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SUPPORTING KNOWLEDGE SHARING VISIBILITY: A QUALITATIVE ANALYSIS

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Abstract

Knowledge sharing visibility is a critical environmental factor which can reduce social loafing in knowledge sharing. This is especially true in IT-based knowledge sharing. As such, it is imperative that we better understand how to design IT-based Knowledge Management Systems (KMS) to support high knowledge sharing visibility. This paper examines the impact of knowledge management technology functions (e.g., tracking, knowledge storing) on knowledge sharing visibility through qualitative analysis of semi-structured interviews with participants in a Chinese company. Impact and implications of use for their existing KMS are examined. Results encourage applied statistical, tracking, knowledge distribution and knowledge storing functions for monitoring explicit knowledge sharing, and suggest integration of knowledge maps with communication tools (e.g., instant messenger) to support visibility for implicit knowledge sharing. Extension to use of web 2.0 technologies (e.g., weblogs) in KMS is also explored.

Keywords: IT functions, Knowledge Management (KM), Knowledge Management Systems (KMS), Knowledge sharing visibility, Social loafing, Case study.

1 INTRODUCTION

Numerous firms have adopted IT-based Knowledge Management Systems (KMS) to support their Knowledge Management (KM) projects (Alavi and Leidner, 2001; Hejduk, 2005). Contrary to early expectations, these firms faced a serious problem in that IT-supported KM projects have a high failure rate. One critical reason is the "knowledge sharing dilemma" in that employees have a tendency for social loafing and do not contribute their valuable knowledge to others through IT systems (Cabrera and Cabrera, 2002). For example, some employees use only others' knowledge but do not contribute anything in the KMS. Especially in online environments, the knowledge sharing dilemmas of high levels of social loafing are very serious (King and Marks, 2008; Wasko and Faraj, 2005). It is important to create an environment to reduce social loafing in IT-based knowledge sharing.

From the perspective of social loafing theory, task visibility is a critical contextual variable which will reduce the employees' intention of social loafing in collective work (George, 1992; Jones, 1984; Liden et al., 2004). In current research, it refers to employees' efforts (e.g., sharing knowledge with co-workers via KMS) being identifiable (George, 1992). Under conditions of high knowledge sharing visibility, individuals will perceive their knowledge sharing effort as being easily recognized and will thus be less likely to engage in social loafing. Several studies (Jones, 1984; Melski et al., 2008; Piezon and Donaldson, 2005) report that information technologies can be applied to improve task visibility. According to Sambamurthy's (2003) framework on digital options, common knowledge management systems have several IT-enabled capabilities (e.g., process richness, knowledge reach, knowledge richness) which include many lower level functionalities (e.g., statistical, tracking, knowledge storing) supporting work process and task environment. As we create information systems to support KM, it becomes imperative that we take into consideration the impact of KM technologies on knowledge sharing visibility.

Unfortunately, little is known of the impact of KM technologies on knowledge sharing visibility even though several technology functions (e.g., tracking) have been applied to monitor knowledge sharing behaviour in online environments (Griffith and Sawyer, 2006). In this study we fill this gap by investigating the impact of KM technology functions on knowledge sharing visibility. We pose two research questions: *1) How do KM technology functions affect knowledge sharing visibility? 2) Beyond currently applied KM technologies, are there any other technology functions that can be considered to be applied for supporting visible environments?*

The remainder of the paper is organized as follows. In section two we describe the literature and the research constructs. In sections three we present the research approach of the study, before reporting the case analysis results in section four. In section five we discuss the results and limitations, and suggest future research directions. Conclusions are drawn in section six.

2 LITERATURE REVIEW

2.1 Knowledge Sharing Visibility

Knowledge sharing visibility originated from the definition of task visibility (Jones, 1984). In task visible environments, people's work effort can be identified and monitored. Thus, increasing task visibility can reduce social loafing in the work environment (George, 1992; Jones, 1984; Liden et al., 2004). In this study, knowledge sharing visibility can be defined as the extent to which employees' knowledge sharing behaviour can be identified and monitored by other participants (e.g., their supervisors and peer knowledge reviewers). In high task visible environments, people's (knowledge sharing) behaviour can be easily recognized. However, in non-routine tasks, such as knowledge sharing, task visibility is inherently low, and people have a high tendency to free ride in the KMS

(Goodman and Darr, 1998; King and Marks, 2008). Thus, it is important to create KMS to support high visibility.

There are several studies that discuss how to increase task visibility. More than twenty years ago, Jones (1984) provided an individual-task-structure framework to explain the determinants of task visibility. George (1992) provides three ways to maintain high levels of task visibility, that is, monitoring individual output, having a strong supervisory presence, and keeping groups small. Piezon and Donaldson (2005) provide several ways of increasing task visibility, i.e., creation of weekly milestones, restriction of communication methods, assigning roles with clearly defined responsibilities, and online peer evaluation. In this study we have adopted the Jones' (1984) theoretical framework, and investigate three determinants of knowledge sharing visibility: individual behaviour observability, task clarity and structure differentiation.

1) Individual behaviour observability: Individual behaviour observability can be defined as the extent to which the participant's knowledge sharing behaviour can be recognised and observed in KMS. Many studies have found individual behaviour observability to be a critical mediator between group size and task visibility (George, 1992; Jones, 1984). If group size increases, participants will consider it higher anonymity and feel they have lower opportunity to be observed equally, both of which may reduce their perceived task visibility. The following two constructs are factors affecting the level of individual behaviour observability based on the literature (Jones, 1984; Liden et al., 2004).

- **Recognition (RE):** In the literature, increasing organizational size will reduce task visibility because it is the individual anonymity of the large organization that makes monitoring difficult (Liden et al., 2004). In this study we define recognition level as the extent to which participants' names and roles are identified by others when knowledge is shared.
- **Equality of Contribution (EC):** Many studies argue that lower equality of contribution may negatively affect task visibility (Jones, 1984; Piezon and Donaldson, 2005). Porter and Laler (1965) claim that in small organizations, individual contributions are more visible at lower levels; in large organizations only the top is more visible, and managers have greater opportunities for displaying performance. Further, Jones (1984) argues that lower opportunity to participate may reduce task visibility. In this study EC is related to the extent to which a KMS participant's contribution can be identified by others as being equally based on its quality, independent of contributor levels.

2) Task clarity: Previous studies have argued that the more complex and ambiguous the form of the task, the more difficult will be the monitoring problem (Liden et al., 2004). The following two constructs are factors affecting the level of task clarity of knowledge sharing based on the literature.

- **Task Routineness (TR):** Knowledge sharing has always been identified as a non-routine task in which the process is unstructured and ambiguous (Argote et al., 2003; Sackmann and Friesl, 2007). If task routineness is low, the possibility of monitoring is also low. In this study, task routineness is related to the levels of structure in the knowledge sharing process.
- **Task Independence (TI):** If a task is interdependent, task visibility is low (Jones, 1984). In this study we define task independence as the extent to which KMS participants share knowledge without help from others (Jarvenpaa and Staples, 2000).

3) Structure differentiation: Based on Jones (1984), organizations will attempt to create a task context or structure that will increase task visibility. Structure differentiation may be regarded as the way in which organizations attempt to control and manage the effects of task visibility, shirking and free riding. The following two constructs are factors affecting the level of structure differentiation of knowledge sharing based on the literature.

- **Vertical Differentiation (VD):** Vertical differentiation will both increase task visibility and reduce the possibility of shirking and free riding (Jones, 1984). In this study increasing vertical differentiation means increasing the hierarchical levels and reducing the span of control by peer reviewers.

- **Horizontal Differentiation (HD):** Many studies argue that the grouping of tasks according to employees' expertise increases the ability of supervisors to monitor and evaluate employee performance because supervisors will have a conception of appropriate subordinate performance (Beyer and Trice, 1979; Oh et al., 2006). In this study horizontal differentiation can be defined as the extent to which participants are grouped according to their expertise.

In summary, knowledge sharing visibility can be determined by recognition level, equality of contribution, task routineness, task independence, vertical differentiation, and horizontal differentiation. Further studies have confirmed that IT may affect these determinants of task visibility (Dewett and Jones, 2001; Piezon and Donaldson, 2005). Especially for the task as IT-based knowledge sharing, it is considerable encouragement for developers of KM systems supporting these different determinants to actively increase knowledge sharing visibility.

2.2 IT Functionality

In this study we focus on the knowledge sharing in KMS which have different functions to support KM processes (Alavi and Leidner, 2001). The question is which KM functions have positive/negative impacts on knowledge sharing visibility. Previous studies have developed several typologies at the technology functionality level, but most of these are context-specific. It is difficult to find a typology that can be generally applied to various situations. One of most adopted typology is Davenport and Short's (1990) IT capabilities for process redesign. In this typology, the authors suggest nine IT functionalities. Further, Lee and Lim (2005) adapt old functionalities and add new IT functionalities that suit technology development. The adapted typology has fourteen functionalities, including some knowledge management capabilities such as knowledge storing and knowledge distribution. Based on Sambamurthy et al.'s (2003) digital options, Lee and Lim (2005) also classify IT functionalities into four high-level IT-based strategic capabilities: digitised process reach, digitized process richness, digitized knowledge reach, and digitized knowledge richness. 'Reach' and 'richness' can be explained by the quantitative and qualitative nature of IT-based capabilities.

As knowledge sharing is the focus of this study, we consider only three IT strategic capabilities that can support the knowledge sharing process: process richness, knowledge reach, and knowledge richness. Further, based on the framework of Lee and Lim (2005), we identify six IT functionalities related to the three IT strategic capabilities. The KM technology classifications are illustrated in Table 1.

IT Strategic Capabilities	Definition	IT Fuctionalities
Process Richness	the quality of information collected about transactions in the processes and transparency of that information to other processes and systems that are linked to it, and the ability to use that information to reengineer the process (Sambamurthy et al., 2003)	Analytical & Statistical (AS)
		Tracking (TR)
Knowledge Reach	the comprehensiveness and accessibility of codified knowledge in a firm's knowledge base and the interconnected networks and systems for enhancing interactions among individuals for knowledge transfer and sharing (Sambamurthy et al., 2003)	Knowledge Distribution (KD)
		Knowledge Storing (KT)
Knowledge Richness	the systems of interactions among organizational members to support sense-making, perspective sharing and development of tacit knowledge (Sambamurthy et al., 2003)	Communication (CM)
		Collaboration (CL)

Table 1. KM Technology Classifications and Functionalities

For each function, we identify sub-functions (measures) which KMS have applied in this case. These features can be developed by system developers directly.

1) **Analytical and Statistical Functionality (AS):** AS refers to complex analytical methods which can bear on a process through proper information. In KMS these functionalities can be classified as AS:

Constructs	**Definition**
Poster Statistics (PS)	Number of each poster
Contributor Statistics (CS)	Total poster number, click number of each contributor
Department Statistics (DS)	Poster number, contributor number and click number of each department

2) **Tracking Functionality (TR):** TR refers to IT which can detail tracking of task status, inputs, and outputs.

Constructs	**Definition**
User Login/Registration (UL)	Registration with real information
Contributor Information (CI)	Showing contributor information in each poster, such as uploading time, contributor name & contact, co-author name & contact, and department they belong to.
Contributor History (CH)	Showing (by click) past knowledge the same contributor uploaded

3) **Knowledge distribution (KD):** KD refers to IT allowing the dissemination of explicit knowledge and expertise stored in an organization to improve business processes.

Constructs	**Definition**
Intranet (IN)	Providing Intranet to support each employee in the organization to access the uploaded knowledge
Publishing Notice (PN)	Sending notices to all employees about the new knowledge uploaded

4) **Knowledge Storing (KT):** KT refers to IT allowing the storage of explicit knowledge and expertise through knowledge filtering and codification.

Constructs	**Definition**
Knowledge Codification (CO)	Providing knowledge uploading interface to assist knowledge codification
Knowledge Category (CA)	Categorizing each knowledge to different category
Knowledge Retrieval (KR)	Providing searching engine to support knowledge seeking

5) **Communication (CM):** CM refers to IT allowing organizational members to communicate with each other via computer-mediated communication channels.

Constructs	**Definition**
Group Email (GE)	Providing a group email list to support discussion between knowledge contributor and seeker
Video Conference (VC)	Providing face-to-face communication between two distributed users
Instant Messenger (IM)	Providing IM tools (e.g., MSN) to support immediate communication between two users

6) **Collaboration (CL):** CL refers to IT enabling organizational members to engage in collaborative activities through the ability to coordinate and support organizational co-work.

Constructs	**Definition**
Online Forum (OF)	Providing an online forum (e.g., BBS) to support user collaboration on one special topic

3 RESEARCH APPROACH

A qualitative interview-based approach was taken in this research to assist in answering our research questions. A KMS case study was conducted at Anhui State Grid Company (ASG) which provided electronic manufacturing and technology service for customers. Encountering the requirement of organizational learning, ASG established online KMS to support its employees to share knowledge. The KMS have different technology features to support both explicit knowledge sharing (e.g., work report uploading and downloading) and implicit knowledge sharing (e.g., group discussion via video conference and instant messenger). From 2005, ASG applied incentive strategies to encourage knowledge sharing actively, and provided several KM technology functions (e.g., statistical and tracking functions) to support KM teams monitoring employees' knowledge sharing behaviour and evaluate their contributions. These KM technology functions were summarized and classified in the six previously-noted IT functionalities.

Two departments from ASG were chosen for the study. Department 1 is the "small group" which had 6 employees, and department 2 is the "large group" with 50-60 employees. Six employees (three from each department) were interviewed over a three-week period. These interviewees had actively participated in using KMS to share knowledge. Six interviews appeared to be a reasonable number, both with respect to the goals of this study and the feasibility involved (Yin, 1997). The distribution of interviewees is listed in Table 2.

Department 1 (Small Group)			Department 2 (Large Group)		
Department Characteristics			Department Characteristics		
(1A)	(1B)	(1C)	(2A)	(2B)	(2C)
Individual Characteristics	Individual Characteristics	Individual Characteristics	Individual Characteristics	Individual Characteristics	Individual Characteristics

Table 2. Interview Profiles

The interview worksheet questions were developed by combining previously identified IT functionalities and other factors affecting knowledge sharing visibility. For example, the question "To what extent do you feel that these analytical & statistical functionalities can help your sharing behaviour be more observed?" was created to explore the impact of analytical & statistical functionalities on individual behaviour observability.

The interviews were semi-structured but did not preclude elaboration. On average, the interviews lasted 60 min. All interviews were recorded in Chinese and transcribed into text files. The researcher's native Chinese language proficiency enabled the passing of meaning from Chinese into English while preserving important details. For ease of recording the results, we designed a coding scheme to guide the coding process, as illustrated in Table 3.

IT Strategic Capabilities	**IT Functionalities**	**Code**	**Sub-IT Functionalities**	**Sub-Code**
Process Richness	1.Analytical&Statistical	AS	Poster Statistics	AS-PS-XX
			Contributor Statistics	AS-CS-XX
			Department Statistics	AS-DS-XX
	2.Tracking	TR	User Login	TR-UL-XX
			Contributor Information	TR-CI-XX
			Contributor History	TR-CH-XX
Knowledge Reach	3.Knowledge Distribution	KD	Intranet	KD-IN-XX

			Publishing Notice	KD-PN-XX
	4.Knowledge Storing	KT	Knowledge Codification	KT-CO-XX
			Knowledge Category	KT-CA-XX
			Knowledge Retrieval	KT-KR-XX
Knowledge Richness	5.Communication	CM	Group Email	CM-GE-XX
			Video Conference	CM-VC-XX
			Instant Messenger	CM-IM-XX
	6.Collaboration	OF	Online Forum	CL-OF-XX

XX=Relative Determinants of Knowledge Sharing Visibility: Recognition (RE), Equality of Contribution (EC), Task Routineness (TR), Task Independence (TI), Vertical Differentiation (VD), and Horizontal Differentiation (HD)

Table 3. Classification for Coding of Interview Responses

Our analysis strategy was to analyze each unit (e.g., a particular employee from a department) followed by an examination across all units to ascertain the impact of six IT functionalities on the six determinants of knowledge sharing visibility (i.e., recognition, equality of contribution, task routineness, task independence, vertical differentiation, horizontal differentiation). We then compared the large department to the small department to examine reasons for the differences between different departments. The theoretical framework is illustrated in Figure 1.

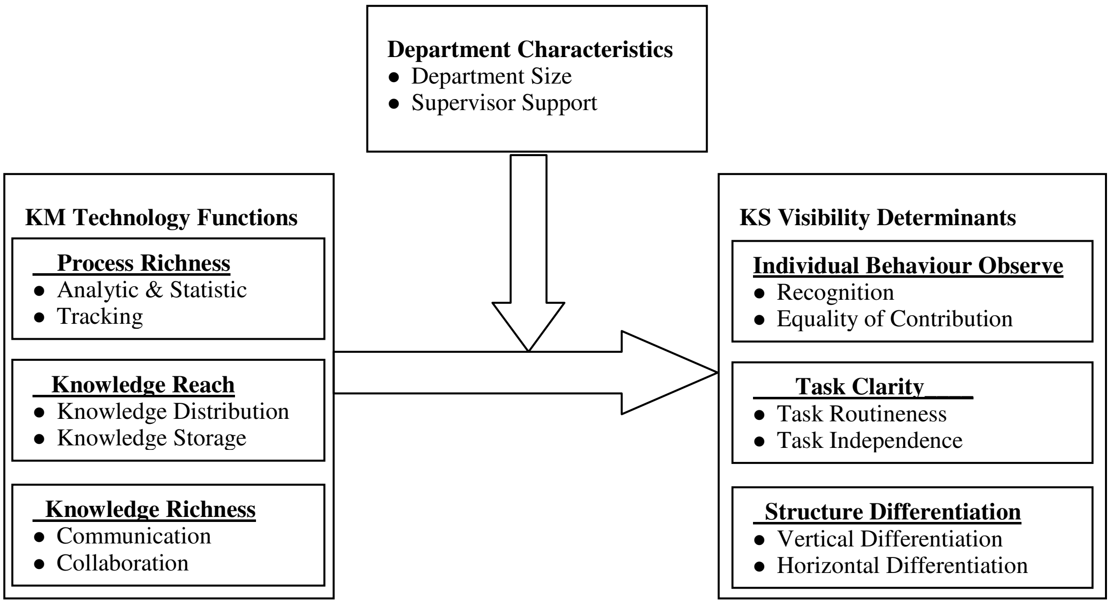

Figure 1. Qualitative Study Theoretical Framework

4 DATA ANALYSIS & RESULTS

In our data analysis, we use matrices to present the information systematically to the reader, enable the identification of coding procedures, and to reduce information of categories (Tesch, 1990). The stages of the coding process are shown as follows:

- Read text recorded from observation and logs
- Divide text into segments of information

- Code Segments
- Refine codes
- Collapse codes into themes

The results of our analysis are summarized in Table 4 with "+" and "-" indicating positive and negative comments, respectively. For example, "+(AS-CS-EC)" under "1A" indicates a positively related comments from interview "A" from group "1" regarding "analytical & statistical (AS)" as related to "contributor statistics (CS)" with regard to "equality of contribution (EC)." Note that both positive and negative comments can occur on the same issue even with the same functionality. An example is quoted as follows.

"It is useful for using electronic forum to share our knowledge. In online forum, we can easily find topic related to my expertise, and we can discuss with other experts with similar background from all around the company…In online forum, we discuss with each other freely, and posters refresh frequently. It is difficult to remember who contribute what important things."

Based on this comment, it can be seen that online forum is beneficial for horizontal differentiation, but may also be negatively related to knowledge sharing task routineness. Therefore, in our coding results, both positive and negative impacts were recorded as [-(CL-OF-TR)/+(CL-OF-HD)].

	Department 1 (small group)			**Department 2 (large group)**		
	1A	**1B**	**1C**	**2A**	**2B**	**2C**
Analytical & Statistical	+(AS-DS-RE) +(AS-CS-EC)	+(AS-CS-EC)		+(AS-CS-EC) +(AS-DS-EC)	+(AS-CS-EC) +(AS-DS-EC)	+(AS-DS-EC)
Tracking	+(TR-UL-RE) +(TR-CI-RE)	+(TR-UL-RE) +(TR-CI-RE)/-(TR-CI-EC) +(TR-CH-HD)	+(TR-UL-UN)	+(TR-UL-UN)	+(TR-UL-RE) +(TR-CH-HD)	+(TR-UL-RE)
Knowledge Distribution	+(KD-PN-RE)	+(KD-IN-RE) +(KD-IN-HD)		+(KD-IN-RE) +(KD-PN-RE) +(KD-PN-EC)	+(KD-IN-RE) +(KD-IN-HD)	+(KD-IN-RE)
Knowledge Storing	+(KT-CO-TR) +(KT-CO-TI) +(KT-CA-HD)	+(KT-CO-TR) +(KT-CA-HD) +(KT-CA-VD)	+(KT-CO-TR)	+(KT-CO-TR) +(KT-CO-TI)	+(KT-CO-TR) +(KT-KR-RE) +(KT-KR-EC) +(KT-KR-HD)	+(KT-CO-TR)
Communi-cation	-(CM-GE-EC) -(CM-IM-TR)	-(CM.-VC-TR) -(CM-VC-TI) -(CM-VC-EC) -(CM-IM-TR)	-(CM-GE-EC) -(CM-GE-TI)	-(CM-VC-TI) -(CM-VC-EC) +(CM-IM-EC)	+(CM-IM-RE)	
Collabor-ation		-(CL-OF-TR)/+(CL-OF-HD)	+(CL-OF-HD)		+(CL-OF-HD)	

Table 4. Summarized Results

From Table 4, we recognize the impact of KM technology on determinants of knowledge sharing visibility:

- **Analytical & Statistical Functions:** AS functions have positive influences on individual behaviour observability. In the large department, interviewees indicated possibly having more opportunities to participate and be observed by their department head as providing department and contributor statistics. Most of them had responses such as: *"When our department head receive department statistics per month, they may praise me if I contribute some work-related reports."*

And *"KMS shows click number with each title…If I contribute a good work report, it will be clicked by more participants…People will not care about whether you are lower or higher level."* However, in the small department, the influences of department statistics were not as salient as in the larger department, as their contributions could be recognized by department supervisors equally without technology support.

- **Tracking Functions:** Most interviewees identified tracking functions as positively influencing knowledge sharing visibility with support for individual behaviour observability and horizontal differentiation. For example, as this interviewee noted, "*… in our KMS, everyone must register as real name…When we upload a work report poster, it will show who am I and which department I belong…We will be recognized by others if we contribute our experience*", and "*others can click my name and find my contact information…If others have some suggestions or want to discuss with me, they can contact me directly.*" However, some interviewees found that tracking technology had negative influence on task independence of knowledge sharing. As one interviewee reported, "*I found a phenomenon about 'co-contributors'…Some department may register an account for whole department and list information of several co-contributors, especially put senior employees in the front…Sometimes we do not know who really write this report, and it seems not equal to lower level employees*".
- **Knowledge Distribution Functions:** Knowledge distribution (KD) functions positively influence individual behaviour observability and differentiation. For example, as one interviewee pointed out, "*Employees from all the parts of company can access KMS through intranet…When you upload a work report poster, it will be accessed by others very easily.*" Compared with interviewees in the small department, most large department interviewees found KD functions to be more useful for supporting individual behaviour observability.
- **Knowledge Storing:** Knowledge storing positively influences task clarity and differentiation. Most interviewees had responses such as, "*The uploading interface guides me how to codify my report, it makes uploading process be more clear…I can codify my report by myself as the process is easy*", and "*reports are classified in different categories as its content…We can access to special category to find more useful knowledge uploaded by experts with similar expertise*".
- **Communication:** Most interviewees found communication tools (e.g., video conference and instant messenger) to have negative influences on task clarity, i.e., task routineness and task independence. For example, one interviewee complained, "*It is hard to control discussion process in video conference…Everyone present ideas in video conference but no one knows who contribute what ideas…*". However, some large department interviewees experienced a positive impact of instant messenger on individual behaviour observability. In the large department, lower level employees shared knowledge with higher level employees directly with instant messenger. For example, *"Sometimes supervisors will ask me questions directly from MSN…I can share my work materials with senior employees, and we can discuss equally…"*
- **Collaboration:** Interviewees found that collaboration tools applied in KMS (i.e., online forums) could have both negative and positive influence on task visibility. Based on interviewees' comments, online forums may provide a virtual community for all employees from different departments sharing "best of practice," which may influence horizontal differentiation with expertise. However, knowledge sharing in online forums is more like "free discussion" and negatively related to task routineness.

5 DISCUSSION

From the above results, we can say that KM technology influences knowledge sharing visibility. However, the situation is complex in that each technology function may provide support for some constructs of knowledge sharing visibility, and less for others. In general, IT process richness capabilities (i.e., analytical & statistical functions and tracking functions) have a positive influence on knowledge sharing visibility as they can make individual behaviour more observable. Knowledge reach capabilities (i.e., knowledge distribution and knowledge storage) are positively related to knowledge sharing visibility, as they can support clear knowledge sharing processes and enhance structure differentiation. The effects of knowledge richness capabilities (i.e., communication and collaboration tools) which support implicit knowledge sharing are more complex since they may negatively influence task clarity but may enhance equality of contribution.

As is often the case, this research has raised more questions than it has answered. We found that KM technology functions even interact with departments and individual characteristics in online KMS as follows:

1) Department size: KM technologies may interact with department size on influencing constructs of knowledge sharing visibility. For example, in large departments, analytical and statistical functionality is more salient in supporting equality of contribution.
2) Individual characteristics: Based on the interviewees' responses, some individual characteristics may moderate the impact of KM technologies on constructs of knowledge sharing visibility. For example, some active interviewees liked functionalities which showed their information and garnered them more recognition. However, shy interviewees might fear showing their contributor information and thus could withdraw their knowledge.
3) Department culture: We also found that department embedded culture and atmosphere may also be a moderator. In a department with supervisor support for knowledge sharing, interviewees may perceive more positive responses on relationship between KM technology and individual behaviour observability. In a department where a supervisor does not support knowledge sharing, interviewees may perceive some technology functions, such as "contribution information" as not being salient, as they may not be appraised by the department supervisor for contributing knowledge.

In the interview process, interviewees were also asked to give some comments and suggestions for new technologies which had not yet been applied in KMS.

- Weblogs and Wikis: Based on interviewee comments, the application of web 2.0 technology (e.g., weblogs and wikis) as KM tools should be carefully considered. The influences of weblogs on knowledge sharing visibility may be complex. For example, weblogs may make the knowledge sharing process more personal and independent, but this personalized knowledge sharing may make behaviour more difficult to be monitored.
- Knowledge Worker Map: Some interviewees suggested that a knowledge worker map might be a useful tool which could enhance knowledge sharing visibility and, furthermore, could reduce the negative influence of other communication tools. For example, a knowledge worker map could be applied together with instant messenger. This integrated technology application might help to increase individual behaviour observability, structure differentiation, and task clarity. Thus, we suggest that organizations apply a knowledge worker map together with communication tools (e.g., instant messenger) for supporting more visibility on implicit knowledge sharing.

5.1 Limitations and Future Research

This study is limited in many ways. First, the small sample size (i.e., six interviews in two departments) precludes any generalization and only begins to suggest that which may occur in other companies or even within the case company. Clearly, there could be different perceptions if one were to interview top managers and KM leaders in addition to lower level employees. Future research can be conducted to collect more data from different departments and levels of employees. Second, this study has focused only on one company's KMS even though we claim that it includes common functions that could mostly be adopted by other KMS. Future research could be conducted to examine the impact of KM technologies on knowledge sharing visibility in different KMS of different types of companies. Third, this study is limited to a Chinese company and does not reflect that which may occur in companies from other countries. The comparison between different perceptions and adoptions of KM technologies could also be studied in future research.

6 CONCLUSION

In this paper, six in-depth interviews were held with employees that had used KMS for which the results were analyzed using a qualitative coding-based approach. We have sought to examine how determinants of knowledge sharing visibility are affected by KM technology functions. In general, we found IT functions which provide process richness (i.e., analytical & statistical, tracking) and knowledge reach capabilities (i.e., knowledge distribution, knowledge storing) may positively affect knowledge sharing visibility. IT functions which provide knowledge richness capabilities (i.e., communication and collaboration) may have some negative influences on knowledge sharing visibility. We also found that department and individual characteristics may moderate effects of technology functions on knowledge sharing visibility. Thus, we suggest that no one form of technological support is a panacea. Several functions should be integrated in designing KMS to achieve high knowledge sharing visibility. Numerous opportunities exist for future research.

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