

Knowledge sharing: A review and directions for future research

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ABSTRACT

The success of knowledge management initiatives depends on knowledge sharing. This paper reviews qualitative and quantitative studies of individual-level knowledge sharing. Based on the literature review we developed a framework for understanding knowledge sharing research. The framework identifies five areas of emphasis of knowledge sharing research: organizational context, interpersonal and team characteristics, cultural characteristics, individual characteristics, and motivational factors. For each emphasis area the paper discusses the theoretical frameworks used and summarizes the empirical research results. The paper concludes with a discussion of emerging issues, new research directions, and practical implications of knowledge sharing research.

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Knowledge is a critical organizational resource that provides a sustainable competitive advantage in a competitive and dynamic economy (e.g., Davenport & Prusak, 1998; Foss & Pedersen, 2002; Grant, 1996; Spender & Grant, 1996). To gain a competitive advantage it is necessary but insufficient for organizations to rely on staffing and training systems that focus on selecting employees who have specific knowledge, skills, abilities, or competencies or helping employees acquire them (e.g., Brown & Duguid, 1991). Organizations must also consider how to transfer expertise and knowledge from experts who have it to novices who need to know (Hinds, Patterson, & Pfeffer, 2001). That is, organizations need to emphasize and more effectively exploit knowledge-based resources that already exist within the organization (Damodaran & Olphert, 2000; Davenport & Prusak, 1998; Spender & Grant, 1996).

As one knowledge-centered activity, knowledge sharing is the fundamental means through which employees can contribute to knowledge application, innovation, and ultimately the competitive advantage of the organization (Jackson, Chuang, Harden, Jiang, & Joseph, 2006). Knowledge sharing between employees and within and across teams allows organizations to exploit and capitalize on knowledge-based resources (Cabrera & Cabrera, 2005; Damodaran & Olphert, 2000; Davenport & Prusak, 1998). Research has shown that knowledge sharing and combination is positively related to reductions in production costs, faster completion of new product development projects, team performance, firm innovation capabilities, and firm performance including sales growth and revenue from new products and services (e.g., Arthur & Huntley, 2005; Collins & Smith, 2006; Cummings, 2004; Hansen, 2002; Lin, 2007d; Mesmer-Magnus & DeChurch, 2009).

Because of the potential benefits that can be realized from knowledge sharing, many organizations have invested considerable time and money into knowledge management (KM) initiatives including the development of knowledge management systems (KMS) which use state-of-the-art technology to facilitate the collection, storage, and distribution of knowledge. However, despite these investments it has been estimated that at least \$31.5 billion are lost per year by Fortune 500

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companies as a result of failing to share knowledge (Babcock, 2004). An important reason for the failure of KMS to facilitate knowledge sharing is the lack of consideration of how the organizational and interpersonal context as well as individual characteristics influence knowledge sharing (Carter & Scarbrough, 2001; Voelpel, Dous, & Davenport, 2005).

This paper contributes to our understanding of knowledge sharing in several ways. First, we review and integrate the literature from several different disciplines investigating how organizational, team, and individual characteristics influence individual-level knowledge sharing. Studies of individual-level knowledge sharing have been conducted in information systems (e.g., Wasko & Faraj, 2005), organizational behavior (e.g., Bordia, Irmer, & Abusah, 2006), strategic management (e.g., Reagans & McEvily, 2003), and psychology (e.g., Lin, 2007a) but no systematic review has been conducted to date. Prior reviews have focused on technological issues involved in knowledge sharing or knowledge transfer across units, organizations, or within interorganization networks (see Alavi & Leidner, 2001; Argote, 1999; Argote, McEvily, & Reagans, 2003 for reviews). This review focuses on understanding the factors that influence knowledge sharing between employees. This is important because team and organizational level knowledge is influenced by the extent to which knowledge sharing occurs between employees (e.g., Cabrera & Cabrera, 2005; Gupta & Govindarajan, 2000; Nonaka, 1994; Polanyi, 1966; Tsoukas & Vladimirous, 2001).

Second, this review provides an organizing framework for previous knowledge sharing research and identifies emerging theoretical and methodological issues and future research needs. The framework shown in Fig. 1 was based on the review of the literature and provides a structure for the paper. Fig. 1 shows five emphasis areas of knowledge sharing research, the topics within each area of emphasis that have been investigated, and the relationships between each area of emphasis and knowledge sharing. As shown in Fig. 1, the topics studied within each area of emphasis have been shown to directly or indirectly influence knowledge sharing through motivational factors. The right hand of Fig. 1 shows the common dependent variables examined in the literature (knowledge sharing intention, intention to encourage knowledge sharing, and knowledge sharing behaviors). Also, in Fig. 1, the topics shown in the shaded boxes with solid lines have been examined in the existing literature. The topics shown in the boxes with dotted lines need future research attention. The topics shown in the overlapping areas represent those that have been examined in prior studies but still warrant further research attention. Third, this review contributes to human resource management practice by discussing the implications of knowledge sharing research for the implementation, support, and effectiveness of knowledge sharing initiatives in organizations.

The paper begins by discussing how we identified the studies included in the review and defines important concepts found in knowledge sharing research (e.g., knowledge, knowledge sharing). Next, for each area of emphasis the paper identifies its theoretical foundations and reviews research results. The last two sections of the paper discuss emerging issues and future

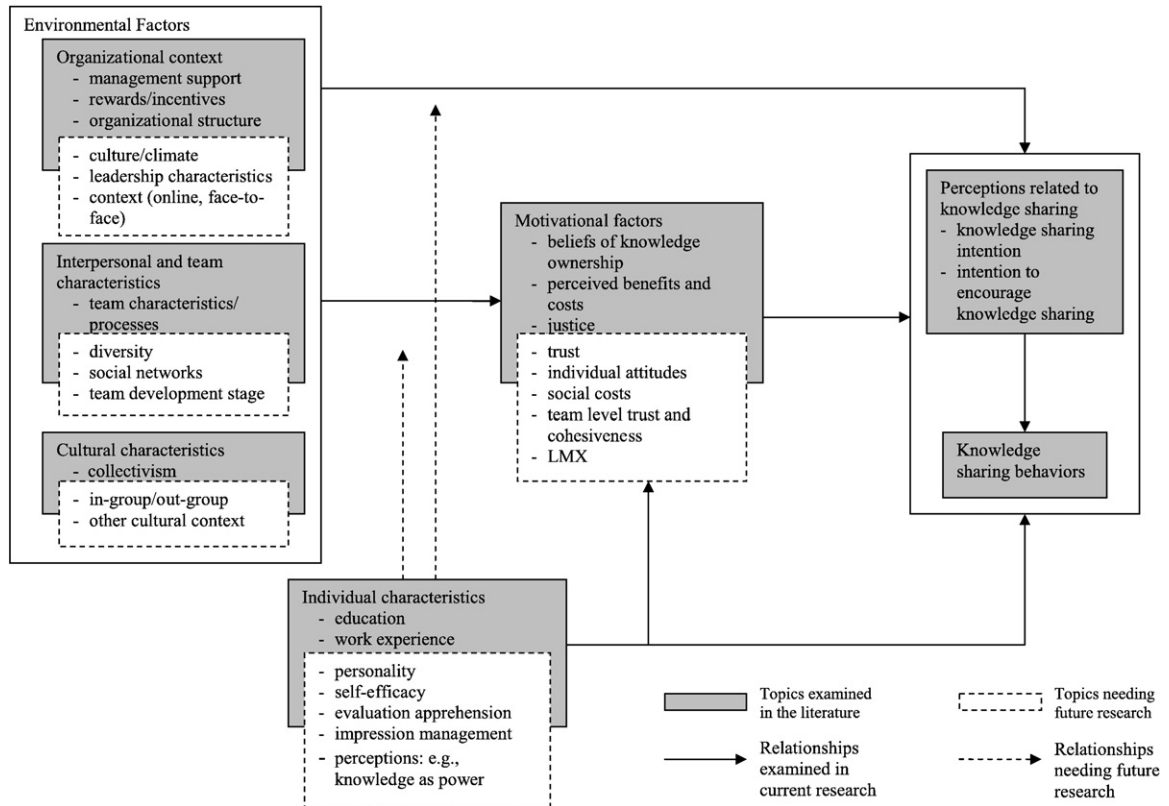


Fig. 1. A framework of knowledge sharing research.

research questions that need to be addressed to advance our understanding of individual-level knowledge sharing and the practical implications of knowledge sharing research.

1. Identification of studies

We conducted a narrative review of the literature rather than a meta-analysis because of the wide variety of disciplines contributing to individual-level knowledge sharing research, the small number of empirical studies investigating any one of the factors in each emphasis area, the lack of use of common measures of knowledge sharing, and our interest in understanding the different theories that have been used as the basis for knowledge sharing research. The articles included in this review were primarily identified using ABI-Inform and Business Source Premier. Articles published in academically refereed journals in management, organizational behavior, human resource development, applied psychology, and information systems were included in the review. Work published in books, conferences, or working papers was excluded. Reference sections of articles found were also searched. Knowledge sharing, knowledge exchange, and their variations were used as search terms.

We found seventy-six qualitative and quantitative studies that were published since Argote (1999) through early 2008. The review also includes three studies published prior to 1999 (Constant, Kiesler, & Sproull, 1994; Constant, Sproull, & Kiesler, 1996; Lam, 1996) because they have been cited quite often in the literature but were not included in previous reviews. The areas of emphasis of knowledge sharing research shown in Fig. 1 and the theories or theoretical frameworks used were identified based on the authors' review of the studies. Any disagreements between the two authors were discussed and consensus was reached.

2. Definitions

Researchers have not reached consensus on the distinctions, if any, between knowledge and information. For example, Nonaka (1994) considers information to be just “a flow of messages” whereas knowledge is based on information and justified by one's belief. Other researchers believe that all information is considered knowledge but knowledge is more than just information, i.e., knowledge includes information and know-how (e.g., Kogut & Zander, 1992; Machlup, 1980; Zander & Kogut, 1995). Management information systems' researchers tend to use “knowledge” to suggest that there is value and uniqueness in examining KMS compared to the traditional information systems (Alavi & Leidner, 2001).

Many researchers use the terms knowledge and information interchangeably, emphasizing that there is not much practical utility in distinguishing knowledge from information in knowledge sharing research (see Bartol and Srivastava, 2002; Huber, 1991; Makhija and Ganesh, 1997). We adopt this perspective by considering knowledge as information processed by individuals including ideas, facts, expertise, and judgments relevant for individual, team, and organizational performance (e.g., Alavi & Leidner, 2001; Bartol & Srivastava, 2002).

Knowledge sharing refers to the provision of task information and know-how to help others and to collaborate with others to solve problems, develop new ideas, or implement policies or procedures (Cummings, 2004; Pulakos, Dorsey, & Borman, 2003). Knowledge sharing can occur via written correspondence or face-to-face communications through networking with other experts, or documenting, organizing and capturing knowledge for others (Cummings, 2004; Pulakos et al., 2003). Although the term knowledge sharing is generally used more often than information sharing, researchers tend to use the term “information sharing” to refer to sharing with others that occurs in experimental studies in which participants are given lists of information, manuals, or programs.

Knowledge sharing differs from knowledge transfer and knowledge exchange. Knowledge transfer involves both the sharing of knowledge by the knowledge source and the acquisition and application of knowledge by the recipient. “Knowledge transfer” typically has been used to describe the movement of knowledge between different units, divisions, or organizations rather than individuals (e.g., Szulanski, Cappetta, & Jensen, 2004). Although “knowledge exchange” has been used interchangeably with “knowledge sharing” (e.g., Cabrera, Collins, & Salgado, 2006), knowledge exchange includes both knowledge sharing (or employees providing knowledge to others) and knowledge seeking (or employees searching for knowledge from others). In this review, we use the term “knowledge exchange” when discussing studies that measured knowledge sharing using scales that assessed both knowledge sharing and seeking.

3. Areas of emphasis in knowledge sharing research

The framework presented in Fig. 1 organizes knowledge sharing research based on several areas of emphasis including organizational context, interpersonal and team characteristics, cultural characteristics, individual characteristics, and motivational factors. Each area of emphasis consists of related topics that we identified in our review of knowledge sharing research.

3.1. Organizational context

3.1.1. Organizational culture and climate

Many studies have examined the effect of organizational culture on knowledge sharing. Based on a qualitative study of fifty companies, De Long and Fahey (2000) found that the benefits of a new technology infrastructure were limited if long-standing organizational values and practices were not supportive of knowledge sharing across units.

A number of cultural dimensions that likely influence knowledge sharing have been identified, but trust has attracted the most research attention. A culture that emphasizes trust has been found to help alleviate the negative effect of perceived costs on sharing (Kankanhalli, Tan, & Wei, 2005). It has also been linked with the implementation of intranet-based KMS, individual knowledge sharing, and firms' capability of knowledge exchange and combination (Chiu, Hsu, & Wang, 2006; Collins & Smith, 2006; Liao, 2006; Ruppel & Harrington, 2001; Willem & Scarbrough, 2006). Similarly, an organizational climate that emphasizes individual competition may pose a barrier to knowledge sharing whereas cooperative team perceptions help create trust, a necessary condition for knowledge sharing (Schepers & Van den Berg, 2007; Wang, 2004; Willem & Scarbrough, 2006). In addition to trust, research has also shown that organizations with cultures emphasizing innovation are more likely to implement intranet KMS (Ruppel & Harrington, 2001) and facilitate information sharing through subjective norms that encourage sharing (Bock, Zmud, Kim, & Lee, 2005; McKinnon, Harrison, Chow, & Wu, 2003). Lin and Lee (2006) found that executives' perceptions of the relative advantage of knowledge sharing for the business, compatibility to existing business process, and complexity to encourage knowledge sharing served as mediators between organizational climate and an organization's intention to encourage knowledge sharing.

Mixed results have been found in studies examining the relationship between learning culture and knowledge sharing. Taylor and Wright (2004) found that a climate that encouraged new ideas and focused on learning from failure was positively related to effective knowledge sharing. Hsu's (2006) case study also advocated continuous learning initiatives. Lee, Kim, and Kim (2006), however, failed to find a significant relationship between knowledge sharing and a learning orientation, i.e., a climate focusing on learning and trying new approaches.

The relationship between norm of reciprocity and knowledge sharing (based on social capital theory) has been examined in the context of communities of practice. A community of practice is a work-related group of individuals who share common interests or problems, and learn from each other through on-going interactions (Lave & Wenger, 1991) and this may exist within one organization or in the form of a professional network that transcends the boundaries of organizations (Brown & Duguid, 1991, 2001). Individuals' knowledge sharing in communities of practice is reciprocated by a third party rather than the recipient (i.e., generalized reciprocation occurs, see Ekeh, 1974). Norm of reciprocity, one dimension of social capital (Nahapiet & Ghoshal, 1998), refers to knowledge exchanges that are mutual and perceived as fair by both parties. Two studies that examined the norm of reciprocity within an electronic professional community showed inconsistent results. Chiu et al. (2006) found norm of reciprocity to be positively associated with individuals' sharing knowledge while Wasko and Faraj (2005) found a negative relationship. The inconsistent results suggest that the relationship may be contingent on other factors such as participants' personality and perceived usefulness of the community. For example, Kankanhalli et al. (2005) found perceived reciprocity to be positively related to participants' likelihood to contribute knowledge to the community under weak rather than strong pro-sharing norms. This suggests that strong pro-sharing norms may compensate for the low level of reciprocity in the community.

3.1.2. Management support

Management support for knowledge sharing has been shown to be positively associated with employees' perceptions of a knowledge sharing culture (e.g., employee trust, willingness of experts to help others) and willingness to share knowledge (Connelly & Kelloway, 2003; Lin, 2007d). Lee et al. (2006) found that top management support affected both the level and quality of knowledge sharing through influencing employee commitment to KM. Perceived supervisor and coworkers support and their encouragement of knowledge sharing also increase employees' knowledge exchange and their perceptions of usefulness of knowledge sharing (Cabrera et al., 2006; Kulkarni, Ravindran, & Freeze, 2006).

King and Marks (2008), however, failed to find a significant effect for perceived organizational support after controlling for ease of use and usefulness of KMS. It appears that management support specific to knowledge sharing is a better predictor of employee knowledge sharing. They found supervisory control (i.e., perceived supervisor influence over utilizing the KMS in the organization appropriately) was a significant predictor of individual effort which was related to the frequency of knowledge sharing. Similarly, based on French and Raven's (1959) typology of social power, Liao (2008) found that a manager's control of rewards for desired behavior (i.e., reward power) and the employees' belief that the manager had knowledge and expertise in the area (i.e., expert power) were positively related to employees' self-reported knowledge sharing. Both social exchange theory and agency theory have been used in studies examining the management support–knowledge sharing relationship. Overall, these studies show that management support likely influences knowledge sharing.

3.1.3. Rewards and incentives

A lack of incentives has been suggested to be a major barrier to knowledge sharing across cultures (Yao, Kam, & Chan, 2007). Incentives including recognition and rewards have been recommended as interventions to facilitate knowledge sharing and help build a supportive culture (e.g., Hansen, Nohria, & Tierney, 1999; Liebowitz, 2003; Nelson, Sabatier, & Nelson, 2006). Despite the anticipated positive influence of incentives on knowledge sharing the empirical results of studies examining the effects of extrinsic rewards have been mixed.

Based on both social exchange and social capital theories, organizational rewards such as promotion, bonus, and higher salary have been shown to be positively related to the frequency of knowledge contribution made to KMSs especially when employees identify with the organization (Kankanhalli et al., 2005). Similarly, employees who perceive a higher level of incentives to share and use knowledge are more likely to report that the content of KMS is useful (Cabrera et al., 2006; Kulkarni et al., 2006). Based on a sample from Korea, Kim and Lee (2006) also found that an organizational emphasis on performance-based pay system contributed to knowledge sharing.

Contrary to the expected positive effect of rewards, Bock et al. (Bock & Kim, 2002; Bock et al., 2005) found that anticipated extrinsic rewards had a negative effect on attitudes toward knowledge sharing. Several studies found no relationship between extrinsic motivation and knowledge sharing intentions or attitudes toward knowledge sharing (Kwok & Gao, 2005; Lin, 2007c,d). Chang, Yeh, and Yeh (2007) also showed that outcome-based rewards and sufficient rewards for effort did not foster knowledge sharing among product development team members.

It is important to note that the internal validity of the research on the rewards–knowledge sharing relationship may be suspect because in these studies all measured variables were collected on the same survey making it impossible to rule out alternative causal directions for the observed significant relationships or the results attributable to common method variance. The inconsistent findings also suggest the possibility of moderators such as personality or contextual conditions.

Researchers have also examined how different types of rewards (rather than the presence or absence of rewards) influence knowledge sharing. In a lab experiment using a dyadic decision-making scenario, Ferrin and Dirks (2003) found that a cooperative reward system positively affected information sharing between partners whereas a competitive system had the opposite effect. Similarly, studies that have examined the influence of group-based incentives generally found positive results compared to those that examined individual incentives, piece-rate and tournament incentives (e.g., Quigley, Tesluk, Locke, & Bartol, 2007; Taylor, 2006). Siemsen, Balasubramanian, and Roth (2007) found an interactive effect between individual- and group-based incentives such that the positive relationship between group reward and perceived reward for knowledge sharing was stronger when individual-based rewards were increased. L. Weiss (1999) emphasized the need to align incentives and knowledge sharing. Weiss explained that the billable hour system used for many professional jobs such as consultants or lawyers is a disincentive for knowledge sharing. Consultants or lawyers do not bill clients for time devoted to knowledge sharing because clients are unwilling to pay for services from which they do not receive an exclusive benefit. Therefore, the incentives support serving clients and not sharing knowledge.

Because of the difficulties in manipulating reward systems in field studies it is not surprising that most of the studies have been conducted using student samples or experiments in which scenarios or narratives were used to create different incentive conditions. Arthur and Aiman-Smith (2001) was one exception. They examined a gainsharing plan designed to increase employees' suggestions. The volume of suggestions increased rapidly following implementation of the plan, but then leveled off and started to decline over time. However, over time the proportion of suggestions representing second-order learning which challenges existing routines and thoughts became larger than suggestions representing first-order learning (e.g., material saving suggestions).

3.1.4. Organizational structure

A functionally segmented structure likely inhibits knowledge sharing across functions and communities of practices (Lam, 1996; Tagliaventi & Mattarelli, 2006). Researchers have shown that knowledge sharing may be facilitated by having a less centralized organizational structure (Kim & Lee, 2006), creating a work environment that encourages interaction among employees such as through the use of open workspace (Jones, 2005), use of fluid job descriptions and job rotation (Kubo, Saka, & Pam, 2001), and encouraging communication across departments and informal meetings (Liebowitz, 2003; Liebowitz & Megbolugbe, 2003; Yang & Chen, 2007). Overall, the results of these studies suggest that organizations should create opportunities for employee interactions to occur and employees' rank, position in the organizational hierarchy, and seniority should be de-emphasized to facilitate knowledge sharing.

3.2. Interpersonal and team characteristics

3.2.1. Team characteristics and processes

Only a few studies have investigated a small number of team characteristics and processes in relation to knowledge sharing. The results of these studies suggest that team characteristics and processes influence knowledge sharing among team members. For example, the longer a team has been formed and the higher the level of team cohesiveness the more likely team members are to share knowledge (Bakker et al., 2006; Sawng, Kim, & Han, 2006). De Vries, van den Hooff, and de Ridder (2006) examined team communication styles, agreeable and extravert styles, and found that they were positively associated with knowledge sharing willingness and behaviors. Srivastava, Bartol, and Locke (2006) studied management teams in hotel properties. They found that empowering leadership fostered knowledge sharing among team members.

3.2.2. Diversity

Research has investigated how the minority status or diversity of team members relates to knowledge sharing. Based on the similarity-attraction paradigm, Ojha (2005) showed that team members who considered themselves a minority based on gender, marital status, or education were less likely to share knowledge with team members. Sawng et al. (2006) found that R&D teams in large organizations with higher female–male ratios were more likely to engage in knowledge sharing. A few studies have examined the role of social connections with other group members in knowledge sharing (Phillips, Mannix, Neale, & Gruenfeld, 2004; Thomas-Hunt, Ogden, & Neale, 2003). These studies suggest that socially isolated members are more likely to disagree with others and contribute their unique knowledge within a heterogeneous team. The acknowledgement of team members' expertise also helps increase participation in knowledge sharing within a functionally diversified team (Thomas-Hunt et al., 2003).

It is important to note that there is a large body of research focusing on information sampling and how unshared information is pooled to facilitate group decision-making that might be useful for studying knowledge sharing in teams (e.g., Larson & Harmon, 2007; Stasser & Titus, 1987; see Argote, 1999; Stasser & Titus, 2003 for reviews). Studies of information sampling and

information pooling use experiments with student participants. Each participant is given both shared and unique information and asked to participate in a group decision. A hidden profile exists in each group which leads to the optimal decision. In our discussion above we have only included a few recent studies that directly examined information/knowledge sharing.

3.2.3. Social networks

Knowledge sharing may also be embedded in broader organizational networks such as communities of practice. The ties among individuals within social networks can facilitate knowledge transfer and enhance the quality of information received (e.g., Cross & Cummings, 2004; Hansen, 1999; Reagans & McEvily, 2003). In virtual communities both the number of direct ties and personal relationships an individual has with other members have been shown to be positively related to the quantity and the perceived helpfulness of knowledge shared (Chiu et al., 2006; Wasko & Faraj, 2005). Individuals' expectation of maintaining and strengthening their social ties by frequently participating in a web-based professional community has been found to positively affect their intention to continue participating in the community (Chen, 2007).

The concept of tie strength suggests that strong ties involve higher emotional closeness whereas weak ties are more likely to be nonredundant connections and thus be associated with nonredundant information (Granovetter, 1973; Perry-Smith, 2006). Reagans and McEvily (2003) found tie strength and social cohesion to be positively related to the ease of knowledge transfer as perceived by the knowledge source, suggesting that the connections with knowledge recipients may motivate providers to share knowledge. Levin and Cross (2004) found that controlling for trustworthiness, knowledge recipients with weak ties reported more benefits compared to those with strong ties.

These studies have focused more on *relationships* rather than individuals. The findings suggest that the existence of network connections and the associated social capital can facilitate knowledge sharing within a community of practice (e.g., Kankanhalli et al., 2005; Nahapiet & Ghoshal, 1998).

3.3. Cultural characteristics

Multinational organizations and international subsidiaries involving employees with different national cultures and languages can pose challenges for knowledge sharing (Ford & Chan, 2003; Minbaeva, 2007). To deal with these challenges, Siemens modified the reward system for knowledge sharing in their Indian and Chinese subunits to adapt to local income levels (Voelpel et al., 2005). In two related studies, Chow et al. compared Chinese and Anglo-American culture (Chow, Deng, & Ho, 2000; Chow, Harrison, McKinnon, & Wu, 1999). Both studies suggest that participants from the Chinese culture tended to share information for the good of the organization even when sharing was potentially personally disadvantageous (e.g., sharing past mistakes on the job). Chow et al. (2000) also found that Chinese participants were less likely than American participants to share their own "lessons" with someone considered an "out-group" member. Hwang and Kim (2007) measured one cultural dimension, collectivism, and found that one's collectivism was positively related to their attitude toward using the group email function in an online classroom management system to share knowledge. This relationship was fully mediated by their identification with the group and the congruence of such behaviors with their values.

3.4. Individual characteristics

Despite studies suggesting that individuals are predisposed to certain work attitudes and behaviors (e.g., Judge & Bono, 2001), only a few studies have empirically examined the role of individual personality or dispositions in knowledge sharing. Lin (2007a) examined the moderating role of exchange ideology which is a dispositional orientation that defines the relationship between what one gives and receives from an organization. Cabrera et al. (2006) examined openness to experience and found it to be positively related to individuals' self-report of knowledge exchange. They suggest that individuals high in openness to experience tend to have a high level of curiosity resulting in a pique interest to seek others' ideas and insights. Research has also shown that employees' comfort level and ability to use computers likely influence the usage of collaborative electronic media for information sharing (Jarvenpaa & Staples, 2000) and employees with a higher level of education and longer work experience are more likely to share their expertise and have positive attitudes toward sharing (Constant et al., 1994).

The two studies that investigated the expertise-knowledge sharing relationship found mixed results. Constant et al. (1996) found that individuals with higher expertise were more likely to share useful knowledge when other employees asked questions using a company KMS. However, Wasko and Faraj (2005) did not find individuals' self-rated expertise to be related to knowledge sharing. Knowledge sharing does, however, appear to be contingent on individuals' confidence of sharing useful knowledge with others. Several studies have shown that individuals who are more confident in their ability to share useful knowledge are more likely to express intentions to share knowledge and report higher levels of engagement in knowledge sharing (e.g., Cabrera et al., 2006; Lin, 2007c,d). On the other hand, evaluation apprehension, anxiety based on fear of negative evaluations, has been found to be negatively related to knowledge sharing (Bordia et al., 2006).

3.5. Motivational factors

3.5.1. Beliefs of knowledge ownership

Only a few studies have considered individuals' beliefs regarding knowledge ownership, i.e., whether the organization or employees own knowledge (e.g., Constant et al., 1994; Kolekofski & Heminger, 2003). Research has shown that when employees

believed they owned information (rather than the organization) they were more likely to report that they would engage in knowledge sharing (Constant et al., 1994; Jarvenpaa & Staples, 2000). This result can be attributed to employees' internal satisfaction derived from sharing their knowledge with others. Jarvenpaa and Staples (2001) later found that dimensions of organizational culture such as solidarity and need for achievement were related to ownership beliefs. Constant et al. (1994) and Jarvenpaa and Staples (2000, 2001) manipulated participants' perceptions of ownership by providing them with different vignettes (e.g., describing a scenario where the participants were asked to share presentation slides and background notes or their own expertise).

3.5.2. *Perceived benefits and costs*

Perceived benefits/costs have been one of the most studied antecedents of knowledge sharing. Social exchange theory suggests that individuals evaluate the perceived ratio of benefits to costs and base their action decisions on the expectation that it will lead to rewards such as respect, reputation, and tangible incentives (Blau, 1964; Emerson, 1981). Consistent with this theory, research shows that perceived benefits are positively associated with knowledge sharing while perceived costs have a negative influence on knowledge sharing. Most of the studies of perceived benefits/cost were conducted in the context of professional communities.

Participating in knowledge sharing in an online community of practice has been found to be related to increased internal satisfaction, perceived obligation to reciprocate the knowledge gains from the forum, enhanced professional reputations, and helping advance the community (e.g., Lin, 2007c; Hew & Hara, 2007; Wasko & Faraj, 2000, 2005). Interestingly, Bordia et al. (2006) found a positive influence of benefits on knowledge sharing only for technology-aided sharing but not in a face-to-face context. In general, prior research seems to suggest that knowledge sharing is more strongly related to employees' beliefs that their shared knowledge is useful to others than the personal benefits they gain, especially in a professional network (Chiu et al., 2006; Siemsen et al., 2007; Wasko & Faraj, 2000).

Hew and Hara's (2007) qualitative study of three online professional communities examining the perceived costs that might inhibit knowledge sharing found lack of time and unfamiliarity with the subject to be the two most frequently cited reasons for not sharing knowledge. Similarly, Kankanhalli et al. (2005) found that the more time and effort employees perceived as necessary to codify knowledge in order to share knowledge the less likely they would use electronic knowledge repositories for knowledge sharing especially when there was a weak trust of other employees contributing and reusing knowledge.

3.5.3. *Interpersonal trust and justice*

Researchers have used social exchange theory to examine how trust and justice, two key components in interpersonal relationships (Organ, 1990; Robinson, 1996), relate to knowledge sharing. Examining trust and justice is important because knowledge sharing involves providing knowledge to another person or a collective such as a team or community of practice with expectations for reciprocity (e.g., Wu, Hsu, & Yeh, 2007).

Based on interviews conducted in 20 organizations Abrams, Cross, Lesser, and Levin (2003) identified ten behaviors and practices that promote interpersonal trust in a knowledge sharing context. They suggested that the effectiveness of these "trust builders" (e.g., engage in collaborative communication and disclose one's own expertise and limitations) depends on characteristics of the organization. Trust has also been examined as an antecedent or mediator of knowledge sharing (e.g., Butler, 1999; Lin, 2007b). Research has shown that affect- and cognition-based trust have positive influence on knowledge sharing at the dyadic and team levels (Chowdhury, 2005; Mooradian, Renzl, & Matzler, 2006; Wu et al., 2007). Further, Bakker et al. (2006) examined three dimensions of trustworthiness: capability, integrity, and benevolence. They found that individuals tended to share less knowledge with team members whom were perceived to be very capable (capability) and share more knowledge when they believed other team members were honest, fair and followed principles (integrity). Whether a trustee was believed to have good will to the trustor (benevolence), however, was not significantly related to knowledge sharing.

Although this body of research generally has shown a positive interpersonal trust–knowledge sharing relationship, Sondergaard, Kerr, and Clegg (2007) insightfully pointed out that trust could be a double-edged sword. Unjustified trust may cause a potential user to refrain from questioning the usefulness of the knowledge and its context for application, leading to misapplication or misuse of the knowledge. Two studies that have focused on employees' trust in management rather than trust of other employees found mixed results (Mooradian et al., 2006; Renzl, 2008).

The justice–knowledge sharing relationship has received little research attention although the role of justice in affecting the quality of social exchange relationships between employers and their employees is well-established (e.g., Rupp & Cropanzano, 2002). Schepers and van den Berg (2007) found procedural justice to be positively related to perception of knowledge sharing among employees. Using part-time business administration students in Taiwan, Lin (2007b) found that both distributive and procedural justice had positive indirect effects on tacit knowledge sharing via organizational commitment while distributive justice also influenced knowledge sharing through trust in coworkers.

3.5.4. *Individual attitudes*

This line of research is heavily grounded in the theory of reasoned action and the subsequent adapted technology acceptance model which describe how individual behaviors are influenced by beliefs and attitudes (Davis, 1989; Fishbein & Ajzen, 1975). Individuals' expectations of the usefulness of their knowledge and that through sharing they can improve relationships with others have been shown to be related to positive knowledge sharing attitudes which in turn were related to knowledge sharing intentions and behaviors (Bock & Kim, 2002). Similarly, a study of hospital physicians in Korea found that attitudes partially mediated the relationship between subjective norms and physicians' intention to share knowledge (Ryu, Ho, & Han, 2003). Lin and Lee (2004) investigated senior managers' perceptions of encouraging knowledge sharing among employees rather than those of

the individual sharers. They found that managers' intention of encouragement was positively related to employee sharing behaviors. In addition, studies have found that organizational attitudes including job satisfaction and organizational commitment also foster knowledge sharing (de Vries, van den Hooff, & de Ridder, 2006; Lin, 2007a,b).

Overall, it appears that job and organizational attitudes have a significant influence on knowledge sharing. Attitudes toward knowledge sharing have been shown to not only have a direct effect on knowledge sharing but also have an indirect effect on self-reported sharing behavior through positively influencing intentions to share (e.g., Bock et al., 2005; Lin, 2007c).

4. Knowledge sharing research: emerging issues and future research directions

4.1. Expanding the theoretical perspectives used in studying knowledge sharing

Research on knowledge sharing has drawn upon a wide range of theories. The criterion we used for identifying the theoretical foundation for the articles included in this review was quite simple: Did the article mention *any* theoretical perspective as the basis for the study? Based on this criterion the theory of reasoned action, social exchange theory, and social capital and network theories were the most commonly used theoretical perspectives used to study knowledge sharing (approximately one-third of the studies used one of these theories).² However, over 20% of the studies we reviewed did not explicitly ground their research in any theory.

Social exchange theory has been used to investigate perceived benefits and costs as well as the effects of organizational justice and trust on knowledge sharing. Future research should continue to examine knowledge sharing from a social exchange perspective which can provide insights that have yet to be examined. More research is needed to identify and investigate the potential mechanisms through which trust may influence knowledge sharing (cf. Mayer & Gavin, 2005). While source trustworthiness helps enhance knowledge transfer across units (Szulanski et al., 2004), the perception of an individual being trusted by the recipient may also affect his/her motivation to share knowledge with this person. Also, conditional and unconditional trust may have different relationships with knowledge sharing (cf. Jones & George, 1998).

Future studies using generalized social exchange perspective and the theory of social dilemmas may help increase our understanding of the conditions under which knowledge sharing is likely to occur. Knowledge sharing using a KMS that facilitates a community of practice likely creates a public goods social dilemma, i.e., individuals' rational action is to maximize personal benefit, leading to damage to the collective (Cabrera & Cabrera, 2002; Kollock, 1998). The ideas, experiences, and knowledge shared in a KMS are considered to be public goods which are accessible to every member of the system and their value will not diminish with use (Brown & Duguid, 2002; Cabrera & Cabrera, 2002). Because access to knowledge (the public good) is available to all employees they may be motivated to "free ride", i.e., gain benefits from the ideas and knowledge shared by others without making a contribution to the KMS. The generalized social exchange perspective may be useful for investigating the dynamic development of trust as it relates to knowledge sharing. Generalized social exchange of knowledge may also occur among employees across teams such that employees in a team that received knowledge from another team may reciprocate the favor by sharing knowledge with yet another team. In both the team scenario and an online community context it would be interesting to examine how a "social sanctions" system develops and works to reduce free-riding in a generalized social exchange (cf. Das & Teng, 2002).

Several studies included in the review used social capital and network theories. Many of these studies rely on Nahapiet and Ghoshal's (1998) social capital framework (i.e., structural, relational, cognitive dimensions). However, other perspectives of social network theories such as structural holes and closeness of network theories are relatively underutilized and may improve our understanding of knowledge sharing in teams and communities of practice. These theories may be useful because they recognize that employees do not work, learn, or share knowledge in isolation but are embedded in social networks. Many organizations support multiple communities of practice that may be interdependent and overlapping: knowledge sharing across the communities can contribute to organizational learning and innovation (Brown & Duguid, 1998). When a formal or informal group (or community of practice) is formed its members bring with them not only their own knowledge, skills, and abilities but also their social connections.

How does the "boundary-spanning" community facilitate knowledge sharing? In a social network some employees may be more critical than others depending on their network positions. Specifically, if employees bridge structural holes between otherwise disconnected individuals or groups they allow knowledge and information to be exchanged more effectively within a broader network (Ahuja, 2000; Burt, 1992, 2000). Based on structural holes theory (Burt, 1992), the more employees bridging structural holes the more likely different types of knowledge may be shared. Therefore, it would be interesting to investigate how employees' network positions are related to knowledge sharing and how organizations may better leverage individuals in these critical positions (for example, see Parise, 2007). For example, does the recognition of their own unique and important position in

² A wide range of other theories have been used in knowledge sharing research including expectancy theory, agency theory, knowledge-based view of the firm, equity theory, Kelley and Thibaut's (1978) interdependence theory, Hofstede's cultural framework, theory of absorptive capacity, social power theory, innovation diffusion theory, the similarity-attraction paradigm, social cognitive theory, economic exchange theory, Zand's (1972) model of the dynamic of trust, job characteristics model, expectation-confirmation theory, social categorization theory, the Big Five personality theory, attribution theory, balance theory, social influence theory, Detert et al.'s (2000) framework of culture, Constant et al.'s (1994) theory of information sharing, McAllister's (1995) classification of trust, empowering leadership, Swan's (1999) community model, mechanistic versus organic organizational models, theory of planned action, social interdependence theory, socio-technical perspective, Quinn and Rohrbaugh's (1981) framework for organizational effectiveness, socially-situated view of knowledge and learning, organizational learning perspective, social categorization theory, and resource-based view of the firm.

the network make them more or less likely to share knowledge in order to maintain their position? Does the status of the knowledge seeker make a difference?

Moreover, the results of the studies that have examined knowledge transfer from strong/weak tie perspectives suggest potential research questions on knowledge sharing. For example, Hansen (1999) showed that weak ties helped transfer less complex knowledge across divisions in less time but hindered the transfer of more complex knowledge. This suggests that divisions connected by weak ties may be less willing or less likely to share complex knowledge because they are unwilling to exert more effort for sharing. Although such studies did not specifically examine knowledge sharing, the results suggest that both strong and weak ties may influence knowledge sharing but in different ways. Future research will benefit from explicitly investigating the mechanisms through which social networks characteristics such as tie strength and the number of different types of ties relate to knowledge sharing. Such network characteristics may also jointly influence knowledge sharing with other individual or contextual factors. For example, compared to high self-monitors, low self-monitors tend to have higher overall commitment to their work relationships and may be more likely to develop their strong ties (Day & Kilduff, 2003). Therefore, future research could examine whether higher quality of knowledge is shared with strong ties by low self-monitors compared to the knowledge shared by high self-monitors. Similarly, it would be interesting to understand the mechanisms that motivate employees to share knowledge with others such as through different types of relational ties such as horizontal versus vertical ties (e.g., peers versus supervisor–subordinate) and personal friends versus colleagues.

The influence of attitudes toward knowledge sharing on knowledge sharing intentions and behavior has been investigated rather extensively using the theory of reasoned action. However, few studies have examined their antecedents. For example, Kwok and Gao (2005) showed that the richness of channel for knowledge sharing and one's absorptive capability to learn from others has a positive influence on individuals' attitudes toward knowledge sharing. They argued that individuals with higher absorptive capacity are more likely to experience the benefits of knowledge sharing resulting in more positive attitudes toward knowledge sharing. Future research will benefit from focusing on understanding *how* to enhance positive attitudes toward knowledge sharing.

Furthermore, although the role of motivation has been recognized and emphasized in the knowledge sharing literature (e.g., Davenport & Prusak, 1998; Goodman & Darr, 1998; Hansen, Mors, & Lovas, 2005), it is somewhat surprising that traditional motivation theories such as expectancy theory and social cognitive theory (e.g., Chiu et al., 2006; Quigley et al., 2007) have not been used as often in knowledge sharing research. Future research should investigate knowledge sharing using these theoretical frameworks given the insight these theories have provided in understanding other types of voluntary employee behavior such as participation in training and development (Maurer & Tarulli, 1994; Noe & Wilk, 1993).

In some organizations employees consider knowledge sharing an extra-role behavior, i.e., it is not included in formal job descriptions, while in others it is considered an in-role behavior because knowledge sharing is expected and is evaluated and/or rewarded (e.g., Ewing & Keenan, 2001; Stevens, 2000). Future research needs to investigate whether there are differences in the type or quality of knowledge shared when it is considered an in-role versus extra-role behavior. Theories related to prosocial organizational behavior and personality may be useful for increasing our understanding of knowledge sharing when it is considered an extra-role behavior.

Finally, more research drawing upon the team composition literature is needed to increase our understanding of how to engage team members to enhance knowledge sharing and positively affect team and organizational performance. For example, surface-level and deep-level diversity (i.e., demographic differences and attitudinal differences) (Harrison, Price, & Bell, 1998) within a community of practice may influence knowledge sharing between community members. More knowledge sharing may occur as the members learn more about the other members. Also, to better understand knowledge sharing in teams, research is needed to investigate whether the frequency and type of knowledge shared differs based on the team's stage of development, especially when teams are managing multiple tasks (Marks, Mathieu, & Zaccaro, 2001).

4.2. *Reasons for sharing or not sharing knowledge*

It is important to recognize that employees may decide to share (or not share) knowledge for various reasons. For example, as we reviewed earlier, research has shown that individuals may share knowledge because they enjoy helping others (or altruism) or as a result of reciprocation (e.g., Kankanhalli et al., 2005). While reciprocation arguably has attracted most attention we believe there are other reasons that deserve further research attention.

4.2.1. *Impression management and attribution*

Employees may choose to share knowledge as a way to help develop personal relationships with peers or to simply manage their impression on others. These different intentions may influence with whom knowledge is shared (e.g., supervisors, coworkers within the same unit, or managers across units whom they do not know at a personal level). Employees' personal characteristics may also influence the extent to which they share knowledge for different purposes (e.g., new employees may be more likely to use a KMS to share knowledge than more senior employees because they have greater motivation to try to impress their supervisors). Simultaneously, how knowledge sharing intentions are perceived and interpreted by others may also influence future knowledge sharing behaviors of the knowledge recipient as well as whether the knowledge provider will be able to make a good impression on others, resulting in other benefits such as better performance evaluations and career advancement opportunities (cf. Bolino, 1999; Kelley, 1967). If knowledge sharing behavior is attributed to impression management motives or politics, knowledge providers are likely to be viewed less favorably and the recipient is less likely to reciprocate by sharing knowledge.

4.2.2. Power perspective

One major inhibitor of knowledge sharing is that knowledge can be considered a source of power and superiority (e.g., Gupta & Govindarajan, 2000; Kim & Mauborgne, 1998; Szulanski, 1996). Employees' unique knowledge often results in positive evaluations from human resource systems (e.g., performance appraisal, staffing, etc.) and personal gains such as cash bonuses, promotions, stretch job assignments, and protection from layoffs (Husted & Michailova, 2002). This creates a disincentive for knowledge sharing because by sharing knowledge it becomes a common good and individuals lose their distinctiveness compared to others. Researchers have suggested the need to provide incentives to motivate employees to share their knowledge but few studies have directly examined knowledge sharing from a power perspective (see Liao, 2008; Renzl, 2008). Studies of the role of employees' perceptions of how knowledge may serve as a source of referent, expert, and reward power are needed.

Although individuals may refrain from sharing knowledge for fear of losing power it is also feasible that individuals can increase their expert and referent power by sharing knowledge. For example, high self-monitors may be more likely to identify circumstances when they could gain expert power through knowledge sharing. As a result, high self-monitors might be more likely to share knowledge with someone with higher status such as their supervisor compared to a coworker. Concerns about losing power might be greater when sharing occurs in an electronic KMS where knowledge contributed is recorded and may be viewed by all users even those not making contributions. However, it might also be easier to gain power by sharing knowledge in a community of practice facilitated by technology because it is easier to reach a larger audience and therefore increase the likelihood of receiving personal recognition.

4.2.3. Issues derived from evaluation apprehension

Evaluation apprehension inhibits knowledge sharing (Bordia et al., 2006). Evaluation apprehension may result from self-perceptions that shared knowledge is inaccurate, not valued, and likely to result in unfavorable criticism from others. How can evaluation apprehension be reduced? From a situational perspective, research has shown that organizational culture that emphasizes trust and innovation is conducive to knowledge sharing. Future research is needed to examine whether such cultures help reduce evaluation apprehension by reducing the likelihood that knowledge shared will be critically judged.

Bordia et al. (2006) directly examined the evaluation apprehension–knowledge sharing relationship. However, the fear associated with possible negative evaluation also relates to one's self-evaluation. Although we found several studies have examined individuals' knowledge self-efficacy, research on related but unique concepts such as organization-based self-esteem (OBSE) is necessary to better understand the role of self-evaluation in knowledge sharing.

OBSE, a core component of self-evaluation and a specific form of self-esteem, has been defined as “the degree to which an individual believes him/herself to be capable, significant, and worthy as an organizational member” (Pierce & Gardner, 2004, p. 593). Self-consistency theory suggests that individuals tend to behave in a way that is consistent with their current views of self-worth (Korman, 1970). Therefore, employees with high OBSE may be more likely to share their knowledge with others because they believe they are capable and competent to contribute to the organization through knowledge sharing. OBSE may also moderate the relationships found in the literature. For example, it is possible that although the trust–knowledge sharing relationship tends to be positive, the strength of the relationship may be contingent upon the knowledge sharer's OBSE. Behavioral plasticity theory suggests that low self-esteem individuals are more likely to be affected by social and situational cues (Brockner, 1988). Therefore, individuals with low OBSE may be more affected by their level of trust with the knowledge recipient.

Similarly, recent research on a broad personality concept, core self-evaluations, which consists of global self-esteem, generalized self-efficacy, locus of control, and emotional stability (Judge, Bono, & Locke, 2000), may also contribute to our understanding of knowledge sharing. It would be interesting to investigate if core self-evaluations influence knowledge sharing through influencing perception of the usefulness of knowledge sharing and reducing evaluation apprehension.

Furthermore, research investigating different types of interventions designed to help enhance one's knowledge sharing-related self-efficacy is needed. For example, receiving organizational recognition, positive feedback on the knowledge shared, or feedback on how the knowledge shared has helped coworkers or the company may facilitate knowledge sharing self-efficacy. When the value of one's knowledge is recognized by others, individuals may gain an enhanced self-perception of competency, credibility, and confidence (cf. Stasser & Titus, 2003) which increases the likelihood they will share their knowledge with others.

4.2.4. Social costs

Research on hidden profiles focuses on how information sampling affects team decision-making (Stasser & Titus, 2003). The issue of social costs associated with unique information may help us understand why certain information/knowledge is less likely to be shared. Specifically, it is important for future research to examine when individuals are likely to share knowledge that might be inconsistent with others' knowledge. This is important from an organizational perspective because disagreement likely facilitates the development of new ideas, contributing to creativity and innovation. It is also possible that an employee might be less likely to share knowledge in a team or an online community of practice that might reveal mistakes or errors made by his/her boss or an influential peer.

4.2.5. Knowledge sharing as a learning experience for the sharer

One reason employees seek knowledge in an online community is to learn (Wasko & Faraj, 2000). However, there are also circumstances when knowledge sharing may be considered a learning process for the sharer. For example, employees high in learning goal orientation may perceive knowledge sharing as a learning opportunity because they will not be able to successfully explain something well to their peers unless they fully understand it themselves. If employees are motivated to share knowledge

with their peers but they are not sure if they are able to communicate the knowledge in a manner in which it will be understood, they are more likely to use knowledge sharing as an opportunity to deepen their own understanding and find a better way to organize and explain the knowledge before they share it. Employees high in performance goal orientation, on the other hand, are likely more concerned about demonstrating their competence and effectively performing while avoiding risks and negative judgments (e.g., [Dweck & Leggett, 1988](#)). They may feel that knowledge sharing depletes the time and effort available for other work activities that can result in greater personal benefits and rewards by exceeding expectations on performance goals ([Szulanski, 1996](#)). Also, highly performance goal-oriented employees may not want to devote the time necessary engaging in exchanges with others who are attempting to understand and apply the shared knowledge to their work. As a result, they should be less likely to share knowledge.

Moreover, in an online organizational community of practice, knowledge sharers may learn others' perspectives on the same issue or problem being discussed. Additionally, employees may share their ideas with others to further develop them and to facilitate creativity (cf. [Oldham, 2003](#)).

4.3. Examining knowledge sharing from interactional and process perspectives

Researchers have suggested that personality characteristics likely affect how individuals interpret and respond to work environment stimuli because of predispositions to perceive stimuli in a certain way (e.g., [Shoda & Mischel, 1993](#); [Weiss & Adler, 1984](#)). We found in our review of the literature that researchers have tended to investigate the direct relationship between personal characteristics, contextual factors and knowledge sharing, but few studies have examined their interaction. Both the interactional psychology and trait activation perspectives ([Schneider, 1983](#); [Shoda & Mischel, 1993](#); [Tett & Burnett, 2003](#)) suggest that it is useful to examine how personality may interact with situational factors to influence knowledge sharing. For example, trust in management may facilitate knowledge sharing by ameliorating fear of losing unique value (see [Renzl, 2008](#)), deactivating employees' concerns of losing expert power and constraining the potential influence of other individual characteristics on knowledge sharing.

Future research is also needed to examine how personality affects individuals' responses to organizational work practices designed to motivate knowledge sharing. For example, given the mixed results we found in the literature, more research on the extrinsic rewards–knowledge sharing relationship is needed. It is possible that the effectiveness of extrinsic rewards for motivating knowledge sharing may depend on individual personality traits such as the Big Five ([Kamdar, Nosworthy, Chia, & Chay, 2002](#); [Wang, Noe, & Wang, 2005](#)). For example, because conscientious employees tend to form relational contracts and have less interest in economic rewards ([Raja, Johns, & Ntalianis, 2004](#)), less conscientious employees would likely respond more favorably to organizational work practices that reward knowledge sharing.

More research is also needed to help us understand the mechanisms underlying the observed relationships found in the literature. For example, few studies have examined the relationship between team characteristics and knowledge sharing, particularly the process through which team characteristics affect knowledge sharing. Team-level trust and cohesiveness may serve as important mediators of the team characteristics–knowledge sharing relationship. It is also possible that leadership characteristics may affect the level of team knowledge sharing through creating knowledge sharing norms (cf. [Quigley et al., 2007](#)). Also, leader–member exchanges may mediate the justice–knowledge sharing relationship.

4.4. Understanding differences between interpersonal and technology-aided knowledge sharing

Few studies have examined the differences between knowledge sharing via KMS and face-to-face interactions ([Bordia et al., 2006](#) is an exception). This is important because the factors influencing the decision to share knowledge in face-to-face versus technology-aided interactions are likely different, e.g., employees who are high in extraversion may be more likely to share knowledge in a face-to-face compared to an electronic context because knowledge exchange is more relationship-based. Also, studies using a longitudinal design are needed to examine how individuals' attitudes toward sharing change based on personal experience of sharing knowledge in a team or a KMS.

Almost all the studies of knowledge sharing communities were conducted using electronic knowledge systems (for an exception see [Lin, 2007c](#)). Using electronic systems is only one way of sharing knowledge. Future research needs to investigate how perceived benefits and costs may differ in face-to-face knowledge sharing communities compared to an electronic KMS. Despite the increasing use of technology to facilitate knowledge sharing within organizations, face-to-face interactions are still an indispensable mechanism for knowledge sharing especially when more “sticky” knowledge is involved ([Szulanski, 2000](#)).

4.5. The influence of organizational and national culture on knowledge sharing

Both KM researchers and practitioners acknowledge the importance of organizational culture for the long-term success of KM initiatives. Most of the studies conducted in this area have focused on identifying the cultural dimensions that affect knowledge management and sharing (e.g., [Bock et al., 2005](#); [Collins & Smith, 2006](#); [Connelly & Kelloway, 2003](#)). More research is needed to understand how a knowledge sharing culture can be promoted and to empirically test how such culture can affect the dynamics of knowledge sharing and learning among employees and teams. One important area of research is to investigate how culture affects team characteristics such as team mental models ([Mohammed & Dumville, 2001](#)) which may in turn influence knowledge sharing. Although human resource practices such as performance evaluation, training, and rewards may facilitate the building and

changing of organizational culture and regulate employees' behaviors (e.g., Swart & Kinnie, 2003), future research needs to investigate how the culture/norms in professional communities of practices are established.

The majority of studies that have examined non-Western cultural influences on knowledge sharing have been conducted in Chinese cultures. More studies on how cultural differences affect knowledge sharing in emerging economies in countries in Africa, the Middle East, and South America are needed.

Also, more research is needed to investigate how in-group/out-group membership influences knowledge sharing. For example, how can the influence of in-group/out-group membership on knowledge sharing be reduced? Would providing training to individuals on how to present their lessons or negative experiences in a more neutral way help alleviate concerns over sharing them with an "out-group" member? This issue might be more complex in a multinational organization where the influence of in-group/out-group differences may vary across cultures.

4.6. *Methodological issues in knowledge sharing research*

Approximately one-third of the studies included in this review were qualitative studies which have used interviews, observation, and/or archival documents analysis to answer their research questions. Only a small number of the qualitative studies also collected quantitative data for analysis. An important strength of the studies reviewed was that the majority were conducted in a field setting. Qualitative studies provide a rich and in-depth examination of the organizational context in which knowledge sharing occurs. More qualitative research that focuses on specific issues is needed to help us better design quantitative studies. For example, it would be informative for future research to identify the specific managerial behaviors and actions that employees believe demonstrate support for knowledge sharing. Qualitative research studies of employee knowledge ownership will also be helpful to identify the types of knowledge that employees believe they own and the process through which employees acquire perceptions of ownership. The results of these studies can facilitate more quantitative research regarding the antecedents of employee ownership and their consequences for knowledge sharing. Such studies can also provide useful insights into how organizations can influence employee perceptions of knowledge ownership to increase knowledge sharing.

It is important to recognize that the quantitative studies of knowledge sharing included in this review suffer from several significant limitations. First, the majority of studies measured knowledge sharing using either willingness (or intention) to share knowledge or self-reported knowledge sharing behaviors. Also, several measures combined knowledge sharing with utilizing knowledge and/or seeking knowledge (e.g., Cabrera et al., 2006; Lee et al., 2006). Second, all variables were based on a questionnaire completed by a single source at one time period. These limitations do not allow researchers to rule out possible alternative explanations for significant results (such as shared common method variance) and prevent causal inferences. Social desirability may be particularly an issue when willingness or intention is being measured. Future research needs to measure both subjective and objective knowledge sharing to determine the extent to which self-report and perceptual assessment of knowledge sharing converges with objective assessment collected using a KMS. Also, studies need to assess the independent variables of interest separately from the measures of knowledge sharing.

Few studies we reviewed measured objective knowledge sharing and over half of them were experiments using a student sample (for exceptions see Arthur & Aiman-Smith, 2005; Wasko & Faraj, 2005). This observation might be attributed to the difficulty in collecting third-party data and archival data in a field study. In experiments using student samples it is relatively easy to ask the knowledge recipient to evaluate the knowledge sharing performance of the sharer (e.g., Butler, 1999; Chowdhury, 2005), to obtain discussions to be coded by a third-party trained coder (e.g., Ferrin & Dirks, 2003), or to manipulate what information is being given and whether that piece of information is shared with their group members (e.g., Thomas-Hunt et al., 2003).

More research that uses objective measures of knowledge sharing is needed but objectively measuring knowledge sharing especially in field studies poses some challenges. However, researchers can take several steps to increase the internal and external validities of knowledge sharing research. First, because measures of knowledge sharing are not readily available in the literature researchers need to devote time to develop valid and reliable measures. Currently, researchers tend to use scales that measure the extent to which an individual uses different types of channels (e.g., informal interaction, organizational database) to share knowledge or the extent to which an individual shares different types of knowledge (e.g., personal experience, expertise, ideas). Other characteristics of knowledge sharing may also be worthy of examination. For example, timeliness of responses to queries may be an important attribute for analysis because in some contexts knowledge needs to be shared promptly for the knowledge seeker to find it useful. It is also important for researchers to determine what facets of knowledge sharing are of interest to address their research question (e.g., an interest in message content, an overall assessment of the frequency and/or quality of knowledge sharing).

Second, researchers interested in examining knowledge sharing in an organizational online community of practice or other electronic KMS may obtain a record of knowledge sharing. Following the process used by Wasko and Faraj (2005) a coding scheme can be developed for subject matter experts (raters) to use to evaluate the knowledge sharing dimensions of interest in a more objective and systematic manner. However, this approach is bounded by its limitation to only capture knowledge sharing that has occurred in that KMS, neglecting undocumented face-to-face knowledge sharing. Combining documented knowledge sharing with ratings of knowledge sharing provided by managers or peers may help increase the validity of knowledge sharing measures.

In studies of knowledge sharing in teams it would be beneficial for team members to provide ratings of knowledge sharing. However, these ratings will not likely capture an individual sharing knowledge across teams. Ideally, to comprehensively capture

an individual's overall knowledge sharing performance, the employee's knowledge recipients within a specified period of time can be identified and asked to evaluate each case of knowledge sharing all of which will then be combined to be used as the indicator. Because this is almost impossible to accomplish proxies will have to be used (e.g., the average ratings of a group of peers and/or the rating from managers who have the opportunity to observe and obtain feedback from others on the employee's knowledge sharing).

Third, more empirical studies involving field experiments and using longitudinal research designs are needed because such designs can help establish the causal relationship between individual, team, and organizational factors and knowledge sharing. Studies are needed to evaluate interventions which alter organizational work practices such as rewards or performance management systems to facilitate knowledge sharing. For example, when a company plans to pilot an intervention before implementing a KM initiative company-wide, ideally, two comparable units of an organization may be carefully chosen with one unit first serving as the control condition and then implementing the same intervention. This design allows researchers to compare overall differences in knowledge sharing between the two units as well as differences that occur across time. Researchers should also consider conducting longitudinal studies that measure knowledge sharing before and after an intervention. A longitudinal design with repeated measures can also help us better understand the reciprocal reinforcing effect. For example, trust and organizational culture may help enhance knowledge sharing which may in turn reinforce the trust and the culture.

Finally, phenomena such as knowledge sharing do not reside within one level of analysis but rather are hierarchical, which necessitates an examination across levels to capture their complexity (Klein & Kozlowski, 2000). For example, Quigley et al. (2007) used both individual and dyadic levels to examine dyadic knowledge sharing. More work using multilevel analysis is needed to appropriately examine knowledge sharing dynamics. It is possible that some team- or community-level factors such as team size and autonomy and individual-level factors may jointly influence knowledge sharing of the team or community members.

5. Practical implications of knowledge sharing research

There are several implications for human resource management practices we can draw from the consistent findings in the existing knowledge sharing literature. First, a culture emphasizing trust and innovation is conducive to knowledge sharing. It appears that the importance of organizational culture lies in its ability to have a direct effect on employees' knowledge sharing behavior as well as an indirect effect through influencing managers' attitudes toward knowledge sharing. Human resource practices including fairness in decision-making and open communication likely promote an organizational culture that supports knowledge sharing (Cabrera & Cabrera, 2005). An important caveat is that a positive culture alone may be insufficient to facilitate knowledge sharing. Research suggests it is important to design KM initiatives that are aligned with existing working habits and routines and link knowledge sharing to company goals and values (Hickins, 1999; McDermott & O'Dell, 2001). Because the implementation of a KMS or a new strategic emphasis on knowledge sharing involves asking managers and employees to adopt new attitudes and behaviors related to knowledge sharing, a change management strategy needs to be considered. This strategy needs to create a need to change the status quo, and include activities designed to insure that employees are satisfied with the change process (e.g., reduce the stress level of company employees during change) (M.C. Jones, Cline, & Ryan, 2006; Taylor & Wright, 2004).

Second, research has shown that management and supervisor support is critical for the success of KM and knowledge sharing initiatives. Organizations should require and reward managers for providing the support necessary for encouraging knowledge sharing among employees. Management support for knowledge sharing may be demonstrated by emphasizing sharing "lessons learned" instead of "mistakes made" (Teo, 2005).

Third, prior research appears to suggest the importance of increasing individuals' confidence in sharing useful knowledge with others. Bryant's (2005) study suggests that knowledge sharing can be enhanced by increasing employees' self-efficacy through training. It may also be important for organizations to help shape and facilitate employee perceptions of knowledge ownership which have been found to enhance their knowledge sharing because of internal satisfaction.

Finally, although there has been only a small number of cross-cultural studies conducted to date, the results suggest that organizations need to pay close attention to cultural characteristics in developing human resource practices that will facilitate knowledge sharing, i.e., there is not one universal set of practices that can be used to facilitate knowledge sharing in global and multinational organizations. For example, organizations may need to make adjustments to the type of incentives provided to fit the cultural contexts (Voelpel et al. 2005).

6. Conclusion

This review provides an organizing framework for current research, discusses emerging issues, and identifies future research needs and practical implications of knowledge sharing research. Our review highlights that although there is a growing multidisciplinary literature on knowledge sharing, much remains to be studied.

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References*

- *Abrams, L. C., Cross, R., Lesser, E., & Levin, D. Z. (2003). Nurturing interpersonal trust in knowledge-sharing networks. *The Academy of Management Executive*, 17(4), 64–77.
- Ahuja, G. (2000). Collaboration networks, structural holes, and innovation: A longitudinal study. *Administrative Science Quarterly*, 45(3), 425–455.
- Alavi, M., & Leidner, D. E. (2001). Review: Knowledge management and knowledge management systems: Conceptual foundations and research issues. *MIS Quarterly*, 25(1), 107–136.
- Argote, L. (1999). *Organizational learning: Creating, retaining and transferring knowledge*. Norwell, MA: Kluwer.
- Argote, L., McEvily, B., & Reagans, R. (2003). Managing knowledge in organizations: An integrative framework and review of emerging themes. *Management Science*, 49(4), 571–582.
- *Arthur, J. B., & Aiman-Smith, L. (2001). Gainsharing and organizational learning: An analysis of employee suggestions over time. *Academy of Management Journal*, 44(4), 737–754.
- Arthur, J. B., & Huntley, C. L. (2005). Ramping up the organizational learning curve: Assessing the impact of deliberate learning on organizational performance under gainsharing. *Academy of Management Journal*, 48(6), 1159–1170.
- Babcock, P. (2004). Shedding light on knowledge management. *HR Magazine*, 49(5), 46–50.
- *Bakker, M., Leenders, R. T. A. J., Gabbay, S. M., Kratzer, J., & Van Engelen, J. M. L. (2006). Is trust really social capital? Knowledge sharing in product development projects. *The Learning Organization*, 13(6), 594–605.
- Bartol, K. M., & Srivastava, A. (2002). Encouraging knowledge sharing: The role of organizational rewards systems. *Journal of Leadership and Organization Studies*, 9(1), 64–76.
- Blau, P. M. (1964). *Exchange and power in social life*. New York: Wiley.
- *Bock, G. -W., & Kim, Y. -G. (2002). Breaking the myths of rewards: An exploratory study of attitudes about knowledge sharing. *Information Resources Management Journal*, 15(2), 14–21.
- *Bock, G. -W., Zmud, R. W., Kim, Y. -G., & Lee, J. -N. (2005). Behavioral intention formation in knowledge sharing: Examining the roles of extrinsic motivators, social-psychological forces, and organizational climate. *MIS Quarterly*, 29(1), 87–111.
- Bolino, M. C. (1999). Citizenship and impression management: Good soldiers or good actors? *Academy of Management Review*, 24, 82–98.
- *Bordia, P., Irmer, B. E., & Abusah, D. (2006). Differences in sharing knowledge interpersonally and via databases: The role of evaluation apprehension and perceived benefits. *European Journal of Work and Organizational Psychology*, 15(3), 262–280.
- Brockner, J. (1988). *Self-esteem at work: Theory, research, and practice*. Lexington, MA: Lexington.
- Brown, J. S., & Duguid, P. (1991). Organizational learning and communities-of-practice: Toward a unified view of working, learning, and innovation. *Organization Science*, 2(1), 40–57.
- Brown, J. S., & Duguid, P. (1998). Organizing knowledge. *California Management Review*, 40(3), 90–111.
- Brown, J. S., & Duguid, P. (2001). Knowledge and organization: A social-practice perspective. *Organization Science*, 12(2), 198–213.
- Brown, J. S., & Duguid, P. (2002). Local knowledge: Innovation in the networked age. *Management Learning*, 33(4), 427–437.
- *Bryant, S. E. (2005). The impact of peer mentoring on organizational knowledge creation and sharing: An empirical study in a software firm. *Group & Organization Management*, 30, 319–338.
- Burt, R. S. (1992). *Structural holes: The social structure of competition*. Cambridge, MA: Harvard University Press.
- Burt, R. S. (2000). The network structure of social capital. *Research in Organizational Behavior*, 22, 345–423.
- *Butler, J. K., Jr. (1999). Trust expectations, information sharing, climate of trust, and negotiation effectiveness and efficiency. *Group & Organization Management*, 24(2), 217–238.
- Cabrera, A., & Cabrera, E. F. (2002). Knowledge-sharing dilemmas. *Organization Studies*, 23, 687–710.
- Cabrera, E. F., & Cabrera, A. (2005). Fostering knowledge sharing through people management practices. *International Journal of Human Resource Management*, 16, 720–735.
- *Cabrera, A., Collins, W. C., & Salgado, J. F. (2006). Determinants of individual engagement in knowledge sharing. *International Journal of Human Resource Management*, 17(2), 245–264.
- Carter, C., & Scarbrough, H. (2001). Towards a second generation of KM? The people management challenge. *Education & Training*, 43(4), 215–224.
- *Chang, T. J., Yeh, S. P., & Yeh, I. J. (2007). The effects of joint reward system in new product development. *International Journal of Manpower*, 28(3/4), 276–297.
- *Chen, I. Y. L. (2007). The factors influencing members' continuance intentions in professional virtual communities – A longitudinal study. *Journal of Information Science*, 33(4), 451–467.
- *Chiu, C. -M., Hsu, M. -H., Wang, E., & T. G. (2006). Understanding knowledge sharing in virtual communities: An integration of social capital and social cognitive theories. *Decision Support Systems*, 42(3), 1872–1888.
- *Chow, C. W., Deng, F. J., & Ho, J. L. (2000). The openness of knowledge sharing within organizations: A comparative study of the United States and the People's Republic of China. *Journal of Management Accounting Research*, 12, 65–95.
- *Chow, C. W., Harrison, G. L., McKinnon, J. L., & Wu, A. (1999). Cultural influences on informal information sharing in Chinese and Anglo-American organizations: An exploratory study. *Accounting, Organizations and Society*, 24(7), 561–582.
- *Chowdhury, S. (2005). The role of affect- and cognition-based trust in complex knowledge sharing. *Journal of Managerial Issues*, 17(3), 310–326.
- *Collins, C. J., & Smith, K. G. (2006). Knowledge exchange and combination: The role of human resource practices in the performance of high-technology firms. *Academy of Management Journal*, 49(3), 544–560.
- *Connelly, C. E., & Kelloway, E. K. (2003). Predictors of employees' perceptions of knowledge sharing cultures. *Leadership & Organization Development Journal*, 24(5/6), 294–301.
- *Constant, D., Kiesler, S., & Sproull, L. (1994). What's mine is ours, or is it? A study of attitudes about information sharing. *Information Systems Research*, 5(4), 400–421.
- *Constant, D., Sproull, L., & Kiesler, S. (1996). The kindness of strangers: The usefulness of electronic weak ties for technical advice. *Organization Science*, 7(2), 119–135.
- Cross, R., & Cummings, J. N. (2004). Tie and network correlates of individual performance in knowledge-intensive work. *Academy of Management Journal*, 47(6), 928–937.
- Cummings, J. N. (2004). Work groups, structural diversity, and knowledge sharing in a global organization. *Management Science*, 50(3), 352–364.
- Damodaran, L., & Olphert, W. (2000). Barriers and facilitators to the use of knowledge management systems. *Behaviour & Information Technology*, 19(6), 405–413.
- Das, T. K., & Teng, B. -S. (2002). Alliance constellations: A social exchange perspective. *Academy of Management Review*, 27, 445–456.
- Davenport, T. H., & Prusak, L. (1998). *Working knowledge: How organizations manage what they know*. Boston, MA: Harvard Business School Press.
- Davis, F. D. (1989). Perceived usefulness, perceived ease of use, and user acceptance of information technology. *MIS Quarterly*, 13(3), 318–340.
- Day, D. V., & Kilduff, M. (2003). Self-monitoring personality and work relationships: Individual differences in social networks. In M. R. Barrick & A.M. Ryan (Eds.), *Personality and work: Reconsidering the role of personality in organizations* (pp. 205–228). San Francisco, CA: Jossey-Bass.
- *De Long, D. W., & Fahey, L. (2000). Diagnosing cultural barriers to knowledge management. *Academy of Management Executive*, 14(4), 113–127.
- Detert, J. R., Schroeder, R. G., & Mauriel, J. J. (2000). A framework for linking culture and improvement initiatives in organizations. *Academy of Management Review*, 25, 850–863.
- *de Vries, R. E., van den Hooff, B., & de Ridder, J. A. (2006). Explaining knowledge sharing: The role of team communication styles, job satisfaction, and performance beliefs. *Communication Research*, 33(2), 115–135.

* References marked with an asterisk indicate empirical studies included in the review.

- Dweck, C. S., & Leggett, E. L. (1988). A social-cognitive approach to motivation and personality. *Psychological Review*, 95(2), 256–273.
- Ekeh, P. P. (1974). *Social exchange theory: The two traditions*. Cambridge, MA: Harvard University Press.
- Emerson, R. M. (1981). Social exchange theory. In M. Rosenberg & R.H. Turner (Eds.), *Social psychology: Sociological perspectives* NY: Basic Books, Inc.
- Ewing, J., & Keenan, F. (2001). Sharing the wealth. *Business Week*, 3724, EB36–39.
- *Ferrin, D. L., & Dirks, K. T. (2003). The use of rewards to increase and decrease trust: Mediating processes and differential effects. *Organization Science*, 14(1), 18–31.
- Fishbein, M., & Ajzen, I. (1975). *Belief, attitude, intention, and behavior: An introduction to theory and research*. Reading, MA: Addison-Wesley.
- *Ford, D. P., & Chan, Y. E. (2003). Knowledge sharing in a multi-cultural setting: A case study. *Knowledge Management Research & Practice*, 1(1), 11–27.
- Foss, N. J., & Pedersen, T. (2002). Transferring knowledge in MNCs: The role of sources of subsidiary knowledge and organizational context. *Journal of International Management*, 8(1), 49–67.
- French, J., & Raven, B. H. (1959). The bases of social power. *Studies in social power* (pp. 150–167). Ann Arbor, MI: Institute for Social Research.
- Goodman, P. S., & Darr, E. D. (1998). Computer-aided systems and communities: Mechanisms for organizational learning in distributed environments. *MIS Quarterly*, 22(4), 417–440.
- Granovetter, M. S. (1973). The strength of weak ties. *American Journal of Sociology*, 78, 1360–1380.
- Grant, R. M. (1996). Toward a knowledge-based theory of the firm. *Strategic Management Journal*, 17, 109–122.
- Gupta, A. K., & Govindarajan, V. (2000). Knowledge management's social dimension: Lessons from Nucor Steel. *Sloan Management Review*, 42(1), 71–80.
- Hansen, M. T. (1999). The search-transfer problem: The role of weak ties in sharing knowledge across organization subunits. *Administrative Science Quarterly*, 44(1), 82–111.
- Hansen, M. T. (2002). Knowledge network: Explaining effective knowledge sharing in multiunit companies. *Organization Science*, 13(3), 232–248.
- Hansen, M. T., Mors, M. L., & Lovas, B. (2005). Knowledge sharing in organizations: Multiple networks, multiple phases. *Academy of Management Journal*, 48(5), 776–793.
- Hansen, M. T., Nohria, N., & Tierney, T. (1999). What's your strategy for managing knowledge? *Harvard Business Review*, 77(2), 106–116.
- Harrison, D. A., Price, K. H., & Bell, M. P. (1998). Beyond relational demography: Time and the effects of surface- and deep-level diversity on work group cohesion. *Academy of Management Journal*, 41(1), 96–107.
- *Hew, K. F., & Hara, N. (2007). Knowledge sharing in online environments: A qualitative case study. *Journal of the American Society for Information Science and Technology*, 58(14), 2310–2324.
- Hickins, M. (1999). Xerox shares its knowledge. *Management Review*, 88(8), 40–45.
- Hinds, P. J., Patterson, M., & Pfeffer, J. (2001). Bothered by abstraction: The effect of expertise on knowledge transfer and subsequent novice performance. *Journal of Applied Psychology*, 86, 1232–1243.
- *Hsu, I. C. (2006). Enhancing employee tendencies to share knowledge – Case studies of nine companies in Taiwan. *International Journal of Information Management*, 26(4), 326–338.
- Huber, G. P. (1991). Organizational learning: The contributing processes and the literatures. *Organization Science*, 2(1), 88–115.
- Husted, K., & Michalova, S. (2002). Diagnosing and fighting knowledge-sharing hostility. *Organizational Dynamics*, 31(1), 60–73.
- *Hwang, Y., & Kim, D. J. (2007). Understanding affective commitment, collectivist culture, and social influence in relation to knowledge sharing in technology mediated learning. *IEEE Transactions on Professional Communication*, 50(3), 232–248.
- Jackson, S. E., Chuang, C. -H., Harden, E. E., Jiang, Y., & Joseph, J. M. (2006). Toward developing human resource management systems for knowledge-intensive teamwork. In J. M. Joseph (Ed.), *Research in personnel and human resources management*, Vol. 25. (pp. 27–70). Amsterdam: JAI.
- *Jarvenpaa, S. L., & Staples, D. S. (2000). The use of collaborative electronic media for information sharing: An exploratory study of determinants. *The Journal of Strategic Information Systems*, 9(2–3), 129–154.
- *Jarvenpaa, S. L., & Staples, D. S. (2001). Exploring perceptions of organizational ownership of information and expertise. *Journal of Management Information Systems*, 18(1), 151–183.
- Jones, G. R., & George, J. M. (1998). *The experience and evolution of trust: Implications for cooperation and teamwork* *Academy of Management Review*, 23(3), 531–546.
- *Jones, M. C. (2005). Tacit knowledge sharing during ERP implementation: A multi-site case study. *Information Resources Management Journal*, 18(2), 1–23.
- *Jones, M. C., Cline, M., & Ryan, S. (2006). Exploring knowledge sharing in ERP implementation: An organizational culture framework. *Decision Support Systems*, 41(2), 411–434.
- Judge, T. A., & Bono, J. E. (2001). Relationship of core self-evaluations traits—self-esteem, generalized self-efficacy, locus of control, and emotional stability—with job satisfaction and job performance: A meta-analysis. *Journal of Applied Psychology*, 86(1), 80–92.
- Judge, T. A., Bono, J. E., & Locke, E. A. (2000). Personality and job satisfaction: The mediating role of job characteristics. *Journal of Applied Psychology*, 85(2), 237–249.
- Kamdar, D., Nosworthy, G. J., Chia, H.-B., & Chay, Y.-W. (2002). Giving up the 'secret of fire': The impact of incentives and self-monitoring on knowledge sharing. *Paper presented at the Academy of Management Meeting*. Denver, CO.
- *Kankanhalli, A., Tan, B. C. Y., & Wei, K. -K. (2005). Contributing knowledge to electronic knowledge repositories: An empirical investigation. *MIS Quarterly*, 29(1), 113–143.
- Kelley, H. H. (1967). Attribution theory in social psychology. In D. Levine (Ed.), *Nebraska symposium on motivation*, Vol. 15. (pp. 192–240). Lincoln, NE: University of Nebraska Press.
- Kelley, H. H., & Thibaut, J. W. (1978). *Interpersonal relations: A theory of interdependence*. New York: Wiley.
- *Kim, S., & Lee, H. (2006). The impact of organizational context and information technology on employee knowledge-sharing capabilities. *Public Administration Review*, 66(3), 370–385.
- Kim, W. C., & Mauborgne, R. (1998). Procedural justice, strategic decision making, and the knowledge economy. *Strategic Management Journal*, 19(4), 323–338.
- *King, W. R., & Marks, P. V., Jr. (2008). Motivating knowledge sharing through a knowledge management system. *Omega*, 36(1), 131–146.
- Klein, K. J., & Kozlowski, S. W. J. (2000). *Multilevel theory, research, and methods in organizations: Foundation, extensions, and new direction*. San Francisco: Jossey-Bass.
- Kogut, B., & Zander, U. (1992). Knowledge of the firm, combinative capabilities, and the replication of technology. *Organization Science*, 3, 383–397.
- *Kolekofski, J. K. E., & Heminger, A. R. (2003). Beliefs and attitudes affecting intentions to share information in an organizational setting. *Information & Management*, 40(6), 521–532.
- Kollock, P. (1998). Social dilemmas: The anatomy of cooperation. *Annual Review of Sociology*, 22, 183–205.
- Korman, A. K. (1970). Toward a hypothesis of work behavior. *Journal of Applied Psychology*, 54, 31–41.
- *Kubo, I., Saka, A., & Pam, S. L. (2001). Behind the scenes of knowledge sharing in a Japanese bank. *Human Resource Development International*, 4(4), 465–485.
- *Kulkarni, U. R., Ravindran, S., & Freeze, R. (2006). A knowledge management success model: Theoretical development and empirical validation. *Journal of Management Information Systems*, 23(3), 309–347.
- *Kwok, S. H., & Gao, S. (2005). Attitude towards knowledge sharing behavior. *The Journal of Computer Information Systems*, 46(2), 45–51.
- *Lam, A. (1996). Engineers, management and work organization: A comparative analysis of engineers' work roles in British and Japanese electronics firms. *The Journal of Management Studies*, 33(2), 183–212.
- Larson, J. R., & Harmon, V. M. (2007). Recalling shared vs. unshared information mentioned during group discussion: Toward understanding differential repetition rates. *Group Processes & Intergroup Relations*, 10(3), 311–322.
- Lave, J., & Wenger, E. (1991). *Situated learning: Legitimate peripheral participation*. Cambridge, UK: Cambridge University Press.
- *Lee, J. -H., Kim, Y. -G., & Kim, M. -Y. (2006). Effects of managerial drivers and climate maturity on knowledge-management performance: Empirical validation. *Information Resources Management Journal*, 19(3), 48–60.
- *Levin, D. Z., & Cross, R. (2004). The strength of weak ties you can trust: The mediating role of trust in effective knowledge transfer. *Management Science*, 50, 1477–1490.
- *Liao, L. -F. (2006). A learning organization perspective on knowledge-sharing behavior and firm innovation. *Human Systems Management*, 25(4), 227.
- *Liao, L. -F. (2008). Impact of manager's social power on R&D employees' knowledge-sharing behaviour. *International Journal of Technology Management*, 41(1/2), 169–182.

- *Liebowitz, J. (2003). A knowledge management strategy for the Jason organization: A case study. *Journal of Computer Information Systems*, 44(2), 1–5.
- Liebowitz, J., & Megbolugbe, I. (2003). A set of frameworks to aid the project manager in conceptualizing and implementing knowledge management initiatives. *International Journal of Project Management*, 21(3), 189–198.
- *Lin, C. -P. (2007a). To share or not to share: Modeling knowledge sharing using exchange ideology as a moderator. *Personnel Review*, 36(3), 457–475.
- *Lin, C. -P. (2007b). To share or not to share: Modeling tacit knowledge sharing, its mediators and antecedents. *Journal of Business Ethics*, 70(4), 411–428.
- *Lin, H. -F. (2007c). Effects of extrinsic and intrinsic motivation on employee knowledge sharing intentions. *Journal of Information Science*, 33(2), 135–149.
- *Lin, H. -F. (2007d). Knowledge sharing and firm innovation capability: An empirical study. *International Journal of Manpower*, 28(3/4), 315–332.
- *Lin, H. -F., & Lee, G. -G. (2004). Perceptions of senior managers toward knowledge-sharing behaviour. *Management Decision*, 42(1/2), 108–125.
- *Lin, H. -F., & Lee, G. -G. (2006). Effects of socio-technical factors on organizational intention to encourage knowledge sharing. *Management Decision*, 44(1), 74–88.
- Machlup, F. (1980). *Knowledge, its creation, distribution, and economic significance*. Princeton, NJ: Princeton University Press.
- Makhija, M. V., & Ganesh, U. (1997). The relationship between control and partner learning in learning-related joint ventures. *Organization Science*, 8(5), 508–527.
- Marks, M. A., Mathieu, J. E., & Zaccaro, S. J. (2001). A temporally based framework and taxonomy of team processes. *Academy of Management Review*, 26(3), 356–375.
- Maurer, T. J., & Tarulli, B. A. (1994). Investigation of perceived environment, perceived outcome, and person variables in relationship to voluntary development activity by employees. *Journal of Applied Psychology*, 79(1), 3–14.
- Mayer, R. C., & Gavin, M. B. (2005). Trust in management and performance: Who minds the shop while the employees watch the boss? *Academy of Management Journal*, 48(5), 874–888.
- McAllister, D. J. (1995). Affect- and cognition-based trust as foundations for interpersonal cooperation in organizations. *Academy of Management Journal*, 38(1), 24–59.
- McDermott, R., & O'Dell, C. (2001). Overcoming cultural barriers to sharing knowledge. *Journal of Knowledge Management*, 5(1), 76–85.
- *McKinnon, J. L., Harrison, G. L., Chow, C. W., & Wu, A. (2003). Organizational culture: Association with commitment, job satisfaction, propensity to remain, and information sharing in Taiwan. *International Journal of Business Studies*, 11(1), 25–44.
- Mesmer-Magnus, J. R., & DeChurch, L. A. (2009). Information sharing and team performance: A meta-analysis. *Journal of Applied Psychology*, 94, 535–546.
- Minbaeva, D. (2007). Knowledge transfer in multinational corporations. *Management International Review*, 47(4), 567–593.
- Mohammed, S., & Dumville, B. C. (2001). Team mental models in a team knowledge framework: Expanding theory and measurement across disciplinary boundaries. *Journal of Organizational Behavior*, 22, 89–106.
- *Mooradian, T., Renzl, B., & Matzler, K. (2006). Who trusts? Personality, trust and knowledge sharing. *Management Learning*, 37(4), 523–540.
- Nahapiet, J., & Ghoshal, S. (1998). Social capital, intellectual capital, and the organizational advantage. *Academy of Management Review*, 23(2), 242–266.
- *Nelson, A., Sabatier, R., & Nelson, W. (2006). Toward an understanding of global entrepreneurial knowledge management (EKM) practices: A preliminary investigation of EKM in France and the U.S. *Journal of Applied Management and Entrepreneurship*, 11(2), 70–89.
- Noe, R. A., & Wilk, S. L. (1993). Investigation of the factors that influence employees' participation in development activities. *Journal of Applied Psychology*, 78(2), 291–302.
- Nonaka, I. (1994). A dynamic theory of organizational knowledge creation. *Organization Science*, 5(1), 14–37.
- *Ojha, A. K. (2005). Impact of team demography on knowledge sharing in software project teams. *South Asian Journal of Management*, 12(3), 67–78.
- Oldham, G. R. (2003). Stimulating and supporting creativity in organizations. In S. E. Jackson, M. A. Hitt & A.S. DeNisi (Eds.), *Managing knowledge for sustained competitive advantage: Designing strategies for effective human resource management* (pp. 243–273). San Francisco: Jossey-Bass.
- Organ, D. W. (1990). Motivational basis of organizational citizenship behavior. In B. M. Staw & L.L. Cummings (Eds.), *Research in organizational behavior* (pp. 43–72). Greenwich: JAI Press.
- Parise, S. (2007). Knowledge management and human resource development: An application in social network analysis methods. *Advances in Developing Human Resources*, 9(3), 359–383.
- Perry-Smith, J. E. (2006). Social yet creative: The role of social relationships in facilitating individual creativity. *Academy of Management Journal*, 49(1), 85–101.
- Pierce, J. L., & Gardner, D. G. (2004). Self-esteem within the work and organizational context: A review of the organization-based self-esteem literature. *Journal of Management*, 30, 591–622.
- *Phillips, K. W., Mannix, E. A., Neale, M. A., & Gruenfeld, D. H. (2004). Diverse groups and information sharing: The effects of congruent ties. *Journal of Experimental Social Psychology*, 40(4), 497–510.
- Polanyi, M. (1966). *The tacit dimension*. London: Routledge Kegan Paul.
- Pulakos, E. D., Dorsey, D. W., & Borman, W. C. (2003). Hiring for knowledge-based competition. In S. E. Jackson, M. A. Hitt & A.S. Denisi (Eds.), *Managing knowledge for sustained competitive advantage: Designing strategies for effective human resource management* (pp. 155–176). San Francisco: Jossey-Bass.
- *Quigley, N. R., Tesluk, P. E., Locke, E. A., & Bartol, K. M. (2007). A multilevel investigation of the motivational mechanisms underlying knowledge sharing and performance. *Organization Science*, 18(1), 71–88.
- Quinn, R. E., & Rohrbaugh, J. (1981). A competing values approach to organizational effectiveness. *Public Productivity Review*, 5(2), 122–140.
- Raja, U., Johns, G., & Ntalianis, F. (2004). The impact of personality on psychological contracts. *Academy of Management Journal*, 47(3), 350–367.
- *Reagans, R., & McEvily, B. (2003). Network structure and knowledge transfer: The effects of cohesion and range. *Administrative Science Quarterly*, 48(2), 240–267.
- *Renzl, B. (2008). Trust in management and knowledge sharing: The mediating effects of fear and knowledge documentation. *Omega*, 36(2), 206–220.
- Robinson, S. L. (1996). Trust and breach of the psychological contract. *Administrative Science Quarterly*, 41(4), 574–599.
- Rupp, D. E., & Cropanzano, R. (2002). The mediating effects of social exchange relationships in predicting workplace outcomes from multifoci organizational justice. *Organizational Behavior & Human Decision Processes*, 89(1), 925–946.
- *Ruppel, C. P., & Harrington, S. J. (2001). Sharing knowledge through intranets: A study of organizational culture and intranet implementation. *IEEE Transactions on Professional Communication*, 44(1), 37–52.
- *Ryu, S., Ho, S. H., & Han, I. (2003). Knowledge sharing behavior of physicians in hospitals. *Expert Systems with Applications*, 25(1), 113–122.
- *Sawng, Y. W., Kim, S. H., & Han, H. -S. (2006). R&D group characteristics and knowledge management activities: A comparison between ventures and large firms. *International Journal of Technology Management*, 35(1–4), 241–261.
- *Scheepers, P., & van den Berg, P. T. (2007). Social factors of work-environment creativity. *Journal of Business and Psychology*, 21(3), 407–428.
- Schneider, B. (1983). Interactional psychology and organizational behavior. In L. L. Cummings & B.M. Staw (Eds.), *Research in organizational behavior*, Vol. 5. (pp. 1–32). Greenwich, Connecticut: JAI Press Inc.
- Shoda, Y., & Mischel, W. (1993). Cognitive social approach to dispositional inferences: What if the perceiver is a cognitive social theorist? *Personality and Social Psychology Bulletin*, 19, 574–585.
- *Siemsen, E., Balasubramanian, S., & Roth, A. V. (2007). Incentives that induce task-related effort, helping, and knowledge sharing in workgroups. *Management Science*, 53(10), 1533–1550.
- *Sondergaard, S., Kerr, M., & Clegg, C. (2007). Sharing knowledge: Contextualising socio-technical thinking and practice. *The Learning Organization*, 14(5), 423–435.
- Spender, J. -C., & Grant, R. M. (1996). Knowledge and the firm: Overview. *Strategic Management Journal*, 17, 5–9.
- *Srivastava, A., Bartol, K. M., & Locke, E. A. (2006). Empowering leadership in management teams: Effects on knowledge sharing, efficacy, and performance. *Academy of Management Journal*, 49(6), 1239–1251.
- Stasser, G., & Titus, W. (1987). Effects of information load and percentage of shared information on the dissemination of unshared information during group discussion. *Journal of Personality and Social Psychology*, 53(1), 81–93.
- Stasser, G., & Titus, W. (2003). Hidden profile: A brief history. *Psychological Inquiry*, 14, 304–313.
- Stevens, L. (2000, October). Incentives for sharing. *Knowledge Management*, 54–60.
- Swan, J. (1999). Introduction. In H. Scarbrough & J. Swan (Eds.), *Case studies in knowledge management* (pp. 1–12). London: Institute of personnel and development.
- *Swart, J., & Kinnie, N. (2003). Sharing knowledge in knowledge-intensive firms. *Human Resource Management Journal*, 13(2), 60–75.
- Szulanski, G. (1996). Exploring internal stickiness: Impediments to the transfer of best practice within the firm. *Strategic Management Journal*, 17, 27–43.
- Szulanski, G. (2000). The process of knowledge transfer: A diachronic analysis of stickiness. *Organizational Behavior and Human Decision Processes*, 82, 9–27.

- Szulanski, G., Cappetta, R., & Jensen, R. J. (2004). When and how trustworthiness matters: Knowledge transfer and the moderating effect of causal ambiguity. *Organization Science*, 15, 600–613.
- *Tagliaventi, M. R., & Mattarelli, E. (2006). The role of networks of practice, value sharing, and operational proximity in knowledge flows between professional groups. *Human Relations*, 59(3), 291–319.
- *Taylor, E. Z. (2006). The effect of incentives on knowledge sharing in computer-mediated communication: An experimental investigation. *Journal of Information Systems*, 20(1), 103–116.
- *Taylor, W. A., & Wright, G. H. (2004). Organizational readiness for successful knowledge sharing: Challenges for public sector managers. *Information Resources Management Journal*, 17(2), 22–37.
- *Teo, T. S. H. (2005). Meeting the challenges of knowledge management at the Housing and Development Board. *Decision Support Systems*, 41(1), 147–159.
- Tett, R. P., & Burnett, D. D. (2003). A personality trait-based interactionist model of job performance. *Journal of Applied Psychology*, 88(3), 500–517.
- *Thomas-Hunt, M. C., Ogden, T. Y., & Neale, M. A. (2003). Who's really sharing? Effects of social and expert status on knowledge exchange within groups. *Management Science*, 49(4), 464–477.
- Tsoukas, H., & Vladimirou, E. F. I. (2001). What is organizational knowledge? *Journal of Management Studies*, 38, 973–993.
- *Voelpel, S. C., Dous, M., & Davenport, T. H. (2005). Five steps to creating a global knowledge-sharing system: Siemens' ShareNet. *Academy of Management Executive*, 19(2), 9–23.
- *Wang, C. -C. (2004). The influence of ethical and self-interest concerns on knowledge sharing intentions among managers: An empirical study. *International Journal of Management*, 21(3), 370–381.
- Wang, S., Noe, R. A., & Wang, Z. -M. (2005). *An exploratory examination of the determinants of knowledge sharing*. Dallas, TX: Society for Industrial/Organizational Psychology.
- *Wasko, M. M., & Faraj, S. (2000). "It is what one does": Why people participate and help others in electronic communities of practice. *The Journal of Strategic Information Systems*, 9(2–3), 155–173.
- *Wasko, M. M., & Faraj, S. (2005). Why should I share? Examining social capital and knowledge contribution in electronic networks of practice. *MIS Quarterly*, 29(1), 35–57.
- Weiss, H., & Adler, S. (1984). Personality and organizational behavior. In B. M. Staw & L.L. Cummings (Eds.), *Research in organizational behavior*, Vol. 6. (pp. 1–50). Greenwich, CT: JAI Press.
- *Weiss, L. (1999). Collection and connection: The anatomy of knowledge sharing in professional service firms. *Organization Development Journal*, 17(4), 61–77.
- *Willem, A., & Scarbrough, H. (2006). Social capital and political bias in knowledge sharing: An exploratory study. *Human Relations*, 59(10), 1343–1370.
- *Wu, W. -L., Hsu, B. -F., & Yeh, R. -S. (2007). Fostering the determinants of knowledge transfer: A team-level analysis. *Journal of Information Science*, 33(3), 326–339.
- *Yang, C., & Chen, L. -C. (2007). Can organizational knowledge capabilities affect knowledge sharing behavior? *Journal of Information Science*, 33(1), 95–109.
- *Yao, L. J., Kam, T. H. Y., & Chan, S. H. (2007). Knowledge sharing in Asian public administration sector: The case of Hong Kong. *Journal of Enterprise Information Management*, 20(1), 51–69.
- Zand, D. E. (1972). Trust and managerial problem solving. *Administrative Science Quarterly*, 17, 229–239.
- Zander, U., & Kogut, B. (1995). Knowledge and the speed of the transfer and imitation of organizational capabilities: An empirical test. *Organization Science*, 6(1), 76–92.