Association for Information Systems
AIS Electronic Library (AISeL)

2008

Can Social Exchange Theory Explain Individual Knowledge-Sharing Behavior? A Meta-Analysis

Ting-Peng Liang
National Sun Yat-Sen University, tpliang@facmail.nsysu.edu.tw

Chih-Chung Liu
National Sun Yat-Sen University, birdy.liu@gmail.com

Chia-Hsien Wu
National Sun Yat-Sen University, jasonwu.ch@gmail.com

Follow this and additional works at: http://aisel.aisnet.org/icis2008

Can Social Exchange Theory Explain Individual Knowledge-Sharing Behavior ? A Meta-Analysis

La théorie de l'échange social peut-elle expliquer le comportement de partage des connaissances individuelles? Une méta-analyse

Completed Research Paper

Ting-Peng Liang
Department of Information Management
National Sun Yat-sen University,
Kaohsiung, Taiwan
tpliang@facmail.nsysu.edu.tw

Chih-Chung Liu
Department of Information Management
National Sun Yat-sen University,
Kaohsiung, Taiwan
birdy.liu@gmail.com

Chia-Hsien Wu
Department of Information Management
National Sun Yat-sen University, Kaohsiung, Taiwan
jasonwu.ch@gmail.com

Abstract

Motivating people to contribute knowledge has become an important research topic and a major challenge for organizations. In order to promote knowledge-sharing, managers need to understand the mechanism that drives individuals to contribute their valuable knowledge. Several theories have been applied to study knowledge-sharing behavior. However, the research settings and findings are often inconsistent. In this study, we use the social exchange theory as our base to develop an extended model that includes IT support and organizational type as moderators. A meta-analysis on 29 reported studies was conducted to examine how different factors in the social exchange theory affect knowledge-sharing behavior. The findings confirm that the social exchange theory plays an important role underlying individuals' knowledge-sharing behavior. The results also demonstrate that social interaction and trust derived from the social exchange theory and moderated by IT contextual factors can predict individual's knowledge-sharing behavior.

Keywords: knowledge sharing, social exchange theory, meta research, knowledge management

Résumé

Motiver les individus à partager les connaissances est devenu un sujet de recherche important et un défi majeur pour les organisations. Plusieurs théories ont été mobilisées pour étudier le comportement de partage des connaissances. Toutefois, les cadres de recherche et les résultats sont souvent incohérents. Dans cette étude, nous examinons l'effet de différents facteurs issus de la théorie de l'échange social sur le partage des connaissances.

Introduction

In the Knowledge Economy, businesses view knowledge as a potential source of achieving competitive advantage (Cabrera et al., 2006). Knowledge management (KM) is a key factor that can help traditional businesses in sustaining their competitive advantage in dynamic environments (Kankanhalli et al., 2005). Furthermore, the rapid growth of network access and the development of Web 2.0 have facilitated a sharp increase in the number of virtual communities (VCs), such as open source software foundries, Wiki systems, and Weblogs (Chiu et al., 2006; Hsu et al., 2007; Hsu and Lin, 2008). The Internet enables knowledge exchange in various ways. More and more individuals are participating in VCs to acquire knowledge for resolving problems at work. Both traditional businesses and VCs rely on the valuable content that employees or members provide. Thus, organizations must promote knowledge sharing in order to enhance the knowledge base and to gain competitive advantages and knowledge sharing has been an increasingly important research topic in information systems.

As argued by Davenport and Prusak (1998), however, knowledge sharing is often unnatural because people think that their knowledge is valuable and important. Generally, people who possess great amounts of knowledge are unwilling to share it. A survey revealed that the biggest challenge organizations face with regard to KM is "changing people's behavior," particularly with regard to knowledge sharing (Ruggles, 1998). As a result, many papers have reported findings about factors that affect knowledge-sharing intention and behavior based on several theories such as the Theory of Reasoned Action (e.g., Lin, 2007) or the Social Exchange Theory. Among several theories, social exchange has been the most popular in explaining knowledge sharing; according to this theory, individuals share their knowledge because of their perception of the benefit that may result from such behavior. Hence, individuals in organizations that provide an environment to support a positive perception are more likely to contribute their knowledge.

An examination of previous studies, however, reveals that despite the use of the same theory, different studies tend to adopt different factors to fit the theory. Furthermore, most of them involve different IT supports and use different organizational contexts (such as VC versus real organizations). For example, Kankanhalli et al. (2005) examined the effect of employees' knowledge self-efficacy and enjoyment in helping others on employees' knowledge contribution to electronic knowledge repositories. Ye et al. (2006) focus on several social exchange factors such as reputation, reciprocity, knowledge self-efficacy, enjoyment in helping others, and commitment to explain knowledge contribution of VC members. King and Marks (2008) investigated the effect of organizational support on employees' contribution frequency in traditional companies with KM systems (KMS). Although all these three works explored knowledge-sharing behavior based on the social exchange perspective, different studies often reported inconsistent findings. Taking *trust* as an example, our survey indicates that nine studies showed significant positive influences on individuals' knowledge-sharing behavior; but five other studies did not agree with this finding. Similarly, other social factors, such as organizational support, commitment, and social interaction, showed inconsistent results in different studies. Therefore, the goal of this study is to develop an extended model that classifies major factors into three dimensions (individual cognition, interpersonal interaction, and organizational effort) to investigate whether these factors being adopted in previous studies can explain an individual's knowledge-sharing behavior. One potential reason that results in inconsistent findings is missing key variables. Therefore, we also examine the moderating effect of organizational type and IT support. These two factors are chosen because of their salient roles in previous studies. Our research questions are as follow:

1. What factors that are related to the social exchange aspect of knowledge sharing affect individuals' knowledge-sharing behavior?

2. Do contingent variables such as organizational type and IT support moderate the effect of these factors on knowledge sharing?

The next section will briefly explain the social exchange theory and knowledge sharing followed by an explanation of our proposed research model and the variables included in the model. Then, we will present the meta-research method used in this study and the sample chosen for this study. This is followed by the findings from our meta-analysis, and finally, the conclusion, limitations and potential implications for researchers and practitioners will be discussed.

Social Exchange Theory and Knowledge Sharing

The social exchange theory (Blau, 1964) is a commonly used theoretical base for investigating individual's knowledge-sharing behavior. According to this theory, individuals regulate their interactions with other individuals based on a self-interest analysis of the costs and benefits of such an interaction. People seek to maximize their benefits and minimize their costs when exchanging resources with others (Molm, 2001). These benefits need not be tangible since individuals may engage in an interaction with the expectation of reciprocity (Gouldner, 1960). In such exchanges, people help others with the general expectation of some future returns, such as gaining desired resources through social reciprocity. In order to maximize the resources gained, individuals may build social relationships with others by sharing their knowledge.

Davenport and Prusak (1998) have analyzed knowledge-sharing behavior and have outlined some of the perceived benefits that may regulate such behavior. These benefits include future reciprocity, status, job security, and promotional prospects. From this perspective, knowledge sharing will be positively affected when an individual expects to obtain some future benefits through reciprocation (Cabrera et al., 2005). Previous studies have reported factors related to the social exchange theory are successful in explaining knowledge-sharing behavior among individuals. They include personal cognition, interpersonal interaction, and organizational contexts. For example, Kankanhalli et al. (2005) believed that an individual's perceived benefit is one of the major factors that encourage employees to contribute knowledge to electronic knowledge repositories. According to Ma (2007), the amount of knowledge that people contribute to a VC depends on the level of satisfaction that they derive from being members of the community. Chiu et al. (2006) studied the effect of interpersonal factors such as social interaction, trust, and norm of reciprocity on knowledge sharing in VCs. Moreover, Kim and Lee (2006) have examined the organizational context for explaining knowledge sharing. Pai (2006) utilized the support of top management to examine the relationship between knowledge sharing and the use of IS/IT strategic planning. Further, Watson and Hewett (2006) studied the effect of increased knowledge contribution within an organization.

Although some studies have found that the social exchange theory can successfully explain the behavior of knowledge contributors, the existing research has certain drawbacks. More specifically, the constructs used in some previous studies were rather diverse and some provided contradictory results. In addition to the example of trust that we have addressed in introduction, the effect of organizational rewards on knowledge-sharing behavior is also inconsistent. Kim and Lee (2006) found that reward systems were significant variables that affected employee knowledge-sharing capabilities. Lin (2007), however, reported that organizational rewards did not have an effect on employees' willingness to share knowledge with their colleagues. As a result, these contradictory findings often cause problems in both theoretical interpretation and practical implementation.

In order to know what results are more likely to be correct and whether the social exchange theory can truly interpret individuals' knowledge-sharing behavior, this research proposes an extended social exchange model that includes factors in three dimensions, namely, individual cognition (perceived benefits and organizational commitment), interpersonal interaction (social interaction and trust), and organizational context (organizational support and reward systems). In addition, we adopted two moderating variables, IT support and organizational type, to examine whether their moderating effects exist. These factors and research hypotheses are explained as follows.

Individual Cognitions and Knowledge-sharing Behavior

The fundamental dimension in the social exchange theory is individual cognition, which may include perceived benefits and organizational commitment. Forsythe (2006) defined the term "perceived benefits" as "the individuals' subjective perception of gain from their behaviors." The social exchange theory (Blau, 1964) posits that individuals engage in social interaction based on the expectation that it will in some way lead to social rewards such as approval, status, and respect. This suggests that an individual can benefit from active participation in a social group. Davenport and Prusak (1995) stated that knowledge-sharing behavior may be motivated by perceived benefits. Some

people may expect that their contributions will help them build a good reputation and improve their status within their social group. Individuals expecting to receive some benefits in return may believe that it is worth making the contribution (Nahapiet and Ghoshal, 1998). Wasko and Faraj (2005) also argue that the possibility of improving one's reputation serves as an important motivational factor for offering useful advice to others in an organizational electronic network. In extra-organizational electronic networks, Lakhani and von Hippel (2003) found that individuals expect to gain status by answering frequently and intelligently.

Some people may choose to contribute their knowledge because they experience positive feelings of sociability (Wasko and Faraj, 2005). This positive feeling is a type of intrinsic reward, e.g., realizing one's complete personal and professional potential and feeling of pride when others use one's ideas (Cabrera et al., 2006). For example, Osherloh and Frey (2000) reported that intrinsic rewards are the most effective in facilitating the sharing of tacit knowledge. Thus, the expectation of personal benefits can motivate individuals to share their knowledge with the community (Constant et al., 1996). This leads to our first hypothesis.

H1a: Perceived benefit is positively associated with an individual's knowledge-sharing behavior.

Organizational commitment is defined by O'Reilly and Chatman (1986) as the level and type of psychological attachment an employee has with an organization. It refers to a positive attitude toward the organization (Meyer and Allen, 1997; Mowday et al., 1982) and to the quality of the relationship between the employee and the organization. Organizational commitment has been found to be related to many organizational behaviors including turnover, job satisfaction, sense of obligation, and helpfulness (Meyer et al., 1993; O'Reilly and Chatman, 1986).

Wasko and Faraj (2005) claim, on the basis of shared membership, that one's commitment to a collective refers to a sense of responsibility to help others within that collective. This may play an important role in encouraging an individual to share his or her knowledge. Results from prior research on the usage of KMS provide supportive evidence that organizational commitment is a strong determinant of individual engagement in knowledge sharing (van den Hooff and Ridder, 2004; Cabrera et al., 2006). In an electronic network, an individual's commitment served as an important motivational factor for providing more helpful responses to others (Wasko and Faraj, 2005). Therefore, organizational commitment is considered to be the second major factor and we posit the following hypothesis:

H1b: Organizational commitment is positively associated with an individual's knowledge-sharing behavior.

Interpersonal Interaction and Knowledge-sharing Behavior

According to the social exchange theory, exchange refers to the actions of individuals in dyadic relations (Homans, 1958; Blau, 1964; Emerson, 1962). Social interaction is also a channel for information and resource flows (Tsai and Ghoshal, 1998). The more exchange partners engage in social interactions, the greater is the intensity, frequency, and breadth of information exchanged (Larson, 1992). In addition to individual factors, therefore, interpersonal interaction is the second dimension. This study examines two popular interpersonal factors found in previous studies, namely, social interaction and trust. Social interaction represents the strength of the relationships, the amount of time spent, and the frequency of communication among members.

Hall (2003) stated that social interaction may lead to a series of exchanges between parties. Nahapiet and Ghoshal (1998) argued that "network ties (social interaction) influence both access to parties for combining and exchanging knowledge and anticipation of value through such exchange." Furthermore, social interaction provides the opportunity to combine and exchange knowledge. Recent studies have also found empirical support for the influence of social interaction on individual's knowledge sharing (e.g., Chiu et al., 2006). This results in the following hypothesis:

H1c: Social interaction is positively associated with an individual's knowledge-sharing behavior.

Trust refers to a set of specific beliefs primarily pertaining to the integrity, benevolence, and ability of another party (Chiu et al., 2006). In the social exchange theory, Blau (1964) states that trust is essential for the social exchange process. Trust creates and maintains exchange relationships, which in turn may lead to the sharing of good quality

knowledge. When trust exists between two parties, they are more willing to engage in cooperative interaction (Nahapiet and Ghoshal, 1998).

Interpersonal trust is important in teams and organizations for creating an atmosphere for knowledge sharing (Nonaka, 1994). An important characteristic of informal interactions that should be noted is that individuals' contributions are difficult to evaluate. Therefore, trust is particularly important in volitional behaviors such as knowledge sharing in a VC (Chiu et al., 2006). Hence, Hypothesis 1d is posited below.

H1d: Trust is positively associated with an individual's knowledge-sharing behavior.

Organizational Efforts on Knowledge Sharing

The third dimension that affects knowledge sharing is organizational efforts in promoting such activities. Two organizational factors are common in KM research: organizational support and reward systems. Organizational support refers to the general perception that an organization cares for the well-being of its employees and values their contributions (Eisenberger, Cummings, Armeli, and Lynch, 1997). The social exchange perspective assumes that the relationship between employees and their employer is built on the trade of effort and loyalty for benefits such as pay, support, and recognition (van Knippenberg, 2006). Therefore, organizational support, direct or indirect, is an essential factor in the theory. Supervisor and coworker support is a subjective measure of the degree of encouragement provided to and experienced by an employee in sharing solutions for work-related problems through the openness of communication, opportunity for face-to-face and electronic meetings to share knowledge, and so on. Therefore, our fifth hypothesis is as follows.

H1e: Organizational support is positively associated with an individual's knowledge-sharing behavior.

In addition to organizational support, reward systems that provide members incentives to shape their behavior (Cabrera and Bonache, 1999) or improve their performance in learning (Pham and Swierczek, 2006) are also essential. Organizational rewards can range from monetary incentives such as increased salary and bonuses to nonmonetary rewards such as advanced promotions and other tangible rewards (Davenport and Prusak, 1998; Hargadon, 1998). Organizational rewards are typically performance-based and can improve employee motivation (Lee and Kim, 2001). In some cases, organizations may also frame their reward policies on the basis of employees' conduct (Pham and Swierczek, 2006).

Hall (2001) explored the theme of incentives for knowledge sharing and classified rewards into explicit/hard rewards and soft rewards. In most existing studies, the explicit/hard rewards that organizations provide to motivate employees to share knowledge are more popular. These include enhanced pay, stock options, bonuses, promotion, and guarantee of future contracts. This leads to the hypothesis below.

H1f: Reward systems are positively associated with an individual's knowledge-sharing behavior.

Roles of IT Context and Organizational Type

A potential problem in previous research is that the effect of different factors may vary in different contexts. For instance, computer-facilitated knowledge sharing may be different from that shared without computer facilitation and knowledge sharing in a real organization may differ from that in a VC. In order to be more precise and to resolve inconsistent findings when investigating knowledge-sharing behavior, we choose to add two popular contingent factors: IT platform and organizational type. Previous studies have reported that different types of organizations and technologies may be used for knowledge management. For example, Alavi (2000) stated that two models of information systems have been identified to support KM: repository model and network model. The repository model corresponds to the codification approach to KM (Hansen et al., 1999). Most of the KM systems implemented by traditional organizations follow this model. The network model corresponds to the personalization approach to KM (Hansen et al., 1999). An important technological component of this approach is the electronic forum software that enables people to interact within VCs (Brown and Duguid, 1991).

Thus, we explore whether the IT context could also account for the moderating effect of social exchange factors in knowledge sharing. The hypotheses for IT facilitation are as follows.

H2a: Using IT-based KMS moderates the relationship between an individual's perceived benefits and his or her knowledge-sharing behavior.

H2b: Using IT-based KMS moderates the relationship between an individual's organizational commitment and his or her knowledge-sharing behavior.

H2c: Using IT-based KMS moderates the relationship between an individual's social interaction and his or her knowledge-sharing behavior.

H2d: Using IT-based KMS moderates the relationship between an individual's trust in the organization and his or her knowledge-sharing behavior.

H2e: Using IT-based KMS moderates the relationship between organizational support provided and an individual's knowledge-sharing behavior.

H2f: Using IT-based KMS moderates the relationship between reward systems and an individual's knowledge-sharing behavior.

Organizational type is another moderator due to conflicting findings in previous studies. For example, Cabrera et al. (2006) confirmed that extrinsic rewards induce employees to share knowledge in an IT multinational company with KMS. However, Lin (2007) found that organizational rewards do not motivate employees to share knowledge in service industries. Similarly, motivation and commitment are lower in public sector organizations (Behn, 1995; Moon, 2000), which may not be the ideal environment for knowledge sharing. Kim and Lee (2006) separated organizations into four dimensions and found that organizations in different dimensions have different degrees of employee knowledge-sharing capabilities. Previous studies that explored knowledge sharing in VC and non-VC produced some mixed results. For example, Wasko and Faraj (2005) confirmed that reputation—a kind of social benefit—is a perceived value derived from knowledge sharing in VCs. However, Burgess (2005) found that perceived social benefit does not motivate employees to share knowledge in a packaged consumer goods organization. Hsu et al. (2007) argued that trust is more important in VCs than in traditional organizations because members of VCs voluntarily contribute their knowledge, without receiving monetary rewards. Knowledge exchange in VCs seems to be a kind of social exchange behavior. However, Chiu et al. (2006) argued that outcome expectation, a kind of social exchange factor, is insufficient for knowledge sharing in the VC context. These contradictory reports indicate that organizational type is a factor that we cannot ignore in investigating knowledge sharing behavior. Therefore, we proposed the following hypotheses:

H3a: Organizational type moderates the relationship between an individual's perceived benefits and their knowledge-sharing behavior.

H3b: Organizational type moderates the relationship between an individual's organizational commitment and their knowledge-sharing behavior.

H3c: Organizational type moderates the relationship between an individual's social interaction and their knowledge- sharing behavior.

H3d: Organizational type moderates the relationship between an individual's trust in the organization and their knowledge-sharing behavior.

H3e: Organizational type moderates the relationship between organizational support provided and an individual's knowledge-sharing behavior.

H3f: Organizational type moderates the relationship between organizational reward systems and an individual's knowledge-sharing behavior.

Figure 1 shows our research model and hypotheses. Since only the difference between VC and real organizations has enough samples for our meta-analysis, the operationalization of organizational type is VC versus real organization in this study.
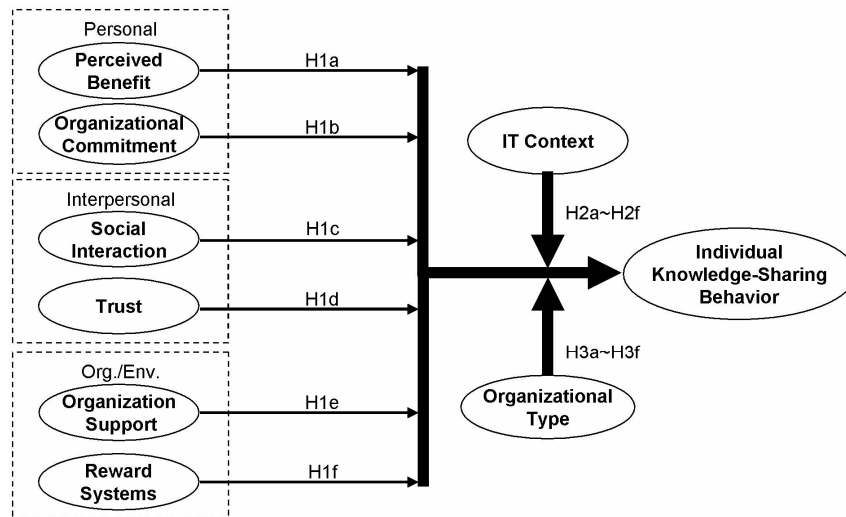
Figure 1. Research model

Research Methodology

The method adopted in this research is meta-analysis, which refers to a set of procedures for accumulating and analyzing descriptive statistics reported by individual studies (Alavi and Joachimsthaler, 1992). It is a technique that enables researchers to collect findings from multiple previous studies in order to draw valid conclusions and explain variability in findings across multiple studies. The meta-analysis techniques employed in this study are similar to those employed in existing IS literature (e.g., Alavi and Joachimsthaler, 1992; Dennis et al., 2001; Kohli and Devaraj, 2003; Sharma and Yetton, 2003, 2007; Sabherwal et al., 2006).

We followed the procedure of meta-analysis suggested in Sabherwal et al. (2006), which includes data collection (identifying the individual studies to be included in the analysis), variable measurement (coding individual studies), and data analysis (accumulating the findings reported by individual studies).

Data Collection

The sample for this meta-analysis consists of empirical studies reported in scholarly/peer-reviewed journals and conference proceedings but omits unpublished dissertations and working papers. Following Hunter and Schmidt (1990, 2004) and Sharma and Yetton (2007), studies were located through multiple literature searches, including bibliographic databases such as ABI/INFORM, Science Direct, and EBSCOhost. The databases were searched using multiple keywords such as knowledge sharing, contribution, distribution and information sharing, and distribution. All keywords were searched on titles, author's keywords, or abstracts of papers. The initial search produced 493 papers.

Studies were selected for inclusion in the meta-analysis only if they satisfied the following three criteria. First, they had to be empirical and had to report the correlation between knowledge-sharing behavior and the independent variables. Second, they were required to provide adequate descriptions of the sharing environment and/or IT tools used and/or the type of organizations (VC or not). Third, in case the same study was reported in multiple papers, only one of them was selected to avoid overweighting. This resulted in the selection of over 54 studies published between 1994 and January 2008. The most common reasons for excluding a study were lack of adequate empirical data for meta-analysis.

Papers published in peer-reviewed conference proceedings were included in order to alleviate the potential problem of meta-analysis that the method typically favors studies with statistically significant results over studies with

insignificant results (Cooper and Hedges, 1994). The conference proceedings included in the study were ICIS, AMCIS, PACIS, HICSS, and ECIS. The search process yielded 20 conference papers.

Since different studies often adopt different variables or define the same variable differently, the resulting papers were further screened by two criteria: (1) whether the study is on the individual level behavior, and (2) whether variables are defined in a comparable way. After carefully reading and coding the selected papers, 28 articles remained for our final meta-analysis. Among them, 23 were journal articles and 5 were conference papers. One of the journal articles included two separate data sets that are considered two different studies for the purpose of meta-analysis. Therefore, the total sample size for our study was 29. Table 1 shows the studies included in the meta-analysis and their characteristics.

Table 1. Studies used in the meta-analysis

Author(s)	Journal or Conference	Tools of Knowledge Sharing	Category by IT Support	Category by VC or non-VC
Bakker et al. (2006)	Journal	(No mention of the use of KMS or online sharing in the article)	Non-IT	Non-VC
Burgess (2005)	Journal	(No mention of the use of KMS or online sharing in the article)	Non-IT	Non-VC
Cabrera et al. (2006)	Journal	KMS in an IT multinational company	Using IT	Non-VC
Chen and Barnes (2006)	Journal	(No mention of the use of KMS or online sharing in the article)	Non-IT	Non-VC
Chiu et al. (2006)	Journal	BlueShop (an IT-oriented VC)	Using IT	VC
Ferrin and Dirks (2003)	Journal	Group Problem-solving software	Using IT	Non-VC
Hsu et al. (2007)	Journal	Discussion forum of Yahoo! Groups and professional associations	Using IT	VC
Jacobs and Roodt (2007)	Journal	(No mention of the use of KMS or online sharing in the article)	Non-IT	Non-VC
Kim and Lee (2006)	Journal	KMS in selected organizations	Using IT	Non-VC
King and Marks (2008)	Journal	KMS in a large US federal agency	Using IT	Non-VC
Lee (2001)	Journal	(No mention of the use of KMS or online sharing in the article)	Non-IT	Non-VC
Lee and Kim (2001)	Conference	Enterprise-wide KMS	Using IT	Non-VC
Liao (2006)	Journal	(No mention of the use of KMS or online sharing in the article)	Non-IT	Non-VC
Lin(2007)	Journal	(No mention of the use of KMS or online sharing in the article)	Non-IT	Non-VC
Lu et al. (2006)	Journal	IT (organizational databases, e-mail and online chat-rooms, Web page or bulletin board systems, electronic document management systems, and specialized KM software)	Using IT	Non-VC
Ma et al. (2007) study 1	Journal	Online community (Quitnet.com)	Using IT	VC
Ma et al. (2007) study 2	Journal	Online community (IS300.net)	Using IT	VC
Nor et al. (2003)	Conference	C2C tourism website	Using IT	VC
Pappas and Flaherty (2007)	Journal	(No mention of the use of KMS or online sharing in the article)	Non-IT	Non-VC
Pham and Swierczek (2006)	Journal	(No mention of the use of KMS or online sharing in the article)	Non-IT	Non-VC
Renzl (2008)	Journal	(No mention of the use of KMS or online sharing in the article)	Non-IT	Non-VC
van den Hooff and Ridder (2004)	Journal	CMC use	Using IT	Non-VC
Wasko and Faraj (2005)	Journal	A Web-based system in a national legal professional association in USA	Using IT	VC
Watson and Hewett (2006)	Journal	Four proprietary knowledge repositories	Using IT	Non-VC
Willem and Buelens (2007)	Journal	(No mention of the use of KMS or online sharing in the article)	Non-IT	Non-VC
Wu et al. (2006)	Conference	Cyber University (asynchronous network learning system)	Using IT	VC
Yuan et al. (2007)	Conference	Coordination technology(software configuration management, project status, notification services, project scheduling and tasking, CASE and process management, programming tools, bug and change tracking, team memory and knowledge center)	Using IT	Non-VC
Zheng and Kim (2007)	Conference	cyworld.com (VC)	Using IT	VC

Variable Measurements and Coding

Independent and dependent variables were properly coded to fit our research constructs. Two researchers coded each paper independently. Any inconsistency in coding was discussed and reviewed by the third researcher. First, key

concepts of each study were identified. Similar concepts were then grouped into a construct. The coding of each variable is explained below.

Perceived Benefit

The first independent variable, perceived benefit, was defined as "the individuals' subjective perception of gain from their behaviors" (Forsythe, 2006). McMillen (1999) categorized perceived benefit as one's self-perceptions (e.g., enjoyment and playfulness), relationships with others (e.g., reputation), and life structure or philosophy. Some benefits, such as outcome expectations, knowledge collection and acquisition, information need, and perceived usefulness, are employed as indicators of perceived benefit. These constructs include individual motivations, such as intrinsic rewards, satisfaction, reputation, and organizational influence. Negative factors (e.g., perceived risk and fear of losing value) were also used in our sample but inversely coded their correlations.

Organizational Commitment

Organizational commitment was defined by most researchers as employees' attitude toward their job and attachment to and involvement in the organization. Commitment represents a duty or obligation to engage in future action and arises from frequent interaction (Coleman, 1990). Van Knippenberg (2006) identified three types of commitments: (1) continuance commitment from necessity, (2) normative commitment from obligation, and (3) affective organizational commitment from emotional attachment and involvement. In this study, data on individuals' commitment to an organization, team, or other persons was put under this construct.

Social Interaction

Social interaction represents the strength of the relationships, the amount of time spent, and the frequency of communication among members (Chiu et al., 2006). The measurement includes mutual understanding, influence, communication, and reciprocity with each other. It also includes individual's social skill, connection and network.

Trust

Trust is defined as "the willingness of a party to be vulnerable to the actions of another party based on the expectation that the other party will perform a particular action important to the trustor, irrespective of the ability to monitor or control that other party." (Mayer, Davis, and Schoorman, 1995). McAllister (1995) classified two types of trust: (1) cognition-based trust: a rational evaluation of an individual's ability to carry out obligations; (2) affect-based trust: an emotional attachment that stems from mutual care and concern that exist between individuals. The measurements of individuals' trust in their organizations, teams, or other persons were included in this construct.

Organizational Support

Organizational support was defined as a global belief concerning the extent to which an organization values employee contributions and cares about their well-being (Eisenberger et al., 1986). Organizational support describes the quality of the employee–organization relationship as indexed by an employee's perception of commitment and support from top management, supervisors, and coworkers, either directly or indirectly (Kulkarni, 2006). Lu et al. (2006) identified two major aspects of organizational support. First, the organizational context provides opportunities for employees to interact with each other and individuals have different degrees and nature of interpersonal relationships. Second, organizations have the authority to take steps to achieve specific goals as well as to provide resources to support or inhibit certain employee actions. Therefore, we included both types of formal support (e.g. train) and informal sanction, and help from top management, supervisors, and coworkers.

Reward Systems

Reward systems are incentives that the organization provides to its members for shaping their behavior (Cabrera and Bonache, 1999) or improving their performance (Lee and Kim, 2001). Organizational rewards are typically based on performance measurement so that organizations can improve employee motivation (Lee and Kim, 2001). Some

firms' reward policies are also based on processes and behaviors and not only outcomes (Pham and Swierczek, 2006). Organizational rewards found in sample studies ranging from monetary incentives, such as increased salary and bonuses, to nonmonetary awards, such as promotions, advancement, and other tangible rewards (Davenport and Prusak, 1998; Hargadon, 1998). In our study, we focus on the extrinsic rewards that organizations provide to motivate employees or members to share knowledge. The constructs include rewards, incentives, promotion, and advancement, but exclude "intrinsic rewards."

Knowledge-sharing Behavior

Knowledge-sharing behavior was defined as the degree to which one actually shares one's knowledge with other persons, groups, or organizations. In previous studies, researchers used various variables to measure knowledge-sharing behavior, such as frequency, quantity, time spent on knowledge sharing (King and Marks, 2008; Chiu et al., 2006; Burgess, 2005; Wasko and Faraj, 2005). Some other research focused on different receivers, such as external customers (Chen and Barnes, 2006) and team members (Renzl, 2008) or individuals sharing task-relevant ideas, information, and suggestions with each other (Ferrin and Dirks, 2003). We also include knowledge sharing as the process in which individuals mutually exchange implicit and explicit knowledge (van den Hooff et al., 2003; Yuan et al., 2007).

Moderating Variables

Regarding the two moderating variables, we classified the sample by whether a particular study adopted an IT-based tool for IT facilitation and whether the organization was a real one or a VC (such as blogs or online community). The last two columns in Table 1 show the category of the sample.

To ensure consistency in coding, we designed a coding sheet and formulated coding rules (e.g., preference for multi-item measures over single-item measures). Initially, two researchers coded the selected papers independently. The researcher identified variables in their research model, contexts, and the relevant statistics (including correlations, reliabilities, and sample sizes) and the research context (IT support and organization type). The coding results were then compared and disagreements were resolved through discussion. A total of 117 usable relationships were identified and coded from the 29 studies for testing the six pairwise relationships in our research model.

Table 2. Descriptive statistics

Pairwise Relationship	No. of Studies (k)	Variance	Range of Correlations		Range of Sample Sizes		Cumulative Sample Size	Average Sample Size
			Lower	Upper	Lower	Upper		
OC–KSB	9	0.0116	0.11	0.506	118	530	2660	295
PB–KSB	29	0.0388	0.03	0.620	112	530	9392	323
SI–KSB	22	0.0494	–0.01	0.652	112	500	6275	285
TR–KSB	26	0.0364	0.04	0.600	91	430	5734	220
OS–KSB	16	0.0203	0.002	0.433	165	430	3881	242
RS–KSB	15	0.0366	0.10	0.625	112	480	4217	281

OC: Organizational commitment; PB: Perceived benefits; SI: Social interaction; TR: Trust;

OS: Organizational support; RS: Reward systems; KSB: Knowledge-sharing Behavior

The descriptive statistics of the sample are shown in Table 2. As we can see, some relationships have been studied more extensively than others. For example, the number of instances that investigates the relationships between perceived benefits (PB) and knowledge-sharing behavior (KSB) and between trust (TR) and KSB is 29 and 26, respectively, while the number of instances that investigates the relationship between organizational commitment and KSB is only 9. The range of correlation coefficients also varies substantially. For example, the correlation between social interaction (SI) and KSB varied from –0.01 to 0.652. The sample sizes of the selected studies vary from 91 to 530.

Results

Correlation Analysis

We followed the guidelines of Hunter et al. (1982) in making statements on the overall significance of each pairwise relationship. First, the sample size-adjusted correlation was calculated. Then, the mean was corrected for attenuation, since the effect of the measurement error could attenuate the correlation coefficient. In other words, the error of measurement could systematically lower the correlation between variables -- the true population effect size. In most studies, coefficient alpha is used as an estimator for the measurement reliability of variables—a practice also adopted in our study.

The statistical significance of the correlations was deduced by the combined Z scores for each construct. Further, we test the significance of our findings. The fail-safe N statistic was calculated for every pairwise relationship to provide the number of insignificant correlations (studies) that would have to be included in the sample to reverse the conclusion that a significant relationship exists. According to Rosenthal's (1991) suggestion, the significant threshold of fail-safe N in the 95% confidential level is $Nfs > 5 * k + 10$, where Nfs is the fail-safe N and k is the total number of studies in each pairwise relationship.

The results shown in Table 3 indicate that all combined Z scores are significant ($p < 0.001$). However, the pairwise relationships between organization support and knowledge-sharing behavior do not clear the file-drawer test at the 0.05 level, since fail-safe N (59.61) is less than the threshold (90). All other pairwise relationships cleared the test and were good enough to conclude the significant results across studies. In other words, our findings in Table 3 support hypotheses H1a~H1f with the exception of H1e. On the basis of an aggregation of 29 studies, five factors were found to have a significant effect on KSB. The only inconclusive factor is organizational support.

Table 3. Correlation analysis

Hypotheses and Pairwise Relationship	True Population Effect Size (r)	Combined Z Scores	Fail-safe N (p=0.05)	Threshold of Fail-safe N in 0.05	Hypothesis Supported
H1a: OC–KSB	0.372	19.916***	58.02*	55	Yes
H1b: PB–KSB	0.377	37.947***	189.69*	155	Yes
H1c: SI–KSB	0.326	26.569***	121.54*	120	Yes
H1d: TR–KSB	0.353	27.639***	157.68*	140	Yes
H1e: OS–KSB	0.236	14.928***	59.61	90	No
H1f: RS–KSB	0.414	28.152***	109.20*	85	Yes

*: $p < 0.05$; **: $p < 0.01$; ***: $p < 0.001$

Moderating Analysis

In order to investigate the effect of two moderators, homogeneity estimates (Q) for each relationship were calculated based on the Hedges and Olkin (1985) procedure. This gives an indication of the possible moderating effects. Q value, which is based on Fisher's Z scores, is compared to a critical value, which is $\chi 2$ for $\alpha = 0.05$ and $k – 1$ degrees of freedom (k being the number of studies). If Q value exceeds the critical value, the hypothesis of the homogeneity of study effects is rejected and the heterogeneity of study effects suggests the presence of moderating variables.

The result shows that all six pairwise relationships fail the homogeneity test ($p < 0.001$). That is, moderators exist. We further divide the sample into different groups (as shown in the categories in Table 1) to separately test the effect of independent variables. The effect of IT support was examined by the difference between two groups: using IT (k = 17) and no-IT (k = 11). Similarly, the moderating effect of organizational type was observed by comparing the difference between VC and non-VC.

We applied three indices in testing the significance of moderators. The moderating effect exists if the results in two groups differ. The average residual variance of groups was required to be less than the one in the combined samples (Hunter et al., 1982; Bausch and Krist, 2007). As a final step, we calculated *t*-statistics to test for significance of differences in effect sizes (Dennis et al., 2001). The moderating effect is concluded if two or more of the three tests support the existence of such an effect.

The result of the three indices for every pairwise relationship between the two groups is shown in Table 4. For the using IT group, three pairwise relationships (organizational commitment, social interaction, and trust) cleared the test, but the other three (perceived benefits, organizational support, and reward systems) did not. Therefore, we conclude that Hypotheses H2a, H2c, and H2d are supported, but H2b, H2e, and H2f are not. In other words, using IT or not can moderate the effect of organizational commitment, social interaction, and trust on KSB.

Table 4. Result of IT facilitation as a moderator

Hypotheses and Pairwise Relationship	# of Instances	True Effect Size (r)	Significant Difference	Difference of Residual Variance	p Value of *t*-test ([+]: p < 0.1)	Hypothesis Supported
H2a: (Non-IT)	3	0.424	Yes	0.002615	0.0665[+]	Yes
OC–KSB (IT)	6	0.317	Yes			
H2b: (Non-IT)	9	0.379	Yes	–0.00166	0.4855	No
PB–KSB (IT)	20	0.376	Yes			
H2c: (Non-IT)	8	0.248	No	0.00381	0.0550[+]	Yes
SI–KSB (IT)	14	0.393	Yes			
H2d: (Non-IT)	7	0.358	No	0.00262	0.4660	Yes
TR–KSB (IT)	19	0.351	Yes			
H2e: (Non-IT)	6	0.224	No	0.001735	0.4545	No
OS–KSB (IT)	10	0.232	No			
H2f: (Non-IT)	7	0.379	Yes	0.00152	0.2573	No
RS–KSB (IT)	8	0.442	Yes			

Table 5. Result of VCs as a moderator

Hypotheses and Pairwise Relationship	# of Instance	True Effect Size (r)	Significant Difference	Difference of Residual Variance	p Value of *t*-test ([+]: p < 0.1)	Hypothesis Supported
H3a: (Non-VC)	8	0.387	Yes	0.00839	---	(Lack of Data)
OC–KSB (VC)	1	0.129	No			
H3b: (Non-VC)	14	0.347	Yes	0.000825	0.188	No
PB–KSB (VC)	15	0.410	Yes			
H3c: (Non-VC)	14	0.306	No	0.004155	0.2988	Yes
SI–KSB (VC)	8	0.357	Yes			
H3d: (Non-VC)	17	0.319	No	0.00144	0.1614	Yes
TR–KSB (VC)	9	0.393	Yes			
H3e: (Non-VC)	14	0.236	No	---	---	(Lack of Data)
OS–KSB (VC)	0	----	---			
H3f: (Non-VC)	15	0.414	Yes	---	---	(Lack of Data)
RS–KSB (VC)	0	----	---			

With regard to the second moderator, the total sample was divided into two groups: VC (k = 7) and non-VC (k = 21). Table 5 shows the result that indicates hypotheses H3c and H3d are supported. It seemed that social interaction and trust were keys in VCs.

Due to the nature of VCs that usually do not have a strong organizational support and rewards for knowledge sharing, no studies have explored the impact of organizational support and reward systems on knowledge-sharing

behavior in VCs. Only one case has investigated the effect of organizational commitment in VC. Therefore, we cannot conclude for these three variables.

Discussion and Conclusion

In this paper, we have conducted a meta-analysis on 29 published studies to examine social exchange factors and their effect on individuals' knowledge sharing behavior. The results indicate that most constructs, except organizational support, in the social exchange theory have a significant effect on individuals' knowledge-sharing behavior. This confirms the role of social exchange as a key theory in interpreting employee behavior in knowledge sharing. An interesting observation is that the correlation between organizational support and individuals' knowledge-sharing behavior is not as significant as many would believe. One possible explanation is that the effect may be diluted by the heterogeneity of different organizational support including formal support (e.g., training) and informal sanction and help from top management, supervisors, and coworkers. While some types of organizational support may have an effect on knowledge-sharing behavior, others may not. Another possibility is that task accomplishments often take priority over knowledge sharing; hence, management support may affect employee attitude but its effect may not be strong enough to change behavior (Lu et al., 2006). Although we did not find significance for organizational support, we cannot conclude that organizational support does not have any effect on knowledge-sharing behavior. Its impact requires further examination.

Other interesting observation is the moderating role of using IT and organizational type, which has not been reported in previous studies. IT moderation shows three significant factors—organizational commitment, social interaction, and trust—while organizational type moderation shows that social interaction and trust have a significant effect. These results provide some evidence that the IT context plays a moderating role in interpersonal factors underlying knowledge contribution. The potential reason for this is the absence of direct communication so that inter-individual relationships may play an important role (Sharma and Yetton, 2007). The effect of VC versus real organization is understandable because social interaction patterns and mutual trust could be very different between them.

Implications for Research

This paper develops an extended social exchange model to interpret factors that affect individuals' knowledge-sharing behavior. We believe that our findings are important and have interesting implications for future research.

First, this study confirms that knowledge sharing is a social exchange behavior. We have identified three facets of social exchange motivators and investigated their effects on knowledge sharing: personal cognition, relationships among members, and organizational effort. We have also included two contingent contextual factors in knowledge sharing research. This extended model is the most extensive so far and provides a new framework for future research.

Second, we have shown that contingent factors such as IT support and organizational type do moderate the knowledge-sharing behavior. This suggests that contextual variables need to be considered more seriously in future research. Social exchange factors can contribute to knowledge sharing to some extent, but IT support leads to a greater level of knowledge-sharing behavior. The impacts of social interaction and trust appear to be moderated by contextual factors (both VC and using IT). This result suggests that future research should take a closer look at how IT facilitation may affect knowledge contributors' behavior.

Third, this study shows that there is a dearth of published research focusing on some important social exchange factors for knowledge sharing in VCs, such as reward systems. Although reward systems have been the focus of organizational behavior and human resource management research for a long time, we do not have adequate data to understand its role in knowledge contribution in a VC environment. As the number of organizations offering monetary incentives increases, it would be interesting to determine whether VCs can draw direct benefits from such incentives.

Implications for Practice

The findings of this study can also help the practitioners. First, our results confirmed that knowledge sharing is a type of social exchange behavior. Knowledge sharing is a time-consuming task that leaves employees less time to

pursue their own work (Burgess, 2005). Therefore, management should provide adequate incentive programs to motivate knowledge contributors to share their knowledge. These programs can focus on extrinsic rewards, such as better work assignment, promotion incentive, salary incentive, bonus incentive, or job security.

Second, the management may design a mechanism to enhance the social relationship of employees before launching the KM system. Our study shows that interpersonal interaction, social interaction and trust are more effective for encouraging knowledge sharing in organizations with IT support than those without IT facilitation. However, less knowledge is shared by knowledge workers in the KMS if social relationships in the organization are weak. Thus, encouraging employees to create and maintain their social relationships is important for knowledge sharing.

Third, VC managers should foster social interaction and create a trust environment for their members. Our results indicated that interpersonal interaction is a significant predictor of individuals' knowledge sharing in VCs. VC managers can enhance knowledge contribution by developing strategies or mechanisms to foster member interaction and trust.

Limitations and Future Research

The above conclusions are subject to a number of limitations, which also indicate opportunities for future research. First, this study examined only social exchange factors related to knowledge sharing. To focus on the perspective of social exchange, we did not use the dominant factors of other aspects as independent variables, such as personality trait (Cabrera et al., 2006; Hsu and Lin, 2008), social identity (Chiu et al., 2006; Ma et al., 2007), social capital (Kankanhalli et al., 2005; Lin, 2007), and IT usage (Cabrera et al., 2006; Lu et al., 2006). Because of the nature of meta research and limitations of existing data, a comprehensive study to include all potential factors is not feasible at this point. Future research may examine the effects of those factors not included in this study. There are also other theories that can be used to explain knowledge sharing behaviors but not examined in this study. Future research can also examine other theories such as the Theory of Reasoned Action.

Second, we have proven the existence of moderators and investigated two moderators. Other factors, such as culture (Griffith et al., 2006), knowledge type (Lu et al., 2006), and performance-related competition (Wang, 2004), may also worth investigation. It would be beneficial to conduct additional basic research and subsequent meta-analyses to find their roles in the social exchange theory.

The operationalization of certain constructs such as organizational type is also a difficult issue. In our study, we differentiate between VC and real organization. There are certainly other kind of classification (e.g., differentiate by industries) that could result in different conclusions. The IT support has similar problems. We compare at two levels -- using or not using IT to facilitate knowledge sharing, without considering the functions of different knowledge management systems. Whether different IT functions can result in different knowledge sharing behavior is an issue that needs further study.

Finally, the findings of the study may also be limited by the coding procedure utilized. A meta-research is targeted at drawing together previous research and correcting for sampling error in single studies (Hunter and Schmidt, 1990). Since different studies may define constructs differently, the aggregation process may lead to misclassification of relationships and hence result in wrong conclusion. For example, communication frequency and quality could be coded into two different constructs or a single one. Different coding certainly could lead to different results. Although we have taken all possible precautions to ensure proper coding, inherent limitations of the meta-analysis method always exist.

References

Alavi, M. and Joachimsthaler, E. A. "Revisiting DSS Implementation Research: A Meta-Analysis of the Literature and Suggestions for Researchers," MIS Quarterly (16:1) 1992, pp. 95-116.

Alavi, M. "Managing Organizational Knowledge," in Framing the Domains of IT Management: Projecting the Future through the Past, R. W. Zmud (Ed.), Pinnaflex Education Resources, Cincinnati, OH, 2000, pp. 15-28.

Bausch, A., and Krist, M. "The effect of context-related moderators on the internationalization-performance relationship: Evidence from meta-analysis," Management International Review (47:3) 2007, pp. 319-347.

Behn, R.D. "The big questions of public management, " Public Administration Review (55:4) 1995, pp. 313–524.

Blau, P. Exchange and Power in Social Life Wiley, New York, 1964.

Brown, J. S., and Duguid, P. "Organizational learning and communities-of-practice: Toward a unified view of working, learning, and innovation, " Organization Science (2:1) 1991, pp.40–57.

Burgess, D. "What motivates employees to transfer knowledge outside their work unit?," The Journal of Business Communication (42:4) 2005, pp. 324-348.

Cabrera, A., Collins, W.C., and Salgado, J.F. "Determinants of individual engagement in knowledge sharing," The International Journal of Human Resource Management (17:2) 2006, pp. 245-264.

Cabrera, E.F., and Bonache, J. "An Expert HR system for Aligning Organizational Culture and Strategy," Human Resource Planning (22:1) 1999, pp. 51-60.

Cabrera, E.F., and Cabrera, A. "Fostering Knowledge Sharing Through People Management Practices," International Journal of Human Resource Management (16:5) 2005, pp. 270-735.

Chiu, C.M., Hsu, M.H., and Wang, E.T.G. "Understanding Knowledge Sharing in Virtual Communities: An Integration of Social Capital and Social Cognitive Theories," Decision Support Systems (42:3) 2006, pp. 1872-1888.

Constant, D., Kiesler, S., and Sproull, L. "What's mine is ours, or is it? A study of attitudes about information sharing," Information Systems Research (5:4) 1994, pp. 400-421.

Cooper, H. , and Hedges, L.V. The Handbook of Research Synthesis, Russell Sage Foundation, New York, 1994.

Davenport, T.H., and Prusak, L. Working knowledge: how organisations manage what they know Harvard Business School Press, Boston, MA, 1998.

Dennis, A.R., Wixom, B.H., and Vandenberg, R.J. "Understanding Fit and Appropriation Effects in Group Support Systems Via Meta-Analysis," MIS Quarterly (25:2) 2001, pp. 167-194.

Eisenberger, R., Cummings, J., Armeli, S., and Lynch, P. "Perceived organizational support, discretionary treatment, and job satisfaction," Journal of Applied Psychology (82:5) 1997, pp. 812-820.

Eisenberger, R., Huntington, R., Hutchison, S., and Sowa, D. "Perceived organizational support," Journal of Applied Psychology (71:3) 1986, pp. 500-507.

Emerson, R. "Power-Dependence Relations," American Sociological Review (27:1) 1962, pp. 31-41.

Forsythe, S., Liu, C., Shannon, D., and Gardner, L.C. "Development of a scale to measure the perceived benefits and risks of online shopping," Journal of Interactive Marketing (2:2) 2006, pp. 55-75.

Gouldner, A.W. "The Norm of Reciprocity: A Preliminary Statement," American Sociological Review (25:2) 1960, pp. 161-178.

Griffith D.A., Myers, M.B., and Harvey, M.G. "An Investigation of National Culture's Influence on Relationship and Knowledge Resources in Interorganizational Relationships Between Japan and the United States," Journal of International Marketing (14:3) 2006, pp.1-32

Hall, H. "Input-friendliness: motivating knowledge sharing across intranets," Journal of Information Science (27:3) 2001, pp. 139-146.

Hall, H. "Borrowed Theory: Applying Exchange Theories in Information Science Research," Library & Information Science Research (25:3) 2003, pp. 287-306.

Hansen, M. T., Nohria, N., and Tierney, T. "What's Your Strategy for Managing Knowledge?, " Harvard Business Review (77:2), 1999, pp. 106-116.

Hargadon, A.B. "Firms as knowledge brokers: lessons in pursuing continuous innovation," California Management Review (40:3) 1998, pp. 209-227.

Hedges, L.V., and Olkin, I. Statistical Methods for Meta Analysis Academic Press, Orlando, FL, 1985.

Homans, G.C. "Social Behavior as Exchange," American Journal of Sociology (63:6) 1958, pp. 597-606.

Hsu, C.L., and Lin, J.C. "Acceptance of blog usage: The roles of technology acceptance, social influence and knowledge sharing motivation," Information & Management (45:1) 2008, pp. 65-74.

Hsu, M.H., Ju, T.L., Yen, C.H., and Chang, C.M. "Knowledge Sharing Behavior in Virtual Communities: The Relationship between Trust, Self-Efficacy, and Outcome Expectations," Int. J. Human-Computer Studies (65:2) 2007, pp. 153-169.

Hunter, J.E., F.L. Schmidt, and G.B. Jackson, Meta-Analysis: Cumulating Research Findings Across Studies, Sage Publications, Beverly Hills, CF, 1982.

Hunter, J.E., and Schmidt, F.L. Methods of Meta-Analysis: Correcting error and bias in research findings Sage Publications, Newbury Park, CA, 1990.

Hunter, J.E., and Schmidt, F.L. Methods of Meta-Analysis: Correcting error and bias in research findings (2nd edn) Sage Publications, Newbury Park, CA, 2004.

Kankanhalli, A., Tan, B.C.Y., and Wei, K.K. "Contributing knowledge to electronic knowledge repositories: an empirical investigation," MIS Quarterly (29:1) 2005, pp. 113-143.

Kim, S., and Lee, H. "The impact of organizational context and information technology on employee knowledge-sharing capabilities," Public Administration Review (66:3) 2006, pp. 370-385.

Kohli, R. and Devaraj, S. "Measuring information technology payoff: a meta-analysis of structural variables in firm-level empirical research," Information Systems Research (14:2) 2003, pp.127-145.

Kulkarni, U.R., Ravindran, S., and Freeze, R. "A Knowledge Management Success Model: Theoretical Development and Empirical Validation," Journal of Management Information Systems (23:3) 2006, pp. 309-347.

Lakhani, K.R., and von Hippel, E. "How Open Source Software Works: Free User-to-User Assistance," Research Policy (32:6) 2003, pp. 923-943.

Larson, A. "Network Dyads in Entrepreneurial Settings: A Study of the Governance of Exchange Relationships," Organization Science (37:1) 1992, pp. 76-104.

Lee, J.H., Kim, Y.G., and Kim, M.Y. "Effects of managerial drivers and climate maturity on knowledge-management performance: empirical validation," Information Resources Management Journal (19:3) 2006, pp. 48-60.

Lin, C.P. "To Share or Not to Share: Modeling Tacit Knowledge Sharing, Its Mediators and Antecedents," Journal of business ethics (70:4) 2007, pp. 411-428.

Lin, H.F. "Effects of extrinsic and intrinsic motivation on employee knowledge sharing intentions," Journal of Information Science (33:2) 2007, pp. 135-149.

Lu, L., Leung, Kwok and Koch, Pamela Tremain "Managerial Knowledge Sharing: The Role of Individual, Interpersonal, and Organizational Factors," Management and Organization Review (2:1) 2006, pp. 149-153.

Ma, M., and Agarwal, R. "Through a Glass Darkly: Information Technology Design, Identity Verification, and Knowledge Contribution in Online Communities," InformationSystems Research (18:1) 2007, pp. 42 - 67.

Mayer, R.C., Davis, J.H., and Schoorman, F.D. "An Integrative Model of Organizational Trust," The Academy of Management Review (20:3) 1995, pp. 709-734.

McAllister, D.J. "Affect- and Cognition-Based Trust as Foundations for Interpersonal Cooperation in Organizations," The Academy of Management Journal (38:1) 1995, pp. 24-59.

McMillen, J.C. "Better for it: How people benefit from adversity," Social Work (44:5) 1999, pp. 455–468.

Meyer, J.P., and Allen, N.J. Commitment in the workplace: Theory, research, and application Sage Publications, Thousand Oaks, CA, 1997.

Meyer, J.P., Allen, N.J., and Smith, C.A. "Commitment to organizations and occupations: Extension and test of a three-component conceptualization," Journal of Applied Psychology (78:4) 1993, pp. 538-551.

Molm, L.D. Theories of social exchange and exchange networks G. Ritzer and B. Smart, Sage, London, 2001, pp. 260-272.

Moon, M. J. "Organizational commitment revisited in new public management: Motivation, organizational culture, sector, and managerial level, " Public Performance & Management Review (24:2) 2000, pp. 177-194.

Mowday, R.T., Porter, L.W., and Steers, R. Organizational linkages: The psychology of commitment, absenteeism, and turnover Academic Press, San Diego, CA, 1982.

Nahapiet, J., and Ghoshal, S. "Social Capital, Intellectual Capital, and the Organizational Advantage," The Academy of Management Review (23:2) 1998, pp. 242-266.

Nonaka, I. "A dynamic theory of organizational knowledge creation," Organization Science (5:1) 1994, pp. 14-37.

O'Reilly, C.A., III, and Chatman, J. "Organizational commitment and psychological attachment: the effects of compliance, identification, and internalization on prosocial behavior," Journal of Applied Psychology (71:3) 1986, pp. 492-499.

Osterloh, M., and Frey, B.S. "Motivation, Knowledge transfer and organisational forms," Organisation science (11:5) 2000, pp. 583-550.

Pai, J.C. "An empirical study of the relationship between knowledge sharing and IS/IT strategic planning (ISSP)," Management Decision (44:1) 2006, pp. 105-116.

Pham, N.T., and Swierczek, F.W. "Facilitators of organizational learning in design," The Learning. Organization (13:2) 2006, pp. 186-201.

Rosenthal, R. Meta Analytic Procedures for Social Research Sage Publications, Newbury Park, CA, 1991.

Ruggles, R. "The state of the notion: knowledge management in practice," California Management Review (40:3) 1998, pp. 80-89.

Sabherwal, R., Jeyaraj, A., and Chowa, C. "Information System Success: Individual and Organizational Determinants," Management Science (52:12) 2006, pp. 1849-1864.

Sharma, R. and Yetton, P. "The Contingent Effects of Management Support and Task Interdependence on Successful Information Systems Implementation," MIS Quarterly (27:4) 2003, pp. 533-555.

Sharma, R., and Yetton, P. "The Contingent Effects of Training, Technical Complexity and Task Interdependence on Successful Information Systems Implementation," MIS Quarterly (31:2) 2007, pp. 219-238.

Tsai, W., and Ghoshal, S. "Social Capital and Value Creation: The Role of Intrafirm Network," Academy of Management Journal (41:4) 1998, pp. 464-476.

van den Hooff, B., and Ridder, J.A.d. "Knowledge sharing in context: the influence of organizational commitment, communication climate and CMC use on knowledge sharing," Journal of Knowledge Management (8:16) 2004, pp. 117-130.

van Knippenberg, D., and Sleebos, E. "Organizational identification versus organizational commitment: Self-definition, social exchange, and job attitudes," Journal of Organizational Behavior (27:5) 2006, pp. 571-584.

Wang, C.C. "The Influence of Ethical and Self-interest Concerns on Knowledge Sharing Intentions among Managers: An Empirical Study," International Journal of Management (21:3) 2004, pp.370-381.

Wasko, M.M., and Faraj, S. "Why Should I Share? Examining Social Capital and Knowledge Contribution in Electronic Networks of Practice," MIS Quarterly (29:1) 2005, pp. 35-57.

Watson, S., and Hewett, K. "A Multi-Theoretical Model of Knowledge Transfer in Organizations: Determinants of Knowledge Contribution and Knowledge Reuse," Journal of Management Studies (43:2) 2006, pp. 141-173.

Ye, S., Chen, H., and Jin, X., (2006) "Exploring the Moderating Effects of Commitment and Perceived Value of Knowledge in Explaining Knowledge Contribution in Virtual Communities," Proceedings of the Tenth Asia Pacific Conference on Information Systems (PACIS 2006), Kuala Lumpur, Malaysia, 2006.

Appendix A - Data from Studies Included in the Meta-Analysis

Bakker, M., Leenders, R.T.A.J., Gabbay, S.M., Kratzer, J., and Van Engelen, J.M.L. "Is trust really social capital? Knowledge sharing in product development projects," Learning Organization (13:6) 2006, pp. 594-605.

Burgess, D. "What motivates employees to transfer knowledge outside their work unit?," The Journal of Business Communication (42:4) 2005, pp. 324-348.

Cabrera, A., Collins, W.C., and Salgado, J.F. "Determinants of individual engagement in knowledge sharing," The International Journal of Human Resource Management (17:2) 2006, pp. 245-264.

Chen, L.Y., and Barnes, F.B. "Leadership Behaviors and Knowledge Sharing in Professional Service Firms Engaged in Strategic Alliances," Journal of Applied Management and Entrepreneurship (11:2) 2006, pp. 51-69.

Chiu, C.M., Hsu, M.H., and Wang, E.T.G. "Understanding knowledge sharing in virtual communities: An integration of social capital and social cognitive theories.," Decision Support Systems (42:3) 2006, pp. 1872-1888.

Ferrin, D.L., and Dirks, K.T. "The Use of Rewards to Increase and Decrease Trust: Mediating Processes and Differential Effects," Organization Science (14:1) 2003, pp. 18-31.

Hsu, M.H., Ju, T.L., Yen, C.H., and Chang, C.M. "Knowledge sharing behavior in virtual communities: The relationship between trust, self-efficacy, and outcome expectations," International Journal of Human-Computer Studies (65:2) 2007, pp. 153-169.

Jacobs, E., and Roodt, G. "The development of a knowledge sharing construct to predict turnover intentions," Aslib Proceedings (59:3) 2007, pp. 229-248.

Kim, S., and Lee, H. "The Impact of Organizational Context and Information Technology on Employee Knowledge-Sharing Capabilities," Public Administration Review (66:3) 2006, pp. 370-385.

King, W.R., and Marks Jr., P.V. "Motivating knowledge sharing through a knowledge management system," Omega (36:1) 2008, pp. 131-146.

Lee, J.H., and Kim, Y.G. "Effects of Managerial Drivers and Climate Maturity on Knowledge Management Performance: Empirical Validation," Proceedings of the Fifth Asia Pacific Conference on Information Systems (PACIS 2001), Seoul, Korea, 2001, pp. 1097-1111.

Lee, J.N. "The impact of knowledge sharing, organizational capability and partnership quality on IS outsourcing success," Information & Management (38:5) 2001, pp. 323-335.

Liao, L.F. "A learning organization perspective on knowledge-sharing behavior and firm innovation," Human Systems Management (25:4) 2006, pp. 227-236.

Lin, H.F. "Knowledge sharing and firm innovation capability: an empirical study," International Journal of Manpower (28:3/4) 2007, pp. 315-332.

Lu, L., Leung, K., and Koch, P.T. "Managerial Knowledge Sharing: The Role of Individual, Interpersonal, and Organizational Factors," Management and Organization Review (2:1) 2006, pp. 15-41.

Ma, M., and Agarwal, R. "Through a Glass Darkly: Information Technology Design, Identity Verification, and Knowledge Contribution in Online Communities," Information Systems Research (18:1) 2007, pp. 42-67.

Noor, N.L.M., Hashim, M., Haron, H., and Ariffin, S. "Community acceptance of knowledge sharing system in the travel and tourism websites: an application of an an extension of TAM," Proceedings of the Thirteenth European Conference on Information Systems (ECIS 2005), Regensburg, Germany, 2005.

Pham, N.T., and Swierczek, F.W. "Facilitators of organizational learning in design," Learning Organization (13:2) 2006, pp. 186-201.

Quigley, N.R., Tesluk, P.E., Locke, E.A., and Bartol, K.M. "A Multilevel Investigation of the Motivational Mechanisms Underlying Knowledge Sharing and Performance," Organization Science (18:1) 2007, pp. 71-88.

Renzl, B. "Trust in management and knowledge sharing: The mediating effects of fear and knowledge documentation," Omega (36:2) 2008, pp. 206-220.

van den Hooff, B., and Ridder, J.A.d. "Knowledge sharing in context: the influence of organizational commitment, communication climate and CMC use on knowledge sharing," Journal of Knowledge Management (8:6) 2004, pp. 117-130.

Wasko, M.M., and Faraj, S. "Why should I share? Examining social capital and knowledge contribution in electronic networks of practice," MIS Quarterly (29:1) 2005, pp. 35-57.

Watson, S., and Hewett, K. "A Multi-Theoretical Model of Knowledge Transfer in Organizations: Determinants of Knowledge Contribution and Knowledge Reuse," Journal of Management Studies (43:2) 2006, pp. 141-173.

Willem, A., and Buelens, M. "Knowledge Sharing in Public Sector Organizations: The Effect of Organizational Characteristics on Interdepartmental Knowledge Sharing," Journal of Public Administration Research and Theory (17) 2007, pp. 581-606.

Wu, S., Lin, C.S., and Lin, T.C. "Exploring Knowledge Sharing in Virtual Teams: A Social Exchange Theory Perspective," Proceedings of the 39th Annual Hawaii International Conference (HICSS 2006), Kauai, Hawaii, USA, 2006.

Yuan, M., Vogel, D., Zhang, X., Chen, Z., and Chu, X. "Antecedents of Coordination Effectiveness of Software Developer Dyads from Interacting Teams: An Empirical Investigation," Proceedings of the Eleventh Asia Pacific Conference on Information Systems (PACIS 2007), Auckland, New Zealand, 2007.

Zheng, J.R., and Kim, H.W. "Investigating Knowledge Contribution from the Online Identity Perspective," Proceedings of the Twenty Eighth International Conference on Information Systems (ICIS 2007), Montreal, Quebec, Canada, 2007.