# Organizational Climate and Perceived Manager Effectiveness: Influencing Perceived Usefulness of Knowledge Sharing Mechanisms

**Wai Fong Boh**
Nanyang Technological University
awfboh@ntu.edu.sg

**Sze Sze Wong**
Nanyang Technological University
aszewong@ntu.edu.sg

## Abstract

*In this study, we examine how perceptions of organizational climate and manager effectiveness influence individuals' perceived usefulness of three types of knowledge sharing mechanisms (KSMs): (1) informal personalization KSMs, (2) formal codification KSMs, and (3) formal personalization KSMs. We collected survey data from 1036 employees from five different subsidiaries of an organization to test our hypotheses. We found that having a warm and cooperative climate has a positive influence on individuals' perceptions of all KSMs. A competitive climate, on the other hand, increases individuals' preference for using formal codification and personalization mechanisms relative to informal personalization mechanisms. Finally, individuals who perceive their managers to be more effective tend to be more supportive of top-down initiatives provided by senior management; thus, these individuals have a significantly more positive opinion of formal mechanisms compared to informal mechanisms. This study provides an extended and more nuanced perspective of how knowledge sharing can be enabled in different social contexts. The results will help managers to customize a portfolio of knowledge management mechanisms based on the climate of their organizational unit.*

*Keywords:* *Knowledge Sharing Mechanisms, Organizational Climate, Manager Role Theory, Social Exchange, Codification, Personalization.*

# Organizational Climate and Perceived Manager Effectiveness: Influencing Perceived Usefulness of Knowledge Sharing Mechanisms

## 1. Introduction

To enable individuals to tap into the knowledge and experiences of others to improve work performance, organizations need to ensure that knowledge is widely shared among their employees. Sharing knowledge enables the organization as a whole to benefit from learning by individuals or local groups, and allows individuals to access new knowledge and diverse ideas that they may not themselves encounter (e.g., Cummings, 2004; Gray, 2000). In particular, encouraging knowledge sharing across organizational units is challenging because employees tend to have limited interactions with members of other units (Mehra, Dixon, Brass, & Robertson, 2006). Communication problems may also arise because individuals from different units have different perspectives and skills (Tushman, 1979). Moreover, because external knowledge sharing can compete with intra-unit activities for time and attention (Choi, 2002) and because knowledge outflows to other units may represent a potential loss of proprietary knowledge of one's unit, individuals may be uncertain about whether sharing knowledge is viewed as legitimate and welcomed by others in the unit.

In order to facilitate access to knowledge embedded in the organization beyond one's unit, organizations implement various knowledge sharing mechanisms (KSMs) (Alavi & Leidner, 2001). KSMs are organizational practices adopted to facilitate the sharing, integrating, interpreting, and applying of know-what, know-how, and know-why embedded in individuals and groups. For example, knowledge can be shared via informal person-to-person interactions, or stored in electronic repositories and later accessed independent of the individual. Given the many types of KSMs available, individuals often have to decide which KSM they would like to use to seek knowledge from others.

Researchers have examined the relative advantages and disadvantages of seeking knowledge from others via different KSMs (Zimmer, Henry, & Butler, 2007). One stream of research focuses on the the characteristics of the media that each KSM represents. In contrast to person-to-person interactions, electronic repositories represent communication channels that possess different capacities for carrying rich information (Daft, Lengel, & Trevino, 1987). Some studies suggest that the appropriate media should be chosen for each task based on task characteristics, such that the media's ability to convey rich information aligns with the uncertainty of the task and the ambiguity of the message to be conveyed (Daft & Lengel, 1986; Rice, 1984). This stream of research assumes that each KSM has objective and invariant properties across contexts (Fulk, Steinfeld, Schmitz, & Power, 1987), which then uniformly affect individual attitudes and behaviors toward the use of the channel, regardless of context (Saunders & Jones, 1990).

Yet another stream of research highlights that the same KSM or media channel is not necessarily viewed in the same light in different contexts because individuals' attitudes toward each communication channel are socially constructed (Fulk et al., 1987; Saunders & Jones, 1990). As Alavi, Kayworth, and Leidner (2005, p. 193) note, knowledge management is "not an objective, discrete and independent phenomenon occurring within organizations", but rather depends heavily on the social settings. From this perspective, each KSM or communication channel does not have objective characteristics that are invariant across contexts; rather, the each KSM's characteristics are subjective (i.e., they are dependent on individuals' attitudes toward the KSMs that are developed from shared perceptions and interactions with their social environment). This stream of research draws on the social information processing perspective, highlighting that individuals' perceptions and interpretations of reality are influenced by social construction of their environment, based on the actions and words of their co-workers (Fulk et al., 1987).

In the knowledge management literature, one prominent stream of research that centers on the role of the social environment is the study of organizational climate and knowledge sharing. Organizational climate describes the work environment perceived by an individual, which represents the shared perceptions of organizational events, and the practices, procedures, and behaviors that organizations reward and expect (Pullig, James, Maxham, Joseph, & Hair, 2002). The way in which individuals perceive their organizational climate guides how they interpret events, predict possible outcomes, and judge the appropriateness of their subsequent actions (Jones & James, 1979).

Various studies have demonstrated that an open and cooperative culture facilitates knowledge contribution and use (e.g., Bock, Zmud, Kim, & Lee, 2005; Janz & Prasarnphanich, 2003; Kankanhalli, Tan, & Wei, 2005), which supports the idea that the social environment is a critical source of influence on individuals' knowledge sharing attitudes and behaviors.

Despite this insight, the conventional focus on a single, uniformly shared dimension of climate (i.e., openness and cooperation) and its relation to the extent to which knowledge is shared among employees provides a limited view of how social environments affect knowledge sharing across units. Perceptions of cooperation and competition typically co-exist in organizations with multiple units. As Tsai (2002) notes, "coopetition" occurs in multiunit organizations because units have to cooperate with each other to access relevant resources and yet compete to outperform each other. As the social information processing perspective suggests, employees from different units in the same organization could conceivably construct varying perceptions of cooperativeness or competitiveness because their interpretations of practices, procedures, and behaviors in each unit could plausibly diverge. If employees develop differing perceptions of cooperativeness and competitiveness, then the approach to understanding knowledge sharing across units shifts from predicting how a single dimension of organizational climate affects the amount of knowledge sharing, to how variations in unit climate perceptions are associated with variations in individuals' preferences to use one type of KSM over others. By investigating how perceptions of cooperation and competition are associated with the perceived usefulness of KSMs for seeking knowledge outside of one's unit, appropriate KSMs can be implemented at the unit level to "fit" the social environment.

The premise that organizational climate perceptions of cooperation and competition may vary across units also leads us to revisit the role of managers, who are widely recognized to develop policies, incentive systems, and rewards that form the basis for their subordinates' perceptions of organizational climate. Prior research tends to link managerial action to organizational climate by positing organizational climate as a mediator between managerial action and individuals' attitudes, behaviors, and performance (Kaiser, Hogan, & Craig, 2008; Kuenzi & Schminke, 2009). This implies that managers do not have any direct impact on their subordinates' attitudes toward KSMs, apart from their indirect influence via organizational climate. However, we should recognize that managers are not only architects of organizational climate but also salient representatives of management practices and policies implemented in organizations (Kozlowski & Doherty, 1989). Managers play a key role in motivating employees to adopt organizational practices (Lenox & King, 2004) such as KSMs that they implement and advocate. Traditionally, KSMs are distinguished by their personalization and codification characteristics (Hansen, Nohria, & Tierney, 1999), but they are also differentiated by whether they are formal forms institutionalized by managers or informal forms of knowledge sharing (Boh, 2007). This latter distinction highlights the importance of accounting for subordinates' perceptions of their managers because managers are viewed as the architects and promoters of practices implemented in organizations. To the extent that employees are not passive recipients of views that managers advocate, employees' perceptions of their managers are likely to be a source of direct influence on how they perceive the utility of KSMs that their managers institutionalize.

Accordingly, our study advances a different analytical approach to analyze how shared perceptions of the environment impacts knowledge sharing across units. Instead of a singular focus on cooperation in organizational climate and its impact on amount of knowledge sharing, we conceive that employees from different units can have varying shared perceptions of organizational cooperation and competition, and investigate how these differences are associated with employees' perceived utility of different KSMs for knowledge sharing across units. This approach not only acknowledges that climate perceptions vary across units, but also opens the possibility that knowledge sharing can be fostered in competitive climates through using an informed understanding of which KSMs are viewed as beneficial under competitive conditions. While the influence of organizational climate on employees' attitudes toward KSMs is largely based on the premise that individuals are affected by socially shared perceptions of the social environment that managers foster, we also reason that employees are active evaluators of their managers. Hence, we expect employees' evaluations of the KSMs that their managers institutionalize to be influenced by the extent to which they perceive their managers to be effective.

## 2. Organizational Climate

The concept of organizational climate is closely related to that of organizational culture; Denison (1996), in fact, argues that the primary difference is not one of substance but rather one of difference in perspectives taken on the same phenomena. Both concepts examine organizations' internal social psychological environment and how that affects individuals' behavior. There are, however, also distinct differences. Culture is rooted in values, beliefs, and assumptions. Deeply embedded assumptions and values drive individuals' interpretations of events and activities (Alavi et al., 2005; Denison, 1996). Organizational climate, on the other hand, refers to employees' perceptions of "observable" practices and procedures. In contrast to organizational culture that refers to deeply embedded values that cannot be consciously perceived, organizational climate tends to measure aspects of the organization that are closer to the surface (Denison, 1996).

We chose to examine organizational climate rather than organizational culture for several reasons. Culture researchers tend to focus on the evolution – changes, convergence, and interactions – of the social system; hence, they usually use qualitative research methods to study organizational culture. Organizational climate, on the other hand, is conceptualized as aspects of the social environment that are consciously perceived by organizational members; hence, it is usually measured via quantitative methods, with the assumption that generalization across settings is desirable. Climate researchers usually focus on examining the impact of the social environment on groups and individuals. Because our research examines how the organizational context influences individuals' perceived utility of various KSMs, the approach is more consistent with the underlying intent of organizational climate research (Denison, 1996).

Note that organizational climate represents shared perceptions among employees regarding the formal and informal policies, practices, events, and procedures in the organization (e.g., Schneider & Reichers, 1983), which contrasts with psychological climate, which refers to individual's perception of the work environment. In line with the arguments from the social information processing perspective, we expect individuals from the same organizational unit to be socialized in similar ways and thus develop shared perceptions of the organizational work environment (Kozlowski & Doherty, 1989).

## 3. Perceived Role of the Manager

Scholars widely recognize that an organization's managers play a critical role in fostering knowledge sharing among employees. As Senge (1990) highlights, managers "are responsible for building organizations where people are continually expanding their capabilities to shape their future" (p. 9). In particular, the literature on knowledge management acknowledges the important role that management commitment and support plays in ensuring the success of programs, practices, and technologies deployed to create, capture, share, and leverage knowledge capital embedded in individuals, groups, and organizations (Connelly & Kelloway, 2003). Lenox and King (2004) found that managers play an important role in getting subordinates to buy into and accept the practices that they advocate and implement. Yet there has been insufficient research on understanding exactly how managers exert influence to bring about effective knowledge creation (Tse & Mitchell, 2010).

We draw on role theory of managers (Kahn, Wolfe, Quinn, Snoek, & Rosenthal, 1964; Katz & Kahn, 1978) to argue that one key way that managers exert influence on their subordinates is by fulfilling subordinates' role expectations. Subordinates prescribe a set of expectations for their managers. Such expectations may consist of desirable behaviors, values, or other standards of work conduct, and are often grounded in employees' self-interest and desires. The extent to which a manager's job behaviors are congruent with their subordinates' role expectations (Tsui, 1984) will affect the subordinate's evaluation of the manager's effectiveness. We define managerial effectiveness as the extent to which their subordinates are satisfied with the job behavior and activities demonstrated by the manager. The more a manager's behavior meets the expectations of their subordinate, the more the manager will be judged as effective, and this may also reflect the interpersonal affect that the subordinate feels toward their manager, or their "approval" of the manager (Kaiser et al., 2008).

We complement role theory with social exchange theory (Blau, 1964; Gouldner, 1960) to argue that, to the extent that subordinates perceive that their managers have met their role expectations, the

subordinates will reciprocate with behavior and attitudes that they believe commensurate with the expectations of their supervisor (Fondas & Stewart, 1994; Hochwarter, Witt, Treadway, & Ferris, 2006), such as exhibiting good organizational citizenship behavior (Chen, Lam, Naumann, & Schaubroeck, 2005). Thus, individuals are more likely to conform to what their managers desire when they perceive their managers as effective, specifically in positively evaluating KSMs that their managers have institutionalized.

In Section 4, we describe the conceptualizations of different types of KSMs in the literature. In Section 5, we describe the research site and the types of KSMs that the organization used to facilitate knowledge sharing among employees. The understanding of the KSMs within the research context allows us to describe, in Section 6, the theoretical perspectives that are relevant to help us understand which characteristics of each KSM is most salient under different conditions. This enables us to present a systematic analysis for why the unit's organizational climate and employees' perceptions of their manager influence their judgments about the relative usefulness of different KSMs. In Section 7, we then describe the methodology adopted to test the hypotheses. Finally, we present the results and implications of the empirical study in Section 8.

# 4. Dimensions of Knowledge Sharing Mechanisms

Hansen et al. (1999) distinguish between two types of KSMs: personalization and codification. Knowledge shared via codification is carefully articulated, captured, and stored in documents and databases so that other employees in the organization can access and easily use that knowledge. Knowledge shared via personalization, on the other hand, is closely tied to the person who developed it, and is shared through direct person-to-person interactions. Boh (2007) recently built on Hansen's work to introduce a typology to classify KSMs. This typology not only highlights personalization versus codification as one dimension that distinguishes KSMs, but also differentiates between informal and formal KSMs. Informal KSMs refer to ad-hoc and unstructured mechanisms that support individual knowledge sharing in an unplanned manner. Formal KSMs, on the other hand, are designed to enable the transference of learning and knowledge from an individual to a large number of individuals by embedding knowledge sharing capabilities into the structure and routines of an organization. Formal KSMs tend to be established and endorsed by the organization, and should be supported with the necessary infrastructure to encourage the KSM's use. This typology highlights that not all personalization mechanisms are ad-hoc and informal, and not all codification mechanisms are formal. Constructing a two-dimensional matrix with "codification versus personalization" and "formal versus informal" creates a four-quadrant framework (See Table 1) that can be used to classify various types of knowledge-sharing mechanisms.

| Table 1. Framework of Knowledge-Sharing Mechanisms (Adapted From Boh, 2007) | | |
|---|---|---|
| | **Informal** | **Formal** |
| Personalization | **Quadrant 1**<br><br>Informal channels (e.g., chatting in the cafeteria, hallway conversations)<br>Social activities | **Quadrant 2**<br><br>Communities of practice meetings<br>Dialogue sessions<br>Cross-training<br>Joint exercises |
| Codification | **Quadrant 4**<br><br>Informal document exchange | **Quadrant 3**<br><br>Organization-wide repositories<br>Organization Intranet |

**Quadrant 1** (informal personalization KSMs): describes opportunities where individuals engage in person-to-person knowledge sharing in an ad-hoc and unstructured manner. The ability of individuals to make effective use of informal personalization mechanisms for knowledge sharing, however, depends on whether individuals have the knowledge of "who knows what" in the organization, and have access to colleagues who may have that knowledge (Borgatti & Cross, 2003).

**Quadrant 2** (formal personalization KSMs): describes mechanisms that create opportunities for person-to-person knowledge sharing through formalized and structured routines. Organizations may formalize knowledge sharing not just by means of codification, but also through structured and formal practices that facilitate person-to-person knowledge-sharing. This includes organizing sharing sessions for communities of practice (CoP) or having structured training programs to enable employees to cross-train colleagues from other units.

**Quadrant 3** (formal codification KSMs): describes mechanisms that foster person-to-document knowledge sharing through the capture and retrieval of knowledge in electronic repositories. Such mechanisms emphasize the use of information technology (IT) to create electronic repositories for storing, searching, and retrieving various forms of intellectual capital.

**Quadrant 4** (informal codification KSMs): describes mechanisms that foster informal and ad-hoc person-to-document knowledge sharing such as when individuals exchange documents. The focus on using electronic databases for codifying knowledge (described in quadrant 3) assumes that codified knowledge is only exchanged via documents stored in an electronic database. A significant amount of the documents exchange, however, may take place informally where individuals find the right documents to reuse through personal contacts.

As individuals use different KSMs to gain knowledge over the course of their work, they tend to develop a holistic perception of the usefulness of each KSM type. Prior research on technology, for example, has frequently examined the perceived usefulness of technologies and innovations introduced in organizations (Davis, 1989). We define perceived usefulness as the degree to which an individual believes that a mechanism would enhance their job performance (Davis, 1989). To the extent that the effectiveness of any KSM rests on employee willingness to use that mechanism and the utility the employee gains from using the mechanism, it is important to investigate how the organizational context impacts employees' perceptions of the usefulness of different mechanisms.

In Section 5, we explain our research context and the KSMs adopted to provide a better understanding of the characteristics of the KSMs examined in our study.

## 5. Research Site

We conducted our study in five different subsidiaries of an organization, Alpha Inc. (a pseudonym), which focuses on emergency response tasks. Alpha Inc., located in Asia, has more than 20,000 employees, made up of both front-line employees (line personnel) and staff personnel who provide advisory and support functions to the line personnel. Each subsidiary focuses on different aspects of emergency response services (e.g., providing emergency response services targeted at different types of security threats). In each subsidiary, some units are responsible for specific geographical regions, while other units handle one or more specialized emergency response services (e.g., responding to emergencies relating to hazardous materials). All subsidiaries are located in the same city. Hence, while individuals tend to work closely in their unit, their experiences and knowledge are applicable to other units in the subsidiary. With the frequent interaction and high level of dependency in units, however, most sharing of knowledge tends to take placehin units. Recognizing the challenge, senior management of Alpha Inc. has encouraged each subsidiary to implement KSMs to encourage knowledge sharing across units. In line with this strategic vision, a cross-subsidiary task force, which involves the vice-president of each subsidiary and employees selected as knowledge champions for the subsidiary, has been set up. Due to the differences in the nature of tasks across subsidiaries, there is less scope for knowledge sharing across subsidiaries. Hence, we regard each subsidiary as a distinct organization, and focus on examining knowledge sharing across units in subsidiaries.

The ability to study five subsidiaries in the same organization provides an ideal research design because we are able to operationalize and contextualize constructs in a similar manner across subsidiaries. There is little variance in the way that each KSM is implemented in each subsidiary. Studying different subsidiaries in the same organization also enables us to identify a set of mechanisms that are adopted in common across subsidiaries. It is critical to ensure that the KSMs we examine are common and implemented in a similar manner to afford meaningful comparisons across different subsidiaries.

We made use of a combination of qualitative and quantitative methods to collect data in 2006 to test our hypotheses. We first conducted in-depth interviews to gain an understanding of the types of KSMs used in each subsidiary. Based on the interviews, we then developed a survey that was administered to a total of 1135 employees from the five subsidiaries. We then adopted a multi-level structural equation modeling technique to analyze the data, which is structured at two levels – with individual responses (level 1) nested in units (level 2) (Julian, 2001). In Section 5, we describe some of our key interview findings regarding the types of mechanisms used for knowledge sharing in Alpha Inc.

## 5.1. Mechanisms for Knowledge Sharing: Insights from Interviews

We conducted 29 interviews with a total of 45 employees in the five subsidiaries. The length of interviews ranged from 45 minutes to two hours. Copious notes were taken during each interview, and transcribed in 24 hours. Interviewees included senior managers and as junior and senior personnel who were in line and staff functions. Appendix A provides details of the interviewees and the interview protocol.

### 5.1.1. Informal Personalization Mechanisms

Because most employees in each subsidiary were collocated in the same location, informal and unplanned face-to-face encounters such as hallway conversations were commonly used to share knowledge. Moreover, because subsidiaries had large cafeterias, it became a key meeting place for many employees. Employees have cultivated the habit of having informal chats in the cafeteria. Knowledge sharing via such cafeteria chats was so prevalent that one subsidiary's knowledge management manager was even toying with the idea of trying to codify such informal chats. This manager stated that:

> *One thing I would like to do is to capture the knowledge exchanged during the informal cafeteria chats. A lot of knowledge, ranging from the sharing of experiences about what works and what doesn't, to little gossip about how to deal with people with different personalities are shared between seniors and juniors, and between peers during these discussions.*

Employees in Alpha Inc. frequently participated in social activities, which provided opportunities for employees to socialize and get to know one another. Such activities included after-work leisure activities such as basketball sessions, outings, or dinners with colleagues. Interviewees noted that participating in social activities was a useful way to build personal contacts, which is helpful when one was seeking information. As pointed out by one interviewee:

> *After-work social activities encourage networking and learning through fun and games. We will usually gather people from different units for a basketball session, and this really encourages interactions between employees from different units.*

### 5.1.2. Informal Codification Mechanisms

Employees in Alpha Inc. often share codified knowledge with other units through emails. As an emergency response organization, each subsidiary has to deal with emergency response incidents in their day-to-day operations. The employee in charge of responding to the incident will be responsible for documenting what happened during the incident in the form of an "incident report". Such incidents are often shared via email to other units, especially if the employee or unit manager deems the incident to be reflective of a trend in modes of operation or of certain information and intelligence that would be useful to other units.

> *The incident reports cover routine issues (experienced in the course of operations). The information will be disseminated through email to other units. The unit managers may input their comments or questions to highlight what should have been done and how to avoid similar mistakes.*

Informal personalization mechanisms often supplement informal codification mechanisms. For example, when emails are used to share incident reports, employees often follow up with the knowledge provider to ask for more details about the incident.

> *My staff and I will read the incident reports that we receive via email. My counterparts in other units will alert me via email or phone call when they send the incident report if there is something particularly interesting. For example if (unit X) discover new methods…and there is learning value for us, they will also highlight the information to us. Sometimes, if I find something of particular interest, I may even follow up with a request for them to take photographs of their findings, so that we can learn more about the new findings.*

In addition, informal personalization mechanisms that are initiated to obtain certain information across units are often followed up with an exchange of codified information. For example, when employees ask other units for their experience in handling certain issues and problems, much of this information may be already documented in incident reports that the units will then share with the requesting unit.

### 5.1.3. Formal Personalization Mechanisms

Recognizing the need to enable some amount of systematic knowledge sharing across units, and yet allow for person-to-person interactions, Alpha Inc. has put in place several formal personalization KSMs. First, they established communities of practice (CoP) for employees interested in a particular topic area to get together voluntarily to share their experiences. Because all units for each subsidiary were located in the same city, participants of CoP preferred to meet face-to-face rather than online. Frequently, different units would host the sharing sessions on a rotation basis, and external parties may even be invited to attend the sharing sessions. One interviewee described the CoP as follows:

> *People with common interests will get to know each other and build trust. I participate in the Organization Excellence CoP, where we share best practices and identify new trends in this domain area. CoPs encourage the sharing of knowledge through presentations and story-telling, which we tend to prefer, compared to reading reports. Experienced employees will share their past experiences and this is a lot more convincing as it brings across their personal points of view.*

While CoP meetings facilitate knowledge sharing across peers, Alpha Inc. regularly organized dialogue sessions and town hall meetings to facilitate communication between senior management and employees of each subsidiary. In these dialogue sessions, the managers of different units come together to communicate to all units key lessons learnt and points to take note of in employees' daily operations. Employees could also raise areas of concern.

In addition, Alpha Inc. also made use of mechanisms such as cross-training and joint exercises to ensure there was a formalized way to share operational knowledge across units. In cross-trainings, subject-matter experts from each unit provided training to other units, overviewed their job scope, and even trained employees from other units to handle simple aspects of their jobs if the situation requires them to do so. For example, cross-training was provided to ensure that the first unit to arrive at a scene requiring emergency response assistance would be able to assess all aspects of the situation regardless of the unit's specialization. An interviewee described the purpose of the cross training:

> *These cross trainings are not to transfer the core competencies of different units, but the purpose is to allow people to understand what other units are doing, and to provide them with basic skills. For example, we provide basic CPR (Cardiopulmonary resuscitation) training for people from other units, so that they are able to handle emergency situations until we arrive.*

Joint exercises and training were also held regularly, in which employees from different units came together for common training or operational exercises. Such joint exercises took various forms. First, different units often came together for joint exercises, where they simulated various emergency situations, and had different units work with one another to respond to the emergency situations. Alternatively, two or more units came together to analyze various case studies, usually by examining after-action reviews of real cases, and engaged in discussions of what they learnt from the case studies. One interviewee noted:

*These joint exercises allow us to have a better understanding of each others' role, and help us to work hand-in-hand. We need to understand the procedures and functions of other units – not just what is being done, but also why their procedures are such. This enables us to learn about the best approaches to perform our work.*

### 5.1.4. Formal Codification Mechanisms

Prior research highlights two different categories of repositories that organizations use to facilitate knowledge sharing (Markus, 2001). One category stores codified knowledge in a format that has been systematically structured. Such a repository requires significant effort on the part of the contributor to codify their tacit knowledge. The second category of repository stores documents that are generated in the course of employees' work; thus, contributors do not need to recode their knowledge into a different format for storage. Examples of such a repository include those used by consulting firms to store project deliverables from prior projects, which may be informative to other consultants.

Both categories of repositories are used in each subsidiary to facilitate knowledge sharing across units. Each subsidiary had an intranet, where information had been systematically structured and designed by the knowledge management divisions. The intranet stored information about standard operating procedures and policies, and also contained feature articles, such as ethics discussions or appropriate employee responses for tricky situations. Experts were also invited to write and submit articles on various topics, such as best practices in customer service or the latest modus operandi used by groups posing various security threats.

In addition, each subsidiary also had a subsidiary-wide repository for units to store documents such as incident reports documenting any significant emergency response incidents, lessons learnt from major incidents based on after-action reviews, white papers and research papers about various topic areas, and minutes of meetings from various groups and task forces. In contrast to the intranet, the repositories stored documents that were created in the course of the employees' work; additionally, placing documents into the repositories did not require much additional effort on the part of employees. Both types of repositories complemented each other to provide a comprehensive formal codification knowledge sharing approach:

> *The use of the subsidiary-wide repository and the intranet for knowledge sharing are intertwined – for example, we may feature a case or a training session on the intranet, and refer employees to the repository for the full incident report on the case, or the materials for the training session. The only thing is – the intranet requires maintenance. So it acts more like a portal to help employees locate key pieces of information stored in the shared repository.*

### 5.1.5. Role of IT

Of all the KSMs, IT plays a significant role only in the use of subsidiary-wide repository and intranet. This is partly because all employees of Alpha Inc. are located in the same city and there are opportunities for face-to-face interactions with employees from other units via joint operations or joint exercises and joint training, or via informal channels and organized social activities. Moreover, the nature of the emergency response job tends to be more operational than desk-bound in nature. Hence, knowledge sharing through the intranet and subsidiary repository, or through the use of technology, is only one of the means through which knowledge sharing takes place.

While IT has not played a systematic role beyond the codification KSMs in Alpha Inc., there is potential and scope for IT to play a bigger role, even in facilitating personalization KSMs. To facilitate informal personalization knowledge sharing, for example, a couple of subsidiaries are exploring the use of expertise knowledge directories, where individuals' field of expertise and knowledge would be provided, and thus help to facilitate the search for individuals with the right expertise. In one subsidiary, a few units started a pilot project to encourage employees to set up their own homepage as a source of personal information that can be shared with their colleagues and thus facilitate informal knowledge sharing. To facilitate formal personalization knowledge sharing, one subsidiary has started recording video presentations of COP meetings and cross-trainings and put them on the Intranet, which uses technology to provide access to the knowledge shared during these sessions. A

couple of COPs have also made use of electronic discussion forums to share knowledge. Hence, while Alpha Inc. did not systematically make use of IT to facilitate their personalization mechanisms, partly due to the operational nature of work that results in the lack of constant access to the computer, there is scope for Alpha Inc. and other organizations to make use of IT to facilitate the personalization mechanisms.

### 5.1.6. Summary

Table 1 summarizes the KSMs described. In our research, we focus on mechanisms in the first three quadrants: (1) informal personalization mechanisms, (2) formal personalization mechanisms, and (3) formal codification mechanisms. We do not examine informal codification mechanisms (4th quadrant) because knowledge exchange via informal codification mechanisms tends to take place concurrently with informal personalization mechanisms. As our interviewees noted, when two individuals share knowledge on a one-on-one basis, they may also exchange documents concurrently to supplement their discussion. While knowledge sharing via informal personalization and codification mechanisms are both unstructured and take place on an ad-hoc basis, the difference is that the informal codification KSM involves an exchange of documents whereas the informal personalization KSM involves an interactive discussion. Hence, although there may be theoretical differences between the two KSMs, our interviews reveal that it is difficult for an individual to distinguish when they are engaging in informal knowledge sharing via personalization or codification mechanisms in their response to a field survey. Hence, we did not include the informal codification KSM quadrant in our research model.

## 6. Proposed Theoretical Model

As the introduction highlights, the research on media choice assumes that each media has a set of objective characteristics that are assumed to be salient to users and invariant across contexts. In contrast, depending on the way that individuals interpret social cues from their work environment, the social information processing perspective highlights that different characteristics of the media are salient to individuals. As Section 2 highlights, organizational climate and managers are the primary sources of social cues about the usefulness of different KSMs in the work environment because they convey the practices that are rewarding and desirable in the organization. We argue that organizational climate influences employees' perceived utility of KSMs through shaping their judgments of the effort and cost of using various KSMs, such as the perceived availability and reputational costs of using the KSMs. Employees' perceptions of their managers' effectiveness also influence their evaluation of KSMs by shaping their felt need to reciprocate with attitudes desired by their managers.

| Table 2. Changes in Relative Levels of Perceived Utility Based on Organizational Climate and Perceived Manager Effectiveness | | | |
|---|---|---|---|
| | **Informal personalization** | **Formal personalization** | **Formal codification** |
| Warm and cooperative climate ↑ Availability | ↑ | ↑ | ↓ |
| Competitive climate ↑ Evaluation apprehension | ↓ | ↑ | ↑ |
| Perceived manager effectiveness ↑ Reciprocity for institutionalized KSMs | ↓ | ↑ | ↑ |

First, we propose that the warmth and cooperativeness of an organizational climate influences individuals' perceptions of information's availability, and this determines the usefulness of information sources (O'Reilly, 1982; Zimmer et al., 2007). Prior research shows that individuals tend to obtain information from sources that they can easily access with minimal effort (Woudstra & van den Hooff, 2008). It is thus often the accessibility of the information source, not always the quality of information, that is the critical determinant of its use (O'Reilly, 1982). As Borgatti and Cross (2003) highlight, accessing the individual with the right expertise via one's personal network in an ad-hoc manner can be challenging because one may not always find it possible to engage others in a timely fashion, and

those with the appropriate expertise may not be available to answer one's queries. Based on this perspective, we examine how the social environment of workers influences individuals' perceptions of the accessibility of other co-workers as information sources.

Second, we propose that the competitiveness of an organizational climate influences individuals' perceptions of the knowledge-seeking costs that arise from evaluation apprehension. Seeking knowledge from others often entails an acknowledgement of one's deficiency in knowledge in one or more aspects, which causes anxiety and concern over the undesired impression that may be projected through the act of seeking knowledge from others (Bordia, Irmer, & Abusah, 2006, Menon & Pfeffer, 2003). As Lee (1997, p. 336) notes, "Individuals do not seek help, even when help is needed and available, because help seeking implies incompetence and dependence, and therefore is related to powerlessness". Hence, we examine how the social environment may influence one's perceived cost of appearing ignorant and, in turn, their preference for particular KSMs.

Third, we propose that individuals' perceptions of their unit manager's effectiveness influence the sense of reciprocity that individuals feel toward the managers who are advocates of institutionalized information sources and, this sense of reciprocity affects individuals' perceptions of the utility of those information sources. As champions and advocates for the set of KSMs that are institutionalized by senior management, managers are perceived as salient representatives of such organizational practices (Kozlowski & Doherty, 1989). Thus, subordinates' evaluations of the KSMs institutionalized by senior management are likely to be shaped by their perceptions of their unit manager. As Eisenberger, Armeli, Rexwinkel, Lynch, & Rhoades (2001) suggest, managers and subordinates are in a social exchange relationship. To the extent that managers fulfill the expectations of their subordinates, subordinates are likely to reciprocate with desired attitudes. Hence, the perceptions of workers toward their manager will play a significant role in influencing the extent to which workers make sense of the institutionalized KSMs. Table 2 overviews the theoretical arguments that lead to our hypotheses.

## 6.1. Information Availability in a Warm and Cooperative Climate

In searching for information, individuals often use a satisficing strategy with which they make use of the first piece of information they come across that satisfies their needs because there are often costs associated with extensive search (Zimmer et al., 2007). One of the key purposes of knowledge repositories is to facilitate the acquisition and retention of organizational memory, so that the information can be made accessible to other employees regardless of the availability of the employee who contributed the knowledge, or even after the employee has left the organization. Even though knowledge sharing via formal codification mechanisms such as repositories is less likely to support rich exchange of knowledge through direct sharing among individuals, formal codification mechanisms have the advantage of ensuring knowledge accessibility and availability to individuals regardless of place and time as long as the knowledge is captured in a repository that has reasonably effective search capabilities. Relative to formal codification mechanisms, access to others via informal and formal personalization mechanisms is more likely to support richer knowledge exchange but is less likely to be widely available because individuals need to expend "relational energy" (Borgatti & Cross, 2003, p. 435) to obtain access to knowledge providers and to ensure that the latter is mindfully focused on the knowledge seeker's problem. Therefore, based on the information availability arguments, one's perceptions of the organizational climate would be expected to play a key role in affecting the perceived availability of information via informal and formal personalization mechanisms.

As social information processing theory suggests, shared perceptions of the organizational environment emerge from social interactions among co-workers. A warm and cooperative environment refers to an environment where co-workers display a high level of fellowship and helpfulness (Litwin & Stringer, 1968). Thus, such an organizational climate is likely to emerge when the exchanges among co-workers in the organization have been supportive, open, and rewarding. Given the shared perceptions of warmth and cooperation in the organization, individuals are likely to expect greater availability of co-workers for open knowledge-sharing.

As prior research has shown, a cooperative climate increases individuals' motivation to share knowledge (Bock, Kankanhalli, & Sharma, 2006; Kankanhalli et al., 2005). Individuals who perceive a

warm and cooperative climate are likely to perceive potential knowledge providers to be more accessible because the norm of cooperation would mean that not only are people more willing to share their insights and expertise with others, but there are also more opportunities to informally share knowledge (Alavi et al., 2005). An organizational situation that emphasizes the creation of positive helping relationships would increase people's desire to be with others, to interact socially, and to build relations and networks (Litwin & Stringer, 1968). Potential knowledge providers are viewed to be more approachable, which increases the confidence of employees in accessing the required knowledge when they seek knowledge from other people. A warm and cooperative climate should therefore increase perceptions that person-to-person open and rewarding knowledge sharing are more available and accessible. This will apply not only to person-to-person knowledge sharing via informal means, but also when people interact through institutionalized routines. Having a formal routine does not necessarily mean that people will openly share knowledge with others. A warm and cooperative climate will facilitate interactions for knowledge sharing even in a formal setting because it encourages open discussions and highlights the willingness of individuals to share. In contrast, to the extent that interpersonal contact is not important in knowledge sharing using formal codification mechanisms, a warm and cooperative climate should have lesser impact on employees' perceptions of its usefulness. Hence:

> **H1:** *A warm and cooperative climate has a greater positive influence on employees' perceived usefulness of informal and formal personalization knowledge sharing mechanisms compared to formal codification mechanisms.*

## 6.2. Evaluation Apprehension in a Competitive Climate

Prior research shows that knowledge sharing has the potential to evoke evaluation apprehension, and therefore individuals may see interpersonal risk as the cost of seeking knowledge from others via personalization mechanisms (Bordia et al., 2006; Borgatti & Cross, 2003). Evaluation apprehension refers to one's concern that they may be evaluated negatively. Help and information seeking from others has often been linked to evaluation apprehension because individuals may be perceived as having questionable competence when they seek knowledge from others (Menon & Pfeffer, 2003). Researchers have even pointed out that conceding deference to others imply dependence and a transfer of power to the knowledge provider (Lee, 1997). Knowledge seeking via informal personalization is especially susceptible to evaluation apprehension because individuals have to openly admit ignorance on a given topic area to another individual (Borgatti & Cross, 2003). Knowledge seeking via repositories, on the other hand, does not entail observable dependence on others, or admission of one's ignorance on a topic area, because searches in repositories can be done anonymously and in private. Knowledge seeking via formal personalization mechanisms such as cross trainings, CoPs, dialogue sessions, and joint exercises also provide an institutionalized setting that endorses the act of asking questions, which removes the evaluation apprehension of knowledge seekers.

In a competitive climate, employees perceive organizational rewards to be contingent on comparisons of their performance against those of others outside their units (Brown, Cron, & Slocum, 1998); hence, the reputational cost of appearing ignorant is accentuated. Higher levels of competition tend to highlight the need to outperform other units to obtain limited resources, which include recognition and rewards (Tsai, 2002). Comparisons of one's performance with those outside the unit, while useful for improving one's performance, evoke a sense of rivalry between individuals, and such rivalry increases perceived threats to one's organizational status (Menon & Pfeffer, 2003). Such perceived threats often provoke defensive patterns of response (Menon, Thompson, & Choi, 2006), and people tend to become more sensitive to the "status dynamics" (Flynn, Reagans, & Amanatullah, 2006, p. 1123) between competing individuals. Given that the display of competence is important in organizations characterized by a competitive climate, individuals are likely to be more wary of exposing themselves to the stigma of ignorance and the implication of failure. Hence, informal personalization mechanisms are likely to become less preferred compared to codification mechanisms and formal personalization mechanisms in a competitive climate.

> **H2:** *A competitive organizational climate has a greater positive influence on employees' perceived usefulness of formal codification and formal personalization knowledge sharing mechanisms, compared to informal personalization knowledge sharing mechanisms.*

## 6.3. Reciprocity with High Perceived Manager Effectiveness

According to role theory (Kahn et al., 1964; Katz & Kahn, 1978), each role in an organization has a set of role expectations that are prescribed by others who interact with the focal role. Every organizational member is usually associated with a number of others with whom they must work closely, who constitute the member's role set. Members of a person's role set often depend on and have a stake in that person's performance; hence, they develop expectations about what the focal person should or should not do in their role (Sarbin & Allen, 1968). Such role expectations consists of preferences of specific behaviors that the person should or should not do, and conceptions about what the person should be. Such expectations represent standards that members of a person's role set will use to evaluate the focal person's performance. Subordinates thus prescribe a set of expectations to their unit managers about desirable behaviors, values, or other standards of work conduct (Schneider, 2002). The extent to which a unit manager is viewed to be effective thus depends on the extent to which the manager's job behaviors are congruent with their subordinates' role expectations (Tsui, 1984).

We expect subordinates' perceptions of their unit managers to influence their attitudes towards formal KSMs because these are initiatives that management (including subordinates' unit managers) advocate and promote. Formal KSMs – both personalization and codification – are typically mechanisms introduced using a top-down approach, where the management develops approaches, training programs, or computer systems to enable knowledge retention and distribution. Prior research has shown the importance of management support in encouraging the adoption and use of new technologies and innovations (Lenox & King, 2004). In Alpha Inc., the management has consistently encouraged inter-unit knowledge sharing and thus knowledge sharing has been viewed to be a behavior desired by the unit managers of the organization. Several KSMs have also been institutionalized, with the managers of each unit often calling upon their subordinates to embrace and make use of the KSMs for inter-unit knowledge sharing. Our interviewees highlighted the support of their unit managers in encouraging knowledge sharing and the use of institutionalized KSMs, as exemplified by the following quotes:

> *Our unit manager tries to take a proactive stance in encouraging knowledge sharing. Our management will sit in for the cross-training sessions. They will encourage us to go for COPs and the dialogue sessions. My unit manager is quite active in encouraging us.*

> *My unit manager is very passionate about knowledge management and often pushes us to participate in various knowledge management initiatives like the CoPs and the cross-training sessions.*

> *We need people to realize that knowledge sharing is valuable to their job so that they do not need external incentives to share knowledge. As unit managers, we have to act as a knowledge sharing champion and encourage our subordinates to participate in KM initiatives like CoPs or to use and contribute to the knowledge repositories.*

Drawing on social exchange theory (Blau, 1964), we predict that employees who perceive their unit managers to be more effective will reciprocate with more positive evaluation of institutionalized KSMs. Social exchange theory (Blau, 1964) suggests that the exchange relationship between two parties often goes beyond pure economic exchange and entails social exchange. An individual who receives a benefit involved in an exchange relationship will feel a social obligation to reciprocate and return the favor in the unspecified future. A social exchange does not include explicit bargaining (Cropanzano & Mitchell, 2005), but one will respond to social obligations that have been created by the actions of the other party in a social exchange (Watson & Hewett, 2006). Social exchange theory has been applied by prior research to understand the relationship between subordinates and supervisors or their employer as a whole. For example, employees who perceive greater organizational support are more likely to respond with positive attitudes and favorable work behaviors (Eisenberg, Fasolo, & Davis-LaMastro, 1990; Eisenberger et al., 2001), and engage in organizational citizenship behavior (Lynch, Eisenberger, & Armeli, 1999).

Integrating role theory with social exchange, we argue that subordinates are in a social exchange relationship with their unit managers. The more they feel that their unit managers are performing to meet their own expectations, the more likely they will reciprocate with attitudes and behaviors that are desired by the unit managers. Subordinates' perceptions of the extent to which their unit managers have met their role expectations will thus influence their felt need to reciprocate with desired attitudes and behaviors including those related to knowledge sharing advocated by management. Hence, we believe that subordinates' positive perceptions of unit managers will translate into a more positive evaluation of institutionalized KSMs that managers advocate. We hypothesize:

> **H3:** *Positive perceptions of one's unit manager, in terms of his/her effectiveness, has a greater positive influence on employees' perceived usefulness of formal codification and personalization knowledge sharing mechanisms, relative to informal personalization mechanisms.*

## 7. Survey Methodology

To test our hypotheses, we generated a survey to measure employees' perceptions of the usefulness of each KSM, their perceptions of the organizational climate and their managers, and other control variables. We pre-tested the survey on a sample of fifty randomly selected employees in the head office of Alpha Inc. Based on the results of the pilot test, we amended the phrasing for some questions. We then administered the final questionnaire to a total of 1135 employees from 78 units and five subsidiaries of Alpha Inc. We obtained responses from 1065 respondents (Survey 1), which provided an overall 93.8 percent response rate[1]. We chose respondents via a stratified random sampling approach. Depending on the size of each unit, we randomly chose between 10-30 employees from each unit in each subsidiary. We dropped a total of 26 incomplete responses, and used a total of 1039 responses for our analysis. Table 3 shows a brief description of the emergency response services specialized in by each subsidiary, and the estimated size and number of respondents from each subsidiary.

| Table 3. Overview of Subsidiaries | | | | |
|---|---|---|---|---|
| | **Size** | **Primary service provided** | **No. of respondents** | **No. of units** |
| Subsidiary 1 | <1,000 | Drug management | 182 | 8 |
| Subsidiary 2 | 3,000-5,000 | Entries and exits | 186 | 14 |
| Subsidiary 3 | 1,000-3,000 | Rehabilitation | 179 | 17 |
| Subsidiary 4 | 1,000-3,000 | Fire safety | 187 | 13 |
| Subsidiary 5 | >10,000 | Enforcement services | 272 | 26 |

### 7.2. Operationalization of Constructs

Questions in the survey used a seven-point scale anchored from "not at all" to "to a great extent". To ensure that the users focus on knowledge sharing across units, we prefaced the survey with the following description: "This survey assesses your attitudes and perceptions about knowledge sharing with SUBSIDIARY X colleagues **outside your own unit**".

#### 7.2.1. Dependent Variables
Based on our interview findings, we identified the mechanisms used in Alpha Inc. that can be classified as informal personalization, formal codification, and formal personalization KSMs (See Table 1 for summary above). We measured employees' perceived usefulness (PU) of each KSM in enabling them to obtain information and knowledge with others from outside the unit. As the PU of

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[1] We adopted several approaches to ensure a high response rate. First, we obtained the endorsement of the senior managers of Alpha Inc., who actively appealed for the participation of their employees. We also provided various incentives in the form of lucky draw chances and souvenirs. The organization also arranged several sessions where we visited the organization after their training sessions to publicize and distribute the surveys. Employees were also promised full anonymity for their participation.

each type of KSM is defined by the PU of the individual mechanisms (e.g., the perceived usefulness of informal personalization KSMs are defined by the perceived usefulness ratings of the social activities and informal channels), we specify the dependent variables as formative constructs (Petter, Straub, & Rai, 2007)[2].

### 7.2.2. Independent Variable

We measured individual perceptions about organizational climate by asking respondents about their perceptions of the levels of cooperation and competition in their subsidiary[3] because our theoretical interest is in inter-unit knowledge sharing in a subsidiary. We adapted the organizational climate perception measures of warmth and cooperation in the subsidiary from Janz and Prasarnphanich (2003) and Kankanhalli et al. (2005). For the competitiveness dimension of organizational climate, we measured the extent of inter-unit competition in their subsidiary. We adapted the measure of inter-unit competitiveness from Brown et al. (1998). As Section 2 highlights, we are interested in organizational climate perceptions shared among members of the same unit, rather than psychological climate (Schneider & Reichers, 1983). Hence, the climate perceptions are aggregated at the unit level in order to examine the extent to which the climate perceptions for the subsidiary are shared among individuals in the same unit[4].

To obtain a representative measure of the cooperativeness and competitiveness climate scores, we administered a separate survey to another group of 1056 respondents, also sampled using a stratified random sampling approach. We administered the second survey was to obtain measures of organizational climate ratings about the subsidiary from other employees who were in the same unit as our survey respondents. To measure the organizational climate, we averaged the perceptions for each climate measure across all respondents from the same unit for both surveys. To determine if there was intra-unit consensus to generate a climate measure for all respondents in the same unit, we calculated the interrater agreement index, $r_{wg(j)}$ (James, Demaree, & Wolf, 1984), and the intraclass correlation coefficient, ICC (Bliese & Halverson, 1998) for the cooperativeness and competitiveness climate dimensions. The mean $r_{wg(j)}$ was 0.876 for cooperation and 0.82 for inter-unit competition, which indicates a high level of within-group agreement. The ICC was 0.72 for cooperation and 0.57 for inter-unit competition, which demonstrates that there was significantly more variation between groups than in groups, which provides support for aggregating the scores to the unit level. The use of survey responses from two different sets of respondents for the organizational climate scores also enabled us to avoid having a common source bias for both the independent and dependent variables of the study.

We adapted the measures for perceived unit manager effectiveness from Tsui (1984). We measured individuals' perceptions of the effectiveness of managers of the unit, rather than their perceptions of the managers of the subsidiary because the latter do not directly interact with the employees. Rather, it is the unit's managers that have the most direct influence on the perceptions of employees. We also chose unit managers rather than the direct supervisors of each employee because the direct supervisor of each employee will vary in rank and may not be representative of the senior management of the unit, who are recognized as salient representatives of management practices and policies implemented in the organization and advocates of institutionalized KSMs. We measure the extent to which the unit managers have fulfilled their employees' overall expectations. Because perceived manager effectiveness is not an organizational climate dimension, we do not expect consensus among individuals in the same unit about their managers. Research has highlighted that managers do not interact with subordinates uniformly; rather, they often develop different relationships with their subordinates (Graen, Novak, & Sommerkamp, 1982). Hence, unlike individuals' perceptions of organizational climate, we expect that there will be some variance in individuals' perceptions of their managers in the same unit. Hence, managers' perceived effectiveness is measured at the individual level.

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[2]  We prepared an index of the perceived usefulness of each type of KSM by taking an average of the items responses and using the average to represent perceived usefulness for the KSM. Appendix E further shows the Analysis of External Consistency of Formative Measures for the P.U. of Formal Codification KSMs, based on Kim, Shin, and Grover (2010)

[3]  Note that, when we refer to organizational climate, it means the organizational climate of the subsidiary.

[4]  Note that, while the items measure the organizational climate for the subsidiary (the point of reference is the subsidiary, not the unit), the climate measures are aggregated at the unit level.

Table 4 provides the descriptive statistics of the key independent variables and dependent variables by subsidiary.

| Table 4. Descriptive Statistics of Key Variables by Subsidiary | | | | | |
|---|---|---|---|---|---|
| | **Subsidiary 1** | **Subsidiary 2** | **Subsidiary 3** | **Subsidiary 4** | **Subsidiary 5** |
| **Aggregated at the unit level** | | | | | |
| Cooperativeness climate | 4.40 (0.90) | 4.03 (1.12) | 4.62 (0.84) | 4.21 (1.07) | 4.99 (0.79) |
| Competitiveness climate | 4.34 (1.12) | 4.66 (1.26) | 4.60 (1.04) | 4.71 (1.12) | 4.58 (0.96) |
| **Measured at the individual level** | | | | | |
| Perceived unit manager effectiveness | 3.94 (1.25) | 4.07 (1.32) | 4.93 (1.03) | 4.22 (1.26) | 5.05 (0.91) |
| PU of formal codification KSMs | 4.39 (1.36) | 4.97 (1.43) | 5.54 (1.13) | 4.95 (1.30) | 5.67 (0.78) |
| PU of informal personalization KSMs | 5.01 (1.22) | 4.35 (1.42) | 5.29 (1.19) | 4.70 (1.36) | 5.36 (0.90) |
| PU of formal personalization KSMs | 4.66 (1.15) | 4.63 (1.17) | 5.37 (1.10) | 4.54 (1.18) | 5.34 (0.83) |

### 7.2.3. Control Variables

Prior research suggests that task factors and individual attributes can influence knowledge sharing. Hence, we include the following control variables in our analysis:

1. Task interdependence: Individuals whose jobs entail a high amount of interdependency with others face greater uncertainty about their work (Janz, Colquitt, & Noe, 1997). The higher the level of uncertainty and ambiguity in the environment, the more individuals will view personalization KSMs to be useful, compared to codification KSMs (Daft & Lengel, 1986). Personalization mechanisms allow knowledge providers to engage in discussions with knowledge seekers to provide better understanding and insights into the relevant knowledge and information (Gray & Meister, 2006). We adapted measures for task interdependency from Kiggundu (1983).

2. Individual propensity to learn: Borrowing from the educational psychology literature, Gray and Meister (2004) introduced the concept of individual propensity to learn into the knowledge sharing literature. They found that individuals with a strong learning orientation have strong beliefs that their ability can be improved through constant learning and adaptation. Such individuals were thus more likely to seek knowledge via all types of KSMs. We adapted the measures for individual propensity to learn from Gray and Meister (2006).

3. Network size: Borgatti and Cross (2003) found that knowledge seeking via informal personalization was highly dependent on whether individuals knew of others' expertise and whether they had access to potential knowledge providers. Individuals who have a larger personal network are better able to identify the right experts and to gain access to experts when required (Cross & Cummings, 2004). Hence, we expect that an individual with a larger personal network is likely to perceive informal personalization as a more useful KSM than other KMSs. Because it was not practical to collect a complete set of network data for a control variable, we generated a one-item measure for network size by asking respondents how many colleagues' contact numbers they have stored in their personal cell phone. This measure was generated based on insights from our interviews. Many employees of Alpha Inc. communicate with their colleagues via cell phones because they were often out in the field. Hence,

the number of colleagues whose numbers were stored in one's cell phone was a good estimate of the size of that individual's personal network.

We also included three additional controls – age, organizational rank (senior or junior personnel), and job type (staff or line personnel) of the respondent. Appendix B provides a listing of the measures used for all constructs and Appendix C provides the item correlations.

# 8. Results of Analysis

## 8.1. Analysis Approach

Because we measured the organizational climate factors at the unit level, the data has a nested structure and the observations for individuals in the same unit may be correlated with one another. To account for possible biases due to the nested data structure, we tested the hypotheses using multilevel structural equation modeling (SEM) with full maximum likelihood estimation in M-plus 6.1 (Muthén & Muthén, 1998-2007). Multilevel SEM is often used when researchers conduct cluster sampling in which individuals are sampled in different groups. In such a case, there is a lack of independence among the observations because individuals in the same group may share certain influencing factors and hence have correlated observations (Muthén & Satorra, 1989). Multilevel SEM allows for the modeling of both average (fixed) effects and individual/group (random) effects, and explicitly accounts for the interdependence of clustered units. The use of multilevel SEM is also more suitable than hierarchical linear modeling, which is based on linear regressions because the former considers latent variables that are not directly measured, and accommodates them in a hierarchical structure.

M-Plus allowed the modeling of multilevel data in two ways. The first way was a more traditional approach of modeling multilevel data termed "aggregated analysis", in which the usual parameter estimates are computed but adjusted for standard errors and goodness of fit testing based on the nested nature of the data. The second approach, termed "disaggregated analysis", models the complex and nested structure of the sample (Muthén & Satorra, 1995). The latter approach emphasizes the estimation and comparison of the components of variation at the individual level (level 1) versus unit level (level 2). This allows the segregation of the variance of a construct into individual versus unit level, and thus enables the examination of the effects of a construct measured at an individual versus aggregated at a unit level (Lüdtke et al., 2008). Hence, the disaggregated variance approach has a "higher level of ambition" than the aggregated analysis approach (Muthén & Satorra, 1989, p. 288). We thus adopted the disaggregation approach of estimating one model for the individual-level variation and formulating another model for the across-unit variation (Lüdtke et al., 2008; Muthén, 1994).

Moreover, because we also have observations from five different subsidiaries, we included fixed effects for subsidiaries to control for the correlation in error terms within subsidiaries in order to not ignore the additional levels of nesting (Julian, 2001; Moerbeek, 2004). Figure 1 shows the path model of the tested model for both the within-unit and between-unit levels of analyses. The thickness of the arrows from the key independent variables to the dependent variables from illustrated in the path diagram shows the relative strength of the hypothesized relationships between the organizational climate and perceived manager effectiveness variables and the perceived usefulness of the KSMs constructs.

**Figure 1. Summary of Path Model Tested in MPlus**
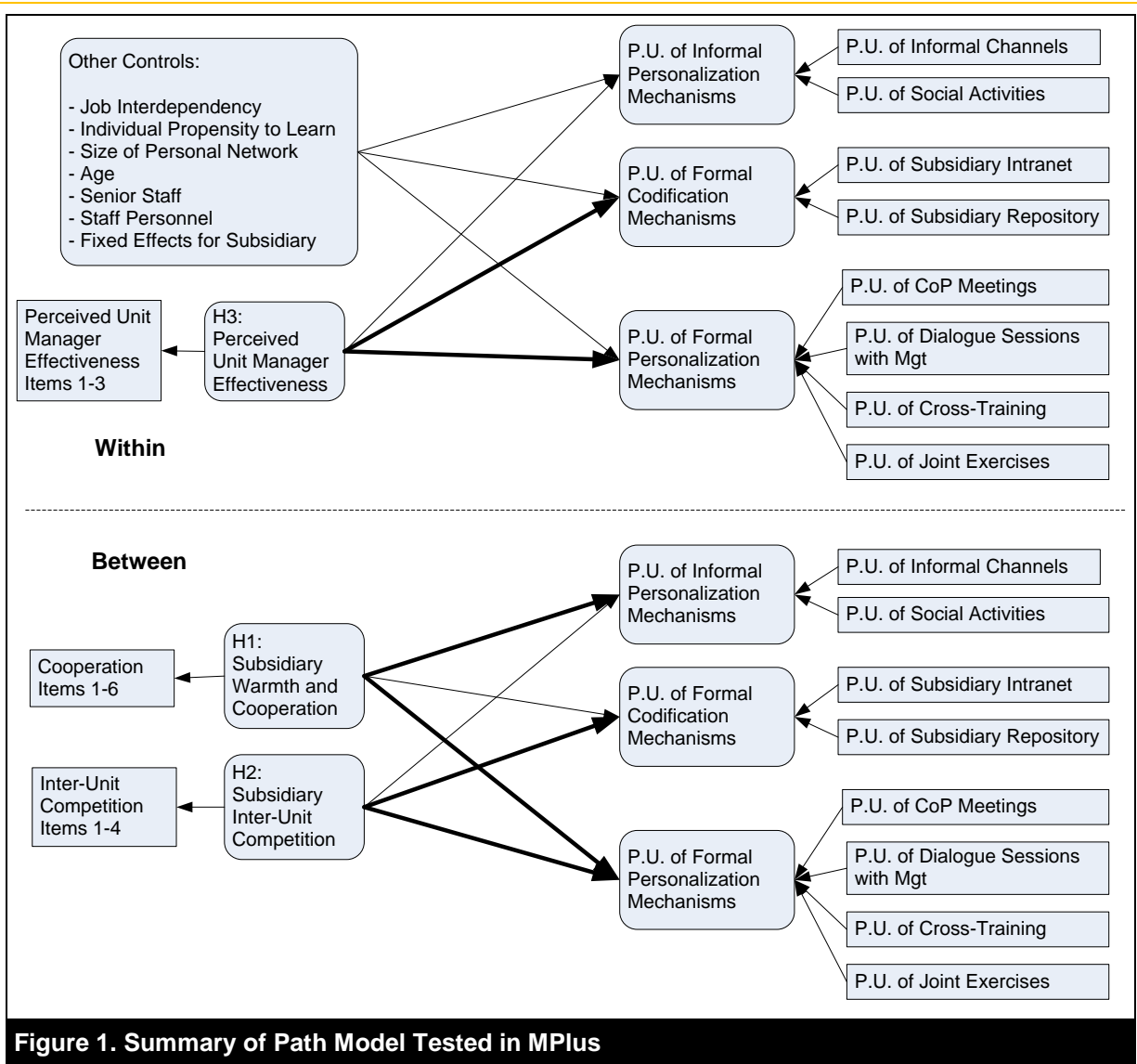
## 8.2. Testing the Measurement Model

Because the dependent variables were formative constructs, we tested the validity and reliability of the three independent variables: warmth and cooperation, inter-unit competition, and perceived manager effectiveness; and the two multi-item reflective control variables: task independence and individual propensity to learn. We used stratified random sampling by units to randomly split our sample into two halves. We used MPlus to apply a multi-level exploratory factor analysis (EFA) on one half of the sample, and a multi-level confirmatory factor analysis (CFA) on the other half of the sample to check the reliability and validity of the measurement model. We used several indices to determine model fit (Dyer, Hanges, & Hall, 2005). While model fit can be assessed using the chi-square goodness-of-fit statistic, which is expected to be non-significant for a well-fitting model, the chi-square statistic is typically significant when sample sizes are large. Thus, we used the comparative fit index (CFI), the root mean square error of approximation (RMSEA), and the standardized root mean square residual (SRMR) as guides in assessing fit. We also differentiate between the SRMR for the group level versus individual level model[5] because prior research has shown that fit statistics that differentiate between levels are more informative in indicating where the source of the lack of model fit may arise from (Ryu & West, 2009). Findings from the multilevel CFA showed that the measurement model was a reasonable fit (SRMR (between) = 0.021; SRMR (within)

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[5] Only the SRMR is provided for individual level and group level in M-PLUS. Other fit indices were not differentiated by levels

= 0.040; RMSEA =0.047[6]; CFI = 0.946). Findings from the multilevel EFA also showed reasonable fit (SRMR (between) = 0.015; SRMR (within) = 0.019; RMSEA =0.067; CFI = 0.951). Appendix D shows the EFA factor loading scores.

| Table 5. Internal Consistency of Constructs | | |
|---|---|---|
| | **Cronbach alpha** | **Average variance extracted** |
| Warmth and cooperation (COOPERATION) | 0.89 (0.92) | 0.59 (0.69) |
| Inter-unit competition (COMPETITION) | 0.84 (0.89) | 0.57 (0.68) |
| Perceived unit manager effectiveness (MANAGER) | 0.96 | 0.78 |
| Job interdependency (DEPEND) | 0.82 | 0.66 |
| Individual propensity to learn (LEARN) | 0.92 | 0.64 |

We also tested for convergent and discriminant validity. Convergent validity is assessed by reviewing the *t*-tests for the factor loadings. Table 5 provides the reliability and the average variance extracted (AVE) for each construct. The Cronbach alphas exceeded Nunnally's (1967) threshold of 0.70, and the AVE for all constructs were also above the recommended threshold of 0.50 (Hair, Anderson, Tatham, & Black, 1995). The discriminant validity was also tested by comparing the square root of the AVE for each construct with the correlation between the focal constructs and all other constructs. Tables 6 and 7 show the intercorrelations among all the constructs at the unit level and the individual level respectively, with the square root of AVEs shown on the diagonals.

| Table 6. Descriptive Statistics and Correlations Among Unit Level Constructs | | | | | |
|---|---|---|---|---|---|
| | **1** | **2** | **3** | **4** | **5** |
| 1. Formal Codification | NA | | | | |
| 2. Informal Personalization | 0.36 | NA | | | |
| 3. Formal Personalization | 0.61 | 0.35 | NA | | |
| 4. Cooperation | 0.53 | 0.41 | 0.57 | 0.83 | |
| 5. Competition | 0.34 | -0.09 | 0.24 | 0.11 | 0.82 |
| Mean | 5.29 | 4.99 | 5.06 | 4.51 | 4.51 |
| S.D. | 0.61 | 0.68 | 0.58 | 0.41 | 0.39 |

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[6] M-Plus does not provide the confidence intervals for the RMSEA for multi-level analysis.

| Table 7. Descriptive Statistics and Correlations Among Individual Level Constructs | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | **1** | **2** | **3** | **4** | **5** | **6** | **7** | **8** | **9** | **10** | **11** | **12** |
| 1. Formal Codification | NA | | | | | | | | | | | |
| 2. Informal Personalization | 0.28 | NA | | | | | | | | | | |
| 3. Formal Personalization | 0.60 | 0.43 | NA | | | | | | | | | |
| 4. Cooperation | 0.47 | 0.36 | 0.57 | 0.77 | | | | | | | | |
| 5. Competition | 0.26 | 0.15 | 0.22 | 0.22 | 0.76 | | | | | | | |
| 6. Manager | 0.48 | 0.31 | 0.53 | 0.62 | 0.22 | 0.88 | | | | | | |
| 7. Depend | 0.13 | 0.18 | 0.16 | 0.26 | 0.06 | 0.23 | 0.80 | | | | | |
| 8. Learn | 0.26 | 0.25 | 0.31 | 0.29 | 0.27 | 0.26 | 0.04 | 0.81 | | | | |
| 9. Network Size | 0.11 | 0.14 | 0.07 | 0.15 | 0.14 | 0.08 | 0.09 | 0.09 | NA | | | |
| 10. Age | 0.02 | -0.10 | 0.03 | -0.08 | -0.02 | -0.04 | -0.12 | -0.10 | -0.11 | NA | | |
| 11. Senior | -0.01 | 0.04 | -0.02 | -0.02 | 0.02 | 0.04 | 0.11 | -0.06 | 0.07 | -0.04 | NA | |
| 12. Staff | 0.11 | 0.07 | 0.08 | 0.10 | -0.05 | 0.17 | 0.19 | -0.03 | -0.14 | 0.01 | 0.12 | NA |
| Mean | 5.15 | 4.97 | 4.94 | 4.50 | 4.58 | 4.49 | 3.76 | 5.52 | 3.82 | 3.08 | 0.35 | **0.41** |
| S.D. | 1.28 | 1.26 | 1.13 | 1.00 | 1.10 | 1.24 | 1.27 | 0.92 | 1.21 | 0.98 | 0.48 | 0.49 |

## 8.3. Testing the Structural Model

We applied Mplus to test the multilevel SEM model. The fit statistics for our model were as follows: CFI was 0.937, RMSEA was 0.042, and SRMR was 0.021 for the unit level and 0.046 for the individual level. These fit indices were in line with Hu and Bentler's (1999) recommendations for good fit. The $R^2$ show that the independent variables account for between 17 to 37 percent and between 17 to 42 percent of the variance for the dependent variables at the individual and unit levels respectively. Table 8 presents the results of the estimated structural model.

To test our hypotheses, we needed to compare whether warmth and cooperation (H1), competitiveness (H2), and perceived unit manager effectiveness (H3) have similar influence on individuals' perceived usefulness of different KSMs. MPLUS allows the specification of parameter constraints, and provides a Wald chi-square test of the specified constraints. We thus conducted six separate Wald tests to test the null hypotheses that two of the path coefficients were equal, based on H1, H2, and H3.

## Table 8. Results of MPLUS Multilevel SEM Analysis

| | Dependent variables: perceived usefulness of | | |
|---|---|---|---|
| | Informal personalization | Formal codification | Formal personalization |
| Warmth and cooperation | $0.41^{**}$ ($\beta_{11}$) | $0.57^{**}$ ($\beta_{12}$) | $0.61^{**}$ ($\beta_{13}$) |
| Inter-unit competitiveness | $-0.10^{*}$ ($\beta_{21}$) | $0.26^{**}$ ($\beta_{22}$) | $0.14$ ($\beta_{23}$) |
| Perceived unit manager effectiveness | $-0.01$ ($\beta_{31}$) | $0.16^{**}$ ($\beta_{32}$) | $0.15^{**}$ ($\beta_{33}$) |
| Job interdependency | $0.06+$ | $-0.03$ | $0.03$ |
| Individual propensity to learn | $0.16^{**}$ | $0.04$ | $0.12^{**}$ |
| Network size | $0.07+$ | $0.06+$ | $0.01$ |
| Age | $-0.01$ | $0.09^{**}$ | $0.12^{**}$ |
| Seniority | $0.04$ | $-0.05$ | $-0.03$ |
| Staff personnel | $-0.01$ | $0.02$ | $-0.02$ |
| R-Square (individual level) | $0.17$ | $0.31$ | $0.37$ |
| R-Square (unit level) | $0.17$ | $0.42$ | $0.42$ |
| Fit statistics | $\chi^2 = 12,690$, df = 611, CFI = 0.937, RMSEA = 0.042, SRMR (Between) = 0.021, SRMR (within) = 0.046 | | |

Note: $^{+}$ $p < 0.10$, $^{*}$ $p < .05$; $^{**}$ $p < .01$; Standardized path coefficient values are displayed in the above table.

## Table 9. Results of Hypotheses Testing

| | | Wald-Test Value | P-Value |
|---|---|---|---|
| Test 1 | Constrained: $\beta_{11} = \beta1_2$ | 0.73 | 0.39 |
| Test 2 | Constrained: $\beta_{12} = \beta_{13}$ | 0.03 | 0.88 |
| Test 3 | Constrained: $\beta_{21} = \beta_{22}$ | 9.20 | <0.01 |
| Test 4 | Constrained: $\beta_{21} = \beta_{23}$ | 5.21 | <0.05 |
| Test 5 | Constrained: $\beta_{31} = \beta_{32}$ | 4.63 | <0.05 |
| Test 6 | Constrained: $\beta_{31} = \beta_{33}$ | 4.97 | <0.05 |

Table 9 summarizes the results of the Wald chi-square tests to test our hypotheses. For example, to test H1, Test 1 compares whether cooperation had equal influence on respondents' usefulness ratings of informal personalization and of formal codification KSMs; Test 2 compares whether cooperation had equal influence on respondents' usefulness ratings of informal personalization and of formal personalization KSMs.

## 8.4. Summary of Results

Table 8 shows that a warm and cooperative climate is positively and significantly related to individuals' usefulness ratings of all three types of KSMs, and there were no significant differences in the effect of a cooperative climate on the three types of KSMs. These results show that a cooperative climate has a consistently positive impact on individuals' usage of all three types of KSMs; hence, H1 is not supported.

Table 8 shows that inter-unit competition is significantly and positively related to employees' perceived usefulness of formal codification KSMs (path coefficient $\beta_{22} = 0.26$, p<0.01). On the other hand, it is significantly and negatively related to employees' perceived usefulness of informal personalization KSMs (path coefficient $\beta_{21} = -0.10$, p<0.05), and it is not significantly related to employees' perceived usefulness of formal personalization KSMs (path coefficient $\beta_{23} = 0.14$, p>0.10). Tests 3 and 4 in Table 9 show that a competitive organizational climate increases employees' perceived usefulness of formal codification KSMs relative to informal personalization KSMs (Test 3, Wald test = 9.20, p<0.01), and employees' perceived usefulness of formal personalization KSMs relative to informal personalization KSMs (Test 4, Wald test = 5.21, p<0.05). These results support H2.

Finally, our results show that employee perceptions of unit manager effectiveness are not significantly related to individuals' usefulness ratings of informal personalization KSMs (path coefficient $\beta_{31} = -0.01$, p>0.10), but significantly related to individuals' usefulness ratings of formal codification KSMs (path coefficient $\beta 3_2 = 0.16$, p<0.01) and of formal personalization KSMs (path coefficient $\beta_{33} = 0.15$, p<0.01). Table 9 further shows that perceived unit manager effectiveness has a significantly more positive influence on employees' attitudes towards formal codification KSMs (Test 5, Wald test = 4.63, p<0.05) and toward formal personalization KSMs (Test 6, Wald test = = 4.97, p<0.05), compared to informal personalization KSMs. These results support H3.

Job inter-dependency did not significantly influence the dependent variables, while individuals with greater propensity to learn were more likely to have positive attitudes towards the personalization KSMs. This may be because employees with a keen desire to learn find it important to make use of personalization KSMs to access knowledge to probe further.

In addition, our results show that the $R^2$ values were lower for informal personalization KSMs ($R^2 = 0.17$), compared to that for formal personalization KSMs ($R^2 = 0.31$) and for formal codification KSMs ($R^2 = 0.37$). This may be due to several reasons. First, demographic variables appear to have a more significant effect on the formal mechanisms. Older employees were more likely to view formal KSMs to be useful, perhaps because older employees in Alpha Inc. tend to abide by the rules of the organization and rely more on their management to tell them what was acceptable or expected of them. Hence, they tend to have more positive perceptions of formal KSMs, and they rely less on informal personalization KSMs to spontaneously share knowledge. Another reason for the relatively lower $R^2$ for informal personalization KSMs is that perceived manager effectiveness had a much greater effect on explaining the perceived usefulness of formal codification and formal personalization KSMs.

## 8.5. Checking for Common Method Bias

While we collected additional data on organizational climate perceptions from another group of respondents in the same unit of each respondent to minimize common source bias for two of the key independent variables of this study, there were five other perceptual constructs that were collected from the same source as the dependent variables. Hence, this design cannot completely eliminate all forms of common method variance. To address possible common method bias effects, we performed three tests that Lindell and Whitney (2001) recommend. First, we performed Harman's single-factor test for all the items (Harman, 1967). If a significant amount of common method bias exists in the data, then a factor analysis of all of the variables in the model will generate a single factor that accounts for most of the variance. Unrotated factor analysis using the eigenvalue-greater-than-one criterion revealed nine factors, and the first factor explained only 20.8 percent of the variance in the data. Secondly, we examined the fit of a one-factor CFA model to our data. The results show that a one-factor CFA model provides a poor fit to our data (CFI=0.232, RMSEA = 0.130, SRMR = 0.199).

Thirdly, we examined common method bias using the marker-variable technique (Malhotra et al., 2006). According to Lindell and Whitney (2001, p. 115), "The smallest correlation among the manifest variables provides a reasonable proxy for common method variance". Malhotra, Kim, and Patil (2006) found that, when the correlation coefficient is less than 0.10, common method variance effects are not substantial, and thus common method bias is not a serious threat. The results of our analysis indicated that common method bias, if any, was not substantial because the smallest correlation coefficient among the reflective latent variables is 0.04. Based on these three methods, it seems reasonable to conclude that this present study is relatively robust against common method bias.

## 9. Discussion

This study investigates how perceptions of organizational climate and manager effectiveness influence individuals' attitudes toward different types of KSMs. We found that having a warm and cooperative climate has a positive influence on individuals' utility perceptions of all three types of KSMs. Contrary to hypothesis 1, we found no significant differences in the effects of a cooperative climate on the three types of KSMs. This may be because a warm and cooperative climate creates a climate where all individuals are helpful to each other, which gives individuals the confidence that they can use any type of KSM to access useful knowledge, regardless of the mechanism through which knowledge sharing occurs. This implies that our argument on the influence of a warm and cooperative climate on increasing perceived information availability has to be amended. It appears that a warm and cooperative climate increases perceived information availability not only for personalization mechanisms, but also for codification mechanisms. Kankanhalli et al. (2005) has also found that a cooperative climate increases individuals' tendency to contribute to knowledge repositories, which increases information availability for users of knowledge repositories. We tested this argument by examining the relationship between warmth and cooperation and the extent of contribution to repositories because we also collected data on individuals' extent of contribution to repositories[7]. By running a regression model with a similar set of independent variables described above, we found that a warm and cooperative climate had a positive and significant influence ($\beta$ = 0.75, $p < 0.001$) on the extent of individual contribution to repositories. This supports the idea that a warm and cooperative climate increases the availability of information from all KSMs, which enhances individuals' usefulness perceptions of all KSMs.

Prior research has found that a competitive organizational climate detracts employees from sharing knowledge with each other (Menon & Pfeffer, 2003; Tsai, 2002). Consistent with these findings, our study shows that individuals' perceptions about the usefulness of informal personalization KSMs decrease in a competitive climate. However, it would be mistaken to conclude that knowledge sharing does not happen in a competitive climate. Rather, our findings suggest that the competitiveness of organizational climate affects how knowledge sharing happens. Perceptions of a competitive inter-unit climate increase perceived utility for using formal codification and personalization KSMs relative to informal personalization mechanisms to share knowledge. Rivalry and competition tends to make individuals sensitive to exposing themselves to the stigma of ignorance and the implication of personal failings by asking for information or knowledge from others. Consistent with this argument, our results show that a competitive climate is associated with lower usefulness perceptions of informal personalization mechanisms. Instead, individuals prefer less visible methods of knowledge sharing, which is through repositories. A competitive climate also increases individuals' preferences for formal personalization mechanisms compared to informal personalization mechanisms because formal mechanisms are formed for the purpose of facilitating knowledge sharing. Hence, knowledge seeking in such occasions is less likely to be construed as an admission of one's incompetence.

Finally, our results show that individuals who perceive their managers to be more effective tend to have a significantly more positive opinion of the usefulness of formal KSMs – both formal personalization and formal codification mechanisms – compared to informal personalization KSMs. This shows the important role that managers play in influencing users' perceptions of formal mechanisms. Individuals who view their managers more positively tend to be more supportive of top-

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[7] We asked respondents to rate the extent to which they agree with the following statements, which are adapted from Kankanhalli et al. (2005): "I frequently make contributions to the KM repository" and "I regularly use the KM repository to contribute my knowledge in my work".

down initiatives provided by their managers, such as dialogues sessions with senior management. Our findings highlight that managers can be more strategic in leveraging their influence by focusing more on promoting formal KSMs. This does not mean simply using technological tools or promoting repositories, but formalizing opportunities to share knowledge via both personalization and codification KSMs.

## 9.1. Implications for Research

Our study has implications for future research in the following ways. First, most prior research examining individuals' preferences for different media characteristics for information and knowledge exchange has focused on task characteristics and individual characteristics. This stream of research assumes that each KSM has inherently objective properties that are invariant across contexts (Fulk et al., 1987). These objective characteristics thus influence individual attitudes and behaviors toward the use of the channel, regardless of context (Saunders & Jones, 1990). However, prior research has shown that knowledge sharing is significantly influenced by an organization's context because social settings often play a key role in influencing an individuals' attitudes and beliefs (Alavi et al., 2005). Hence, our study examines how the organizational context shapes individuals' perceptions of different KSMs. Our findings highlight that, controlling for task and individual characteristics, organizational climate and perceptions of unit managers influence how individuals perceive the utility of different KSMs.

In addition, our work highlights that, to examine the role of organizational norms and other social contextual factors, researchers need to move beyond the cooperation dimension. Most studies conclude that the more cooperative an organization's climate, the fewer barriers there are for knowledge sharing. But perceptions of cooperativeness and competitiveness can co-exist in a multi-unit organization, which raises the question of how organizations can foster knowledge sharing in conditions of "coopetition". Focusing on perceived utility of KSMs, we found that ,while perceptions of a cooperative climate improves individuals' attitudes toward knowledge sharing regardless of the type of KSM, perceptions of a competitive climate and one's perceptions of the unit manager had different influence on the usefulness perceptions of different KSMs. This highlights that the influence of the organizational context on individuals' attitudes and perceptions about knowledge sharing may be more nuanced than the simple relationship that cooperativeness enhances knowledge sharing.

Third, prior research has shown that the extent and willingness of individuals to share knowledge with others are influenced by senior management support (Tan & Zhao, 2003). To the degree that knowledge sharing is effortful, support from management in the form of requisite resources (e.g., time and tools) is likely to be important to foster employees' knowledge sharing behaviors. Our research provides additional insights by showing that employees' attitudes toward knowledge sharing – specifically, utility perceptions of institutionalized KSMs – are also influenced by how they perceive their managers. Our findings suggest that employees are more likely to reciprocate with positive attitudes toward KSMs implemented and advocated by their managers when they perceive the latter to have fulfilled their roles effectively.

Finally, in this paper, we view knowledge management in a holistic manner. As many prior researchers highlight, there is a need for "a balanced view of IT in KM" (Gray & Meister, 2006, p. 153). IT alone does not provide a solution for KM. Rather, there is a need to view IT as only part of the whole portfolio of KSMs. This paper moves the literature toward a systematic way of examining portfolios of KSMs by acknowledging that different types of KSMs are in use, but individuals may prefer KSMs with certain characteristics (e.g., formal vs informal or codification vs personalization) under different task, individual, and contextual situations. By focusing on the organizational context, our study highlights that certain types of KSMs are more appropriate given a social context.

## 9.2. Implications for Practice

Prior research has argued that organizational climate significantly influences the amount of knowledge sharing in an organization. Given that an organization's climate is not something that can be easily changed, such conclusions provide little guidance to managers about what they should do given the inherent characteristics of their organizational climate. This study is a step toward providing guidance on how we can enable or facilitate knowledge sharing in different contextual situations; for

example, even in a climate where there is a high level of competition. This study thus provides insights into how managers should design their KM programs in line with employees' perceptions of the organizational climate and their managers.

Our study provides useful guidance to managers about how they should consider social contextual factors in designing a portfolio of KSMs. For example, in an organization that has a warm and cooperative climate, knowledge sharing can be fostered through various means, and implementing a knowledge repository may not be the only approach. The organization can put in place various opportunities that allow employees to share knowledge with one another, and the cooperative climate will encourage employees to share. With the increasing popularity of social network applications, these are also potential tools that organizations can use to facilitate knowledge sharing via informal personalization KSMs in an organization with a warm and cooperative climate. On the other hand, if employees tend to perceive an organization as having a competitive climate, it may be worth investing in repositories as a source of information and knowledge for employees who may be concerned about seeking information directly from others. Finally, if employees tend to have very positive perceptions of their managers, the latter may be able to leverage these positive perceptions to push for more top-down approaches for knowledge sharing such as having institutionalized routines. As the KM program of each organization is made up of a portfolio of KSMs, insights from this study will help managers to customize a portfolio of KSMs based on the climate of their organization.

## 9.3. Limitations

In this paper, we compare the use of informal personalization, formal personalization, and formal codification KSMs. Perceptions of the usefulness of these mechanisms can depend on the way these mechanisms have been implemented across subsidiaries. The way the mechanisms were implemented was controlled for in our study because the mechanisms were implemented in a similar manner across the five subsidiaries. In terms of informal personalization KSMs, we included the size of employees' personal networks to control for its influence on perceptions of usefulness. Future research would benefit from exploring how the implementations of these KSMs influence knowledge sharing in organizations.

Depending on the type of knowledge sought and the task situation, the effectiveness of each KSM can differ from one situation to another. Our study does not focus on the task characteristics and knowledge characteristics that influence individuals' decision to use one KSM over another because this has been examined in prior research (e.g., Daft & Lengel, 1986; Zimmer et al., 2007), and our focus was on the social context. Nevertheless, we controlled for the task characteristics and individual characteristics of respondents. Future research could extend this research by examining if individuals' use of various KSMs will differ under the interactional influence of task and social environmental characteristics.

In addition, this study examines five subsidiaries in a single organization. The variance in the organizational climate characteristics of different subsidiaries in one organization may not be as wide as the variance across different organizations. Hence, future research can determine if the same findings apply to other companies or to a variety of companies with wider variance in their climate characteristics.

## 10. Conclusion

In this study, we examine how perceptions of organizational climate and manager effectiveness influence individual attitudes toward different KSMs, and how the influence of contextual factors differs across mechanisms. We identified three types of KSMs based on the literature: (1) informal personalization KSMs, (2) formal codification KSMs, and (3) formal personalization KSMs. Our empirical results show that all KSMs work equally effectively in a warm and cooperative climate. A competitive organizational climate, on the other hand, increases individuals' preference for using formal codification and personalization KSMs, and decreases individuals' preference for using informal personalization KSMs. Finally, individuals who perceive their managers to be more effective tend to have a significantly more positive opinion of the usefulness of formal mechanisms (both codification and personalization) compared with informal personalization mechanisms. This study contributes to the literature by providing an extended and more nuanced perspective of how we can

enable knowledge sharing in different social contexts and situations. Insights from this study will also help managers to customize a portfolio of KSMs based on their subordinates' perceptions of the organizational climate and their managers.

## Acknowledgements

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## About the Authors

**Wai Fong BOH** is Associate Professor in Information Technology and Operations Management at the Nanyang Business School, Nanyang Technological University (Singapore). She received her Ph.D. from the Tepper School of Business at Carnegie Mellon University. Her research interests are in the areas of knowledge management, innovation management and social networks. She is/has been on the editorial boards of *Management Science*, *Information Systems Research*, *Organization Science*, *Information & Organization*, and *Journal of Database Management*. She has published in *Management Science*, *Organization Science*, *Academy of Management Journal*, *MIS Quarterly*, *Journal of Management Information Systems*, and other leading journals. She has received numerous awards, including the 2007 Top Five IS Publications, the 2009 Management Science Distinguished Service Award for Reviewers, and the 2005 Academy of Management OCIS Best Dissertation Award.

**Sze-Sze WONG** is Associate Professor in Strategy, Management, and Organization at the Nanyang Business School, Nanyang Technological University (Singapore). She received her Ph.D. from the Fuqua School of Business at Duke University. She has published her research in social networks, team learning, and knowledge management. Her current research focuses on the development of social relationships, and how social relationships can bridge cognitive differences and enable more effective collaboration for knowledge creation.