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Research-in-Progress

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Abstract

This study represents research-in-progress that investigates the factors motivating employee choice of information and communication channels for sharing knowledge. A pilot study was conducted to determine what channels are available, what channels employees actually use, and why they employ those channels. Participants responded to an online questionnaire. Preliminary results show that employees have a wide variety of channels available. Face-to-face, telephone, and e-mail are commonly used for knowledge sharing while Web 2.0 technologies remain underutilized. Channel choice appears to be influenced by the type of knowledge to be shared, among other things. Based on the results and extant literature on practice-based research and cross-boundary knowledge sharing, a model is developed to guide our future research.

Keywords: Knowledge sharing, communication, information, channels, choice

Introduction

Knowledge management is, "a systematically and organizationally specified process for acquiring, organizing, and communicating both tacit and explicit knowledge of employees so that other employees may make use of it to be more effective and productive in their work" (Alavi & Leidner, 1999, p. 6). The purpose of knowledge management is to help organizations avoid situations in which an employee struggles with a problem while another employee knows the solution. Specifically, organizations use knowledge management to harness ideas, knowledge, and solutions so that the information can be archived and retrieved.

According to Jennex (2007), knowledge management has emerged as an important topic because of the confluence of four trends. First, organizations discovered that they lost knowledge as a result of the business process reengineering "fad of the early 1990s" (p. 7). Second, a number of technology trends arose during the late 1990s: personal computers increased in speed and memory, the Internet grew in popularity and the Y2K problem caused many organizations to purchase new computers capable of handling large amounts of data. Third, the explosion in data, information and knowledge, along with its accessibility caused management to lose control of these valuable resources. Finally, the move to a service-based economy created an environment in which skills and capabilities became a competitive advantage, and retaining that information became an important element of many companies' strategies.

In addition, the benefits of knowledge management are becoming more widely accepted. E-Marketer (2001) reported on a KPMG survey of 423 executives from European and U.S. organizations that found that, among other expected benefits, approximately three-quarter of the respondents believed that knowledge management helped their organization maintain a customer focus (72%), provided benefits in marketing (75%), and provided a competitive advantage (79%). Moreover, a 2000 survey of U.S. and European companies found that increased collaboration and productivity were the two most often cited goals of knowledge management initiatives (E-Marketer, 2001).

To realize these benefits and accomplish these goals, organizations typically use one of two strategies in their knowledge management initiatives: codification and personalization. Regardless of the strategy, Bosua and Scheepers (2007) argued that information and communication technologies, "are an essential element of the contemporary organizational landscape, with the potential to support codification and personalization strategies of organizational knowledge" (p. 94). Ribiére and Tuggle (2007) described the codification strategy to knowledge management as using a people-to-documents approach. The codification approach uses information technologies to capture, codify, and store employee knowledge. The information technologies create knowledge repositories where one employee can add specific knowledge and another can easily access the information. This approach makes the knowledge independent of the knower and makes it available to anyone in the organization at any time for many purposes. The personalization approach, by contrast, "focuses on developing networks for linking people so that tacit knowledge can be shared" (Ribiére & Tuggle, 2007, p. 101). This approach attempts to connect individuals and develop networks of relationships in which employees share knowledge that the organization cannot codify.

In order to facilitate the personalization strategy, a wide array of information and communication technologies (ICT) are available for use. These choices range from traditional technologies, such as telephone and e-mail, to more contemporary technologies, such as wikis and blogs. When employees have tacit or explicit knowledge to share, there are several avenues for doing so. With each new technology come claims that the technology can improve knowledge sharing and enhance efficiency. For instance, Thielst (2007) proclaimed that private blogs serve as an excellent tool to enhance internal communication efforts and share information on anything from facility-related issues to performance improvement initiatives. Welsh (2007) recently discussed the benefits her organization has experienced through the use of internal wikis for documenting procedures and training employees.

Knowledge sharing: What makes employees more likely to share?

Knowledge sharing represents an individual's willingness to share knowledge acquired or created with others in the organization (Bock, Lee, Zmud, & Kim, 2005). Knowledge sharing in organizations is a complex process affected by individual, organizational, cultural, and technical factors (Ipe, 2003). Moreover, Bosua and Scheepers (2007) argued that, "knowledge sharing in complex environments is complicated not only by the tacit nature of the knowledge itself, but also by the characteristics of these environments, typified by issues such as time pressure, mobility of the work force, shift work, constraining organizational structures, evolving role definitions, and the loss

of experienced workers" (p. 94). In fact, some (e.g., Bock & Kim, 2002; Davenport, 1997) have argued that knowledge sharing is unnatural, and that people's natural tendency is to hoard knowledge and be suspicious of knowledge from others. Hence, along with the proliferation of knowledge management research has been a burgeoning body of literature on knowledge sharing behaviors.

Some knowledge sharing research has focused on factors promoting or inhibiting knowledge sharing in organizations. For example, Bock and Kim (2002) conducted a survey of 467 employees from four large, public organizations in Korea using the theories of self-efficacy, social exchange, and reasoned action. Interestingly, they found that extrinsic rewards increase knowledge sharing behavior, but have little to no impact on employees' attitudes about knowledge sharing. In fact, expected rewards discouraged employees from forming positive attitudes about knowledge sharing. Ostensibly, this was because experienced workers felt as though knowledge sharing was a normative behavior and should not have been rewarded. Moreover, in a replication and extension of these results, Bock, Lee, Zmud, and Kim (2005) found that not only did extrinsic rewards inhibit the development of positive attitudes toward knowledge sharing, but that the development of positive attitudes was driven by anticipated reciprocal relationships. In other words, employees felt better about knowledge sharing when they believed that others were openly and willingly sharing knowledge with them.

Many researchers have also acknowledged the influence of culture on knowledge sharing behaviors. For example, a recent study exploring cultural factors that influence knowledge sharing among Russian, Chinese, and Brazilian workers in virtual communities of practice, found that a high degree of competitiveness inhibited knowledge sharing in China, but not in Russia and Brazil. Organizational culture is also an important consideration in knowledge sharing. For instance, although reciprocity has generally been considered a strong indicator of willingness to share knowledge, Kankanhalli, Tan, and Wei (2005) found that reciprocity was not as important when the organization has strong pro-sharing norms in addition to norms for collaboration and cooperation. Bock et al. (2005) concluded that an organizational climate characterized by fairness, innovativeness, and affiliation is conducive to knowledge sharing through its influence on the development of subjective norms about knowledge sharing. In addition to the previously mentioned cultural indicators, a culture that emphasizes shared goals also promotes knowledge sharing (Chow & Chan, 2008).

Trust is another indicator that researchers purport to influence knowledge sharing. Results from these studies however are mixed. For example, Chow and Chan (2008) found that among 190 managers in Hong Kong, social trust did not affect their attitudes toward knowledge sharing. Mooradian, Renzl, and Matzler (2006) found that those people with a greater propensity to trust others tended to exhibit greater trust in both peers and management. However, only those employees with great trust in their peers were more willing to share knowledge within and across teams.

What information and communication technologies do employees use?

The research discussed above has done a great deal to provide researchers with a better understanding of knowledge management and knowledge sharing. It has also given practitioners some necessary tools to develop and implement knowledge management initiatives. However, there appears to be a gap in the literature. Although researchers and practitioners understand the benefits of, and implementation strategies for, knowledge management initiatives, the factors contributing to positive attitudes and knowledge sharing behaviors, the research does not tell us what information and communication technologies (ICT) employees actually use for sharing knowledge and why.

If employee participation in knowledge management initiatives is important, then we need to understand what technologies employees actually choose when sharing information. In practice, employees have a wide array of information and communication technologies from which to choose, but they may not make rational choices when determining what ICTs to use for sharing knowledge. Orlikowski's (1992) research has confirmed the notion that technologies are not deterministic, but rather that employee selection and use of technologies emerge from situated practices. Hence, the existence of a wiki does not ensure its use for knowledge sharing.

Not only is it important for us to understand what technologies employees actually use, but what motivates the selection of one technology over another. In other words, what conditions lead one to use the phone instead of a wiki to share knowledge? Carlile (2002) described knowledge as, "*localized, embedded,* and *invested* in practice" (p. 442). These characteristics make sharing knowledge across organizational boundaries especially difficult and, depending on the situation, may lead to under- or overuse of ICTs for sharing (or withholding) information.

The present study is a preliminary attempt at searching for answers to the important questions we have raised here. We seek to understand the decisions employees make in using technologies for knowledge sharing. We ask the following questions:

1. To what information and communication technologies do employees have access for sharing knowledge?
2. What information and communication technologies do employees use when sharing knowledge?
3. What factors influence the choice of information and communication technologies when sharing knowledge?

Initial Study

Procedure and Participants

We used a pilot study to gather data from employees concerning their use of information and communication technologies for knowledge sharing at work. We analyzed this data with the hope of understanding the delineating factors that might influence the choice of communication technologies in knowledge sharing. An online survey was used. Undergraduate business students in Management Information Systems and Managerial Communications courses were offered extra course credit to recruit participants for the study. The participants had to be at least 18 years of age, employed, but not self-employed.

A total of 104 responses were obtained over the course of three weeks. After reviewing and cleaning the data, only 76 responses were deemed valid. The distribution of male and female respondents was 41 and 35, respectively. A variety of ethnic backgrounds including Caucasian (N = 60), Black (N = 5), Asian/Asian-American (N = 7) were represented. The respondents come from organizations of varying sizes with 31 reporting that their companies had fewer than 100 employees, and another18 respondents indicating that their companies employed more than 20,000 people. While 35 participants reported their age to be between 18-29, there were 16 participants aged 30-39, 15 who reported being between 40-49, and 10 who were 50-59 years old.

Technology availability and use

The questionnaire asked participants to identify the means available at work for sharing knowledge. They were given the following options: face-to-face, electronic mail, blogs, wikis, instant messaging, shared virtual workspaces, telephone, video/web conferencing, intranets, discussion forums, and voice over IP. The participants could also manually report any additional means for knowledge sharing available to them. In addition, we asked participants to identify which of the means of knowledge sharing they actually use at work.

Situational use of technology

Participants were asked to identify the means utilized for sharing knowledge in a variety of different situations. We asked them to identify the technologies used to share information about each of the following: general organizational information, sensitive organizational information, general project information, sensitive project information, and information about which they are an expert (see Table 1). We did not define for the participants what we meant by general and sensitive information since those concepts vary by individual.

The data in these tables indicate that participants use a greater variety of tools when sharing information with a project team than with the entire organization. Moreover, participants reported that they rely more heavily on face-to-face communication when they share sensitive information, regardless of the audience. Finally, Web 2.0 technologies are underutilized by our sample.

Qualitative data

In addition to asking participants to identify the technologies they use in different circumstances, we also asked them to tell us why they choose the information and communication channels that they use for each of the situations (see Table 2 for summary of qualitative data).

Participants indicated that when sharing general organizational information, they choose channels primarily based on the channel's ease of use, how fast the channel transmitted the message, convenience, synchronicity, number of participants, and the channel's ability to keep records. When asked to justify channel choice for sensitive organizational information, participants indicated that face-to-face communication is preferred because face-to-face: provides fewer opportunities for "miscommunication," provides the opportunity to see participants' nonverbal responses, and allows one to direct information to specific targets. Some participants indicated that they choose face-to-face because company policies prohibit many other forms of communication. Additionally, some participants indicate that company policy requires that they send sensitive information through encrypted e-mail.

When asked why they choose the information and communication channels they do for sending general project information to team members, participants indicated that ease of use, reliability, convenience, and the ability of the channel to document communications were all factors. Participants told us that they clearly prefer face-to-face and electronic mail to share sensitive project information. Moreover, their channel choices are be driven by concerns about channel security and privacy.

Table 1. Channel Choice When Sharing Knowledge		
Sharing Organizational Knowledge		
	General Information	Sensitive Information
Face-to-Face	63	69
Email	74	32
Phone	41	29
Instant Messaging	22	3
Sharing Project Knowledge		
Face-to-Face	65	69
Email	71	40
Phone	50	27
Instant Messaging	20	8
Virtual Workspaces	18	6
Video Conferencing	17	3

Table 2. Summary of Qualitative Data About Sharing Information	
Common Reasons for Channel Choice When Sharing General Organizational Information	
Reason	**Typical Response**
Ease of Use	"Easy to use"
Speed of Communication	"Fastest way to communicate"
Convenience	"Readily available"
Synchronicity	"I select these technologies because I can reach multiple people at once without having to interrupt their schedules to share the knowledge"
Number of Participants	"These communication channels have the largest audience base"
Record-Keeping Ability	"The company intranet site is used as a central source of information; and works best for global information for all employees. If the information changes as a result of updates, corrections or policy changes, there is one place to make the change"

| Common Reasons for Channel Choice When Sharing Sensitive Organizational Information	
Avoid Miscommunication	"Want to make sure there is no miscommunication"
Ability to Provide Personal Touch	"Face to face because it is the most personal and I can respond immediately with true compassion if need be"
Ability to Direct Information to Specific Targets	"I use these technologies because I want to be sure that the sensitive information is viewed or given only to the coworkers that I choose"
Security	"Secure communications when used properly"
Common Reasons for Channel Choice When Sharing General Project Information	
Ease of Use	"I find it easier"
Reliability	"You are able to have a round table and make sure that all ideas are recorded accurately"
Convenience	"They are available"
Record-Keeping Ability	"Easy to retrieve questions and answers, good for documentation purpose"
Common Reasons for Channel Choice When Sharing Sensitive Project Information	
Security and Privacy	"Can control security and access on a user basis"

Model Development

This project represents the first step of a research program in progress; the ultimate goal of which is to develop an understanding of the factors influencing information and communication channel selection for sharing knowledge in organizations. We are in the process of gathering descriptive information that will help us understand what channels people use. We plan to utilize that descriptive information in combination with the extant literature on practice-based research and cross-boundary knowledge sharing to create and test a model that can be used to help organizations develop wise information and communication technology implementation strategies. Literature on practice-based research and cross-boundary knowledge sharing provides important insights into how employees interact to complete coordinated work when they must work across, "structural, cultural, and political boundaries" (Kellogg, Orlikowski, & Yates, 2006). In addition to the data derived from the present study, these perspectives provide a framework for understanding ICT use in knowledge sharing and add depth to our proposed model by introducing the coordination difficulties that arise at key boundaries (Carlile, 2004). Based on these sources of information, we developed our initial model in Figure 1 that we will discuss in detail below.

Environmental factors and key boundaries

In addition to information type, channel capabilities, and audience considerations, which are discussed below, there are a number of environmental factors that likely influence channel choice for information sharing. The extant literature indicates that organizational culture is important to information sharing. As discussed above, cultures that have norms for collaboration and cooperation (Kankanhalli, Tan, & Wei, 2005), and are characterized by fairness, innovativeness, and affiliation (Bock et al., 2005) are conducive to knowledge sharing.

However, we are interested in finding out what environmental factors drive channel choice once the employee has made the decision to share information. For example, Fulk, Steinfeld, Schmitz, and Power's (1987) social influence model suggests that an employee's use of a particular communication channel is influenced by what important others say about the channel and whether or not the important others use that channel. Participants in the present study confirm that the environment, and in particular embedded organizational practices, drives channel choice. One participant stated that she made her channel choices because, "they are the three most common ways we communicate in the office." If people in one's office use e-mail, then it is wise to use e-mail. Moreover, practice-based research on knowledge sharing across boundaries views coordination as an emergent process (Carlile, 2002;

Levina & Vaast, 2005). From this perspective, one can argue that it is through specific, embedded organizational knowledge sharing practices that employees come to adopt ICTs for boundary-spanning purposes.

Figure 1. A Preliminary Model of Channel Choice in Organizational Knowledge Sharing
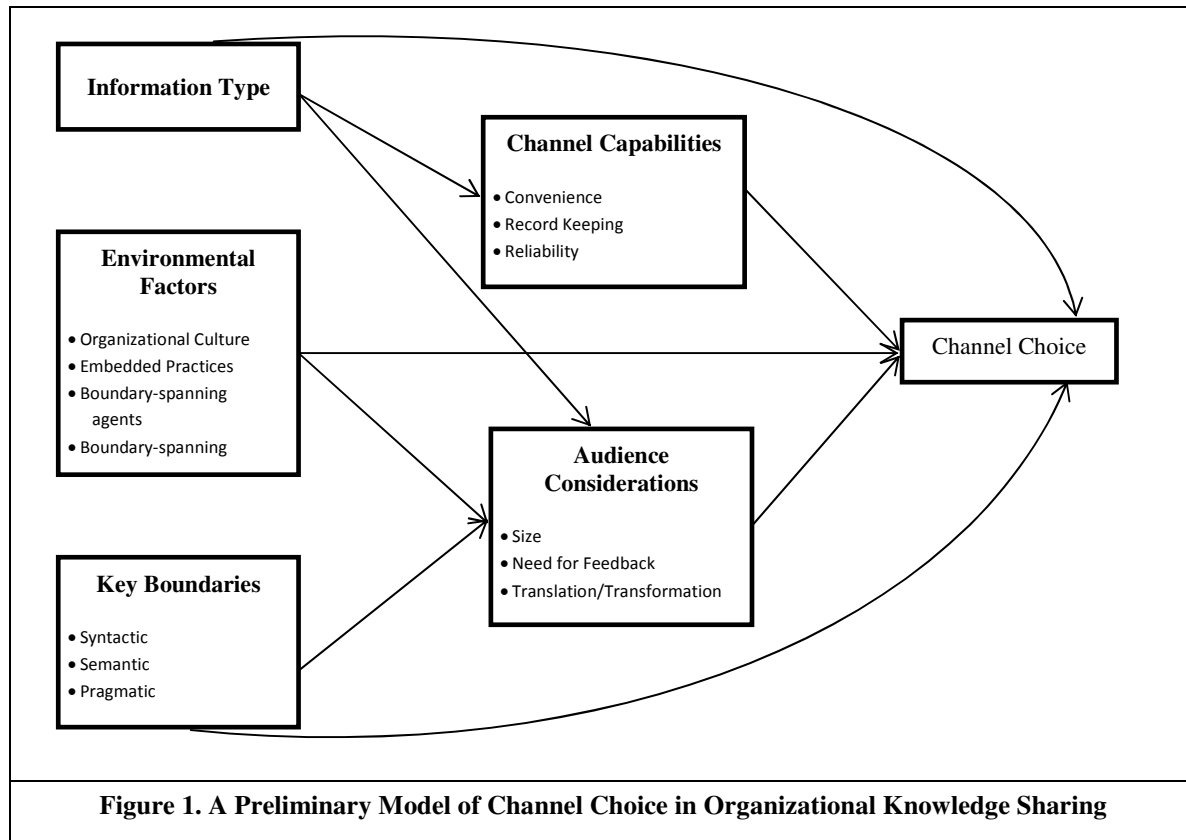
Organizational policies and legal requirements, the degree to which organizations foster competence in boundary-spanning, and the practices of key boundary-spanning agents represent additional environmental factors that may influence channel choice. Policies and requirements may not only directly influence channel choice, but also indirectly influence choice through its affect on channel capabilities. In other words, some information may need to be communicated through channels that capture a record of the interaction. A competitive corporate culture may also influence channel selection practices when sharing knowledge across boundaries. In these environments, people may choose less public channels and share information with only a limited number of others. In fact, a study of a web-based knowledge management system conducted by Bansler and Havn (2003) concluded that one reason why the system ultimately failed was that people only shared information within their personal networks and were, therefore, reluctant to use the system. Spanning boundaries can be risky because spanners risk being marginal players in multiple fields rather than a key player in any field (Levina & Vaast, 2005). To the degree that localized knowledge is valued, employees will not develop competence in boundary spanning. Moreover, the practices of key boundary-spanning agents will influence others involved in sharing knowledge across boundaries. Hence, we propose that the environmental factors discussed here influence channel choice directly and indirectly through its relationship with channel capabilities.

We believe that key boundaries influence channel choice when sharing information in organizations. Boundaries are, "discontinuities in practice" that represent opportunities for members and organizations that are able to join or span the boundaries (Faraj & Xiao, 2006; Levina & Vaast, 2005). According to Carlile (2004) there are three progressively complex boundaries – syntactic, semantic, and pragmatic – that present difficulties in coordination and knowledge sharing. A syntactic boundary exists where knowledge is considered objective and capable of being codified (Kellogg et al., 2006). Problems arise when agents on either side of the boundary do not share the same codes or routines. A semantic boundary exists where knowledge is embedded in employees' practices, situated, and

not easily codified. Problems arise when agents on either side of the boundary do not share the same technical language, and translation is necessary. A pragmatic boundary exists when knowledge, "is rooted in the accumulated experience and know-how of members, and invested in communities' ways of doing things and measures of worth" (Kellogg et al., 2006, p. 24). The agents on either side of these boundaries have different political interests and must modify, or transform, some of their knowledge if coordination is to be successful. This transformation of knowledge requires time, relationship building, and compromise (Beckhy, 2003; Kellogg et al., 2006). Some ICTs can serve as boundary objects at *semantic* boundaries because they provide the cues necessary to translate technical language, whereas other ICTs can serve as boundary objects at *pragmatic* boundaries because they facilitate, "*a process where individuals can jointly transform their knowledge*" (Carlile, 2002, p. 452). Therefore, these key boundaries can directly influence channel choice during boundary-spanning. They may also indirectly influence channel choice through their impact on audience considerations, which we discuss in the next section.

Information type, channel capabilities, and audience considerations.

The present data indicate that in many ways the type of information being shared drives individuals' channel choices. The present results revealed that channel choice is affected by whether the information is about the organization or about a particular project. Further, sensitive information causes employees to favor face-to-face communication over other channels. Future research will likely yield more categories of information and how those types of information drive channel choice. In addition, Daft and Lengel's (1984) media richness model prescribes that the complexity of a message determines channel selection.

The present study's participants indicated that a channel's capabilities influence channel choice. The qualitative data indicated that in some instances ease-of-use and convenience influence channel choice. In other situations privacy, security, and the ability to maintain a record influence participant choices. Moreover, the data revealed that the preferred channel capabilities depended on the type of information being shared. Therefore, we propose that the type of information influences desired channel capabilities, which in turn, affects channel choice.

This study's participants also said that it was important to consider the audience when making channel choices. For instance, one participant stated, "I select these technologies because I can reach multiple people at once without having to interrupt their schedules to share the knowledge." Other audience considerations included the size of the audience and the participant's need for feedback from the audience. Therefore, it appears as though people are considering the audience to some degree when making their channel choices. Additionally, key boundaries likely influence audience considerations. For example, the degree to which the information shared across boundaries needs to be translated or transformed for the audience will depend on whether the key boundary between agents is semantic or pragmatic. Further, we propose that the type of information affects audience considerations. For example, an employee may wish to direct sensitive project information to only one or two people rather than a larger audience. Hence, we propose that the type of information would not only have a direct affect on channel choice, but also be mediated through its influence on channel capabilities and audience considerations.

Directions for Future Research

Ultimately, we intend to validate and refine the model forwarded in the present study. To achieve this end, there are a number of avenues for future research. First, the present sample is small and we will continue to gather more of this data so that we are able to be more confident in our findings. Next, we would like to gather additional qualitative data through in-depth interviews. For example, we can ask employees to describe specific, yet typical organizational knowledge sharing practices. We can also use interviews to look more closely at the nature of the information employees share, rather than the vague categories of general and sensitive information. The online nature of the present study constrained the number of qualitative items we could place in the questionnaire. After collecting observational and interview data, we would then like to combine the data from the present study with the results of our qualitative analysis to refine the preliminary model. Then, we would conduct experimental work testing specific hypotheses derived from the refined model. For example, experiments in which people are given simulated scenarios and asked to make and explain a channel choice for the scenario. In addition, in order to examine the impact of culture on channel choice, we intend to collaborate with colleagues from a university in a country that is culturally different from the United States. Finally, we would like to utilize the information to help organizations in their implementation of their knowledge management strategies.

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