams can produce novel ideas, especially when they have a high level of explicit knowledge sharing.

In addition, research on the effects of team diversity is mainly based on the similarity attraction (Byrne 1971) and social categorization theories (Hogg & Terry 2000; Tajfel & Turner 1979), which predict that people sharing similar demographic characteristics, values, and perspectives tend to like each other and those who see each other as belonging to the same social categories. People are likely to have positive interactions with, and have trust in, those with similar backgrounds and belonging to the same social categories. We have identified a few deficiencies of this approach. First, following this similarity attraction/social categorization perspective, one could come to the logical conclusion that both similarity and dissimilarity can be conducive to creativity. More precisely, as individuals who propose creative ideas often challenge the established framework of beliefs and routines shared in a team (Dougherty & Heller 1994; Frost & Egri 1991; Janssen, 2003, 2005), creative behaviors involve risks. Because interpersonal trust provides psychological safety for people to engage in risk-taking behaviors (cf. Parker, Williams, & Turner 2005), an individual employee who is similar to the rest of the team is more likely to feel that it is safe to exhibit creative behaviors. On the other hand, recent research also suggests that being different from other members of the team can also encourage individual members to exhibit creative behaviors, because people are motivated to learn from others who possess different knowledge (Augustinova et al. 2005) and to develop novel ideas when they feel that they are unique (Janssen & Huang in press). Second, on the basis of the similarity-attraction, researchers have identified various team factors that may mitigate the negative effects of diversity, such as within-team interdependence (Jehn et al. 1999), interpersonal congruence (Polzer et al. 2002; Swann, Kwan, Polzer, & Milton 2003), a safe communication or debate climate (Gibson & Gibbs 2006; Simons, Pelled, & Smith 1999), and team identification (Fay, Borrill, Amir, Hward, & West 2006; Van der Vegt & Bunderson 2005). However, these mechanisms may well result in conformity rather than individuality that is essential for creativity (Janssen & Huang in press). Third, in a functionally heterogeneous team, in-group and out-group categorization becomes less relevant, because all members can have unique knowledge and perspectives. It becomes more complex and difficult for individual members to categorize others into clearly identified groups. Instead, the multiple knowledge and perspectives in the team may draw more attention from its members and influence their interactions with teach other. Indeed, Harrison and Klein (2007) suggested that, to study functionally dissimilarity teams, researchers should take the "group as information processors" framework, which focuses on how the diverse knowledge and perspectives can be integrated by the team and how the team can generate new knowledge and perspectives based on such integration.

Therefore, drawing from the "groups as information processors" perspective, we focused on how the team-level knowledge and information processing can affect members' creative behaviors. We found that the relationship between functional specialization dissimilarity and creative behaviors significantly varied across the 40 projects teams. And such variation in the dissimilarity-creativity link could be explained, at least in part, by team-level tacit and explicit knowledge sharing.

Third, recently, some researchers have suggested that knowledge sharing can be beneficial, as well as detrimental, to team effectiveness and team innovation (Haas & Hansen 2005, 2007). The findings of our study have supported and further refined this view. Specifically, we found that, in functionally heterogeneous teams, a high level of tacit knowledge sharing can help individual knowledge workers to become creative, because it can allow them to understand, interpret, integrate, and utilize the diverse knowledge and perspectives of other members. However, in functionally homogeneous teams, a high level of tacit knowledge sharing is not only redundant but also counterproductive. This is because members of functionally similar teams tend to be more familiar with each other's knowledge backgrounds and perspectives. Tacit knowledge sharing through intensive interactions and more elaborated information sharing may add little value to help members to come up with creative ideas and may slow down the knowledge creation processes.

We also found, in functionally heterogeneous teams, that a high level of explicit knowledge sharing can be counter-productive too, because explicit and codified knowledge is less effective in helping functionally diverse members to comprehend the unique knowledge and perspectives of others. By contrast, in functionally homogeneous teams, explicit knowledge sharing can improve the knowledge creation processes. As members in functionally homogeneous teams are quite familiar with the knowledge and perspectives of each other, explicit and codified knowledge is sufficient for them to grasps other members' views and speed up their knowledge creation processes.

Fourth, our findings do have important implications for practicing managers. Practitioners should pay more attention to the types of knowledge being shared among knowledge workers in teams and organizations. Functionally heterogeneous teams are not necessarily more creative than functionally homogeneous teams. For functionally heterogeneous teams, managers should encourage the members to share with each other more of their tacit knowledge. This can be done through more intensive and in-depth interactions among its members. On the other hand, managers can also help members in functionally homogeneous teams to become more creative by encouraging them to share with each other more of their explicit knowledge.

Limitations

Like any study, this one is not without limitations. First, we cannot draw firm conclusions about causation from a cross-sectional study, and we cannot rule out the possibility of reverse causation. It is possible that creative employees may sometimes be more likely to share their knowledge. Second, we only measure the knowledge sharing behaviors in the project teams, instead of the actually shared knowledge. Although it is more challenging to measure the actually shared knowledge, future research should try to develop models to clarify and differentiate the concepts of knowledge sharing behaviors, shared knowledge, and utilization of the shared knowledge. In so doing, we can understand more about the cross-fertilization processes, which still remain largely unexplored.

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TABLE 1

Descriptive, Reliabilities, Convergent and Discriminant Validity

	Mean	S. D.	1	2	3	4	5
1. Dissim. in Functional Department	0.41	0.36	N.A				
2. Dissim. In Prof. Responsibility	0.57	0.31	0.44 *	N.A			
3. Creativity	3.85	0.68	0.09	- 0.09	0.78(a)		
4. Share Exp Know (d)	5.91	0.82	- 0.14 *	- 0.11	0.12	0.74	
5. Share Tac. Know (d)	5.63	0.86	- 0.13	- 0.04	0.14	0.64 *	0.73
Cronbach's α			N.A.	N.A.	0.95	0.71	0.77
Composite Reliability			N.A	N.A.	0.95	0.71	0.77
Average Variance Extracted			N.A	N.A	0.60	0.54	0.53

a. Diagonals represent the square root of average variance extracted (AVE).
b. Off diagonal elements are the correlations among constructs.
c. For discriminant validity, diagonal elements should be larger than off-diagonal elements.
d. Aggregated at team level.
N.A. Not Applicable.

TABLE 2

Multi-Level Analysis

	Dissimilarity in Functional Department		Dissimilarity in Prof. Responsibility	
Step 1 - Control Variables	Beta	S.E.	Beta	S.E.
Team Size	-0.00	0.01	-0.00	0.01
Age	0.02	0.01	0.02	0.01
Gender	0.12	0.09	0.12	0.09
Tenure	0.01	0.02	0.01	0.02
Education Level	0.08	0.07	0.08	0.07
Prof. Responsibility (PR) (1st Model)	-0.00	0.01		
Functional Units (FD) (2nd Model)			-0.00	0.01
Research Center 1	0.08	0.17	-0.20	0.48
Research Center 2	0.43 *	0.19	0.28	0.31
Increase in Model Fit	χ^2 (8) = 14.23 +		χ^2 (8) = 14.59 +	
Step 2 - Main Effect				
Dissimilarity – Functional Department (FD)	0.03	0.07		
Dissimilarity – Prof. Responsibility (PR)			0.02	0.06
Increase in Model Fit	χ^2 (1) = 0.14		χ^2 (1) = 0.09	
Step 3 - Testing the Slope				
Dissimilarity (FD)	0.00	0.08		
Dissimilarity (PR)			0.04	0.08
Increase in Model Fit	χ^2 (1) = 3.55 +		χ^2 (1) = 3.91 *	
Step 4 – Team Climate				
Sharing Explicit Know. (SEW)	0.11	0.10	0.10	0.10
Sharing Tacit Know. (STW)	-0.05	0.09	-0.04	0.10
Increase in Model Fit	χ^2 (2) = 0.82		χ^2 (2) = 0.83	
Step 5 - 2 Way Interaction				
SEW * Dissimilarity (FD) (1st model)	-0.30 **	0.10		
STW * Dissimilarity (FD) (1st model)	0.27 **	0.10		
SEW * Dissimilarity (PR) (2nd model)			-0.23 **	0.08
STW * Dissimilarity (PR) (2nd model)			0.17 *	0.08
SEW * STW	-0.03	0.05	-0.03	0.05
Increase in Model Fit	χ^2 (3) = 8.80 *		χ^2 (3) = 4.81	
Step 6 - 3 Way Interaction				
STW * SEW *Dissim. (FD) (1st model)	-0.03	0.06		
STW * SEW *Dissim. (PR) (2nd model)			-0.09	0.06
Increase in Model Fit	χ^2 (1) = 0.35		χ^2 (1) = 2.11	

a. In this step, no ΔR^2 was reported because no additional independent variables were added into the model. The model fit indicates whether there is significant variation in intercepts and slopes across teams. + p<0.10, *p<0.5, **p<0.01

FIGURE 1

Integration of Functional Specialization Dissimilarity and Tacit vs. Explicit Knowledge Sharing

	High	Low
Tacit Knowledge Sharing	High Individual Creative Behaviors	Low Individual Creative Behaviors
Explicit Knowledge Sharing	Low Individual Creative Behaviors	High Individual Creative Behaviors

Functional Specialization Dissimilarity

FIGURE 2

Tacit Knowledge Sharing and Explicit Knowledge Sharing Moderate the Link between Functional Specialization Dissimilarity and Creativity

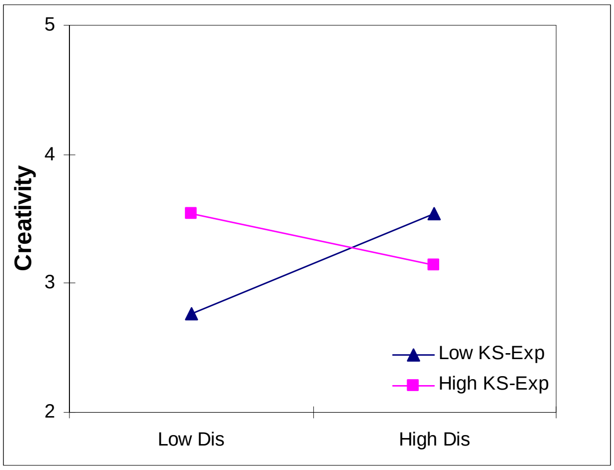

Figure 2A:
Dissimilarity in Functional Department VS. Explicit Knowledge

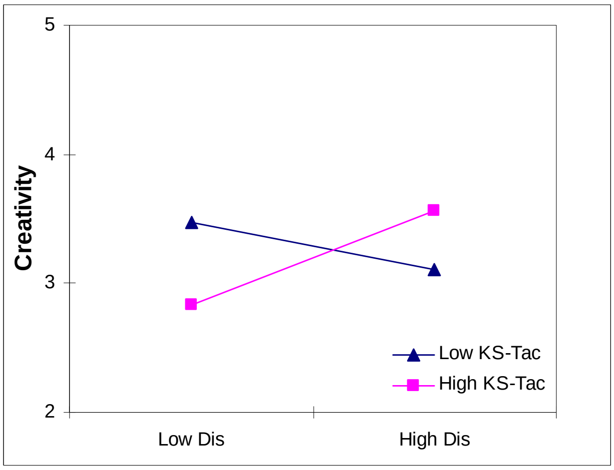

Figure 2B:
Dissimilarity in Functional Department VS. Tacit Knowledge

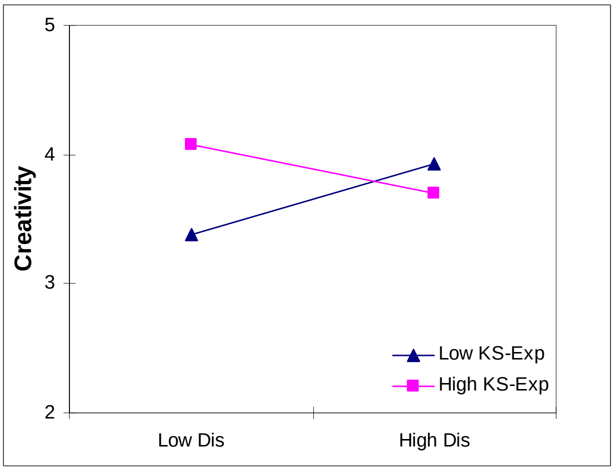

Figure 2C:
Dissimilarity in Professional Responsibility VS. Explicit Knowledge

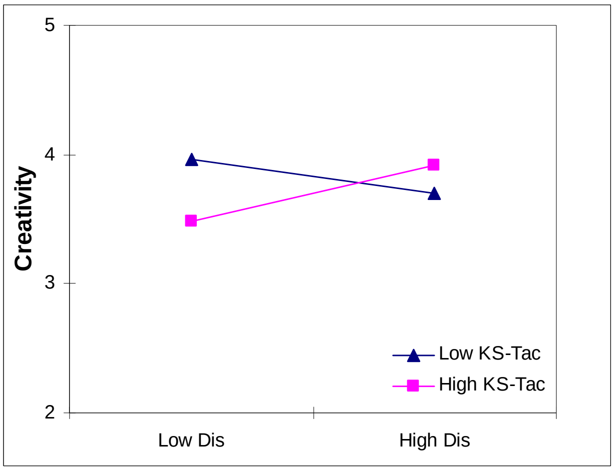

Figure 2D:
Dissimilarity in Professional Responsibility VS. Tacit Knowledge