Computers in Human Behavior 74 (2017) 175–187

Contents lists available at ScienceDirect

Computers in Human Behavior

journal homepage: www.elsevier.com/locate/comphumbeh

A psychological empowerment approach to online knowledge sharing☆

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ARTICLE INFO

Article history:
Received 2 December 2016
Received in revised form
18 April 2017
Accepted 18 April 2017

Keywords:
Job characteristics theory
Knowledge management system
KMS user empowerment
Knowledge sharing
Proactivity
Psychology empowerment theory

ABSTRACT

The success of a knowledge management system (KMS) depends on knowledge sharing. Previous research has claimed that motivational factors can facilitate successful knowledge sharing as a proactive behavior. However, little research has examined what motivators lead to proactive knowledge sharing. By integrating a psychological empowerment perspective with job characteristics theory, this study examines the role of KMS user empowerment, as a specific type of psychological empowerment, in motivating this proactivity to explain employee knowledge-sharing behavior (i.e., contribution and seeking). The findings explain that KMS user empowerment is significantly associated with knowledge sharing, and the work environment (job significance, job autonomy, ease of KMS use, and KMS usefulness) enhances KMS user empowerment. This study contributes to KM research by introducing the concept of KMS user empowerment and demonstrating its role in regulating the proactive knowledge sharing. It also helps managers to promote knowledge sharing among employees in the context of KMS use.

1. Introduction

Firms adopt and implement knowledge management systems (KMSs) to improve employees' ability to easily and effectively perform, and thereby improve firm performance (Wang, Sharma, & Cao, 2016). Most organizations are interested in adopting and implementing KMS in their organization; however, it does guarantee the success of implementation of KM. Over the past 15 years, however, only 20% of firms have increased their level of goal achievement with KMS (The Conference Board, 2000). After their adoption and implementation, KMS tend to be underused and hardly recognized by knowledge workers in their everyday work (Maier, 2007). Underutilization of installed systems has been identified as a major issue underlying the "productivity paradox" surrounding lackluster returns from organizational investments in information technology (IT) (Sichel, 1997).

A successful KMS requires users' knowledge sharing, knowledge sharing involves users' willingness to codify and share their knowledge in the KMS, while also seeking out and reusing the codified knowledge jointly from a virtuous cycle (Usoro, Sharratt, Tsui, & Shekhar, 2007). Previous research (Cabrera & Cabrera, 2002; Cress, Kimmerle, & Hesse, 2006; Kimmerle, Cress, & Hesse, 2007) explained that an individual is reluctant to contribute his or her own knowledge while he or she enjoys others' knowledge in terms social dilemma. The virtuous cycle in knowledge sharing (i.e., knowledge seeking and knowledge contribution) implies a voluntary act by individuals who participate in the exchange of knowledge (Gagné, 2009) and also is some kind of organizational citizenship behavior (Ramasamy & Thamaraiselvan, 2011; Yu & Chu, 2007). Thus, organizations cannot force this knowledge sharing because unlike other IS in mandatory environments, it is an unenforceable informal task. Thus, knowledge is personal intellectual property and is embedded in individuals. In their willingness to share knowledge, employees must accept the loss of some personal time and effort (e.g., Kankanhalli, Tan, & Wei, 2005b; Wasko & Faraj, 2005) or shoulder the burden of repaying other employees' kindnesses (Bock, Kankanhalli, & Sharma, 2006; Yan &

☆ This work was supported by the Ministry of Education of the Republic of Korea and the National Research Foundation of Korea (NRF-2015S1A3A2046711). This work was also supported (in part) by the Yonsei University Future-leading Research Initiative of 2015 (2015-22-0053).

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http://dx.doi.org/10.1016/j.chb.2017.04.039
0747-5632/

Davison, 2013).

To overcome resistance to knowledge sharing, previous studies have highlighted the various factors that affect an individual's willingness to share knowledge from the perspective of social exchange theory (Blau, 1964), theory of planned behavior (Ajzen, 1991), and both theories unified (Bock, Zmud, Kim, & Lee, 2005; Jeon, Kim, & Koh, 2011; Safa & Solms, 2016; Tohidinia & Mosakhani, 2010). According to social exchange theory, knowledge sharing seldom occurs without strong individual motivation (Kankanhalli, Lee, & Lim, 2011; Lin & Lo, 2015; Yan, Wang, Chen, & Zhang, 2016). Motivation is one of the most important factors that influence employees' intentions to share their knowledge. The theory of planned behavior has explained knowledge-sharing behavior encouraged by volition and organizational climate (Hsu, Ju, Yen, & Chang, 2007; Hung, Lai, & Chou, 2015; Lai, Chen, & Chang, 2014). This research showed that the willingness to share knowledge was the result of exchange and was insufficient to explain spontaneous factors that represent a form of proactive behavior and require the user to be strongly motivated. Thus, the factors related to rewards systems are no match for autonomous motivation in generating proactivity (Gagné, 2009).

A better understanding of proactive knowledge sharing requires taking into account an active motivational orientation that can project an individual self-governing influence on proactively sharing knowledge (Meyer, Stanley, Herscovitch, & Topolnytsky, 2002). Psychological empowerment theory proposes psychological empowerment as an active motivational orientation that occurs when one's motivational orientation is combined with the authority necessary to tap the full potential of a work system (Thomas & Velthouse, 1990). A user's motivational state is important in the use of technology and job performance (Seibert, Wang, & Courtright, 2011). However, there is a lack of understanding of how psychological empowerment is developed and works for proactive knowledge sharing in the context of KMS. Thus, this study undertakes to examine knowledge sharing in terms of KMS user empowerment in performing tasks with the use of KMS. This is a conceptual extension of psychological empowerment in the context of KMS. KMS user empowerment as a heightened autonomous motivational state should inspire users to go beyond obligatory knowledge sharing.

To achieve the research goal, this study considers three key issues in comparison with previous research. First, the subjectively perceptual data (i.e., users' self-reported information via questionnaires) of knowledge sharing is limited in reflecting real behavior. This is because of the issue of memory decay and also the possibility of distortions. To capture users' proactive behaviors, this study investigates actual knowledge-sharing behavior via objective system-based data. Second, sustainable knowledge sharing can be made possible by employees' knowledge seeking as well as by their knowledge contributions. By considering the virtual process of knowledge sharing (Kankanhalli et al., 2011), this study incorporates two distinct types of knowledge sharing (i.e., knowledge contribution and knowledge seeking) in an integrative model to verify their relationship. The relationship between these two subtypes of knowledge-sharing behaviors has important implications for managing KMS in organizations.

Third, psychological empowerment can be influenced by the design of the work environment (Gagné, Senécal, & Koestner, 1997; Kraimer, Seibert, & Liden, 1999; Thomas & Velthouse, 1990). Jobs and technology are two important design elements of the work environment in the context of KMS. However, little research has delved into how both job and technological elements affect psychological empowerment. Going beyond previous research on KMS and psychological empowerment, our study examined both job and technological elements in the development of psychology empowerment in the context of KMS use. Overall, this study is an important step in advancing our understanding of knowledge sharing in a way that transcends its mere traditional aspects (i.e., rewards systems, and prosocial factors); it also highlights the important role of KMS user empowerment in proactively sharing knowledge.

2. Theoretical backgorund

2.1. Knowledge sharing: contribution and seeking

Knowledge sharing occurs when an individual disseminates his knowledge (i.e., know-what, know-how, and know-why) to other members within an organization (Van den Hooff, Schouten, & Simonovski, 2012). Knowledge-sharing behavior is defined as an exchange behavior between a contributor and a seeker and involves the provision and acquisition of knowledge (Kimmerle et al., 2007). These two behaviors in knowledge sharing consist of a feedback loop structure (Kankanhalli et al., 2005b). If either element is lacking, its absence makes the knowledge-sharing process ineffective and unsustainable (Foss, Husted, & Michailova, 2010; Phang, Kankanhalli, & Sabherwal, 2009). A thorough comprehension of knowledge-sharing behavior necessitates developing an integrative model and ascertaining the relative importance of the factors of influence. However, previous research paid little attention to the relationship between knowledge contribution and knowledge seeking. An organization typically seeks first to capture an employee's knowledge that has largely been obtained from his or her work experience and then tries to encourage the reuse of this knowledge. Knowledge contribution appears to have been more important than knowledge seeking in previous research (Chang & Chung, 2011; Chen, Chuang, & Chen, 2012; Koriat & Gelbard, 2014; Lin & Lo, 2015; Pee & Chua, 2016; Wang et al., 2016). Examining the relationship between two these KMS behaviors can reveal which one an organization needs to encourage the most. Thus, this study uses an integrative model to investigate which factors influence relations between these two knowledge-sharing behaviors.

Because it cannot be forced and is not mandatory, knowledge sharing relies on employees to decide voluntarily if they will share their knowledge. In light of its voluntary nature, knowledge sharing requires someone who is strongly self-motivated. As for knowledge contribution, an individual faces the problem of making the effort and taking the time required to transfer knowledge and overcome any concerns about ownership of information (Davenport & Prusak, 1998). Therefore, knowledge contribution is a type of proactivity (Kirkman & Rosen, 1999) and organizational citizenship behavior (Ramasamy & Thamaraiselvan, 2011; Yu & Chu, 2007). As for knowledge seeking, employees tend to seek knowledge for their tasks voluntarily. One reason that employees do not seek and use the stored knowledge is to avoid any sense of obligation to repay for the contributors' help (Yan & Davison, 2013). When a knowledge seeker finds it laborious to seek advice, he or she feels the same burden of time and effort as the contributor did (Bock et al., 2006), and suffers from lack of trust in colleagues and in knowledge (Matschke, Moskaliuk, Bokhorst, Schümmer, & Cress, 2014). Therefore, knowledge-seeking is a type of proactivity that requires a seeker to be strongly self-motivated.

However, despite the importance of motivation in knowledge-sharing behaviors, there is a little lack of understanding how a person develops such motivation and how this motivation leads to the two types of proactive behavior found in successful knowledge sharing. Past research has primarily been concerned with the general motivation for both aspects of knowledge sharing. General motivational factors are divided into two parts, extrinsic and

intrinsic, which are defined by whether rewards are expected (extrinsic) or not expected (intrinsic). Neither is sufficient to explain proactivity, i.e., knowledge sharing by overcoming relevant barriers. Extrinsic motivational factors (e.g., money, reputation, promotions) that rely on rewards fall mostly in the category of motivation controlled by the organization and are less effective (i.e., less proactive) than intrinsic motivation (Deci & Ryan, 2000). Moreover, extrinsic factors are generally limited in their capabilities to recognize any individual effort beyond what is mandated. Intrinsic motivational factors have been proposed as substitutes for reward systems. Intrinsic motivation is more effective than extrinsic motivation in promoting voluntary behavior (Almeida, Lesca, & Canton, 2016). However, even intrinsic motivation is far from an active motivational orientation that can influence an individual's self-governance in proactively sharing knowledge (Ryan & Deci, 2000).

To fill this gap, this study focuses on an individual's active motivational orientation, along with his or her ability and discretion, to share knowledge at work in the context of KMS. In the management literature, the concept of psychological empowerment is believed to represent one's motivational orientation together with the authoritative power necessary to tap the full potential of a work system (Thomas & Velthouse, 1990). Thus, in this study we adopt the psychological empowerment theory as the means to examine knowledge sharing because this theory can lead to understanding proactive behavior (Kirkman & Rosen, 1999).

2.2. Psychological empowerment theory: KMS user empowerment

Psychological empowerment is not only a kind of internal work motivation, but also an active motivational orientation. Both are essential elements of proactivity (Seibert et al., 2011). However, psychological empowerment differs from other general intrinsic motivations because it is an active internal motivation unlike other general intrinsic motivations that are passive (Deci & Ryan, 2000). Psychological empowerment has been defined as an individual's experience of motivation that is based on cognitions about himself or herself in relation to his or her work role (Spreitzer, 1995). This research proposes KMS user empowerment as a conceptual extension of psychological empowerment.

Using the definition proposed by Spreitzer (1995), this study defines KMS user empowerment as an active motivational orientation of an employee toward using a KMS at work (Kim & Gupta, 2014) and designates four cognitions of psychological empowerment as also specific for KMS usage for KMS user empowerment: *competence* of KMS user, *impact* of KMS usage, *meaning* of KMS usage, and *self-determination* of KMS user. Competence of KMS user is an individual's belief in his or her ability to use KMS in tasks with relevant knowledge, skills, and confidence. The impact of KMS usage is the degree to which an individual can influence task outcomes based on system use. The meaning of KMS usage refers to the importance an individual attaches to system usage in relation to his or her own ideals or standards. Self-determination of KMS user is an individual's sense of having choices about KMS usage.

The key presumption regarding psychological empowerment is that empowered people are more active and productive than people who are not (Thomas & Tymon, 1994). Empowered employees have a thorough knowledge of their work so that they can thereby plan and schedule their work and are capable of identifying and resolving any obstacles to their performance (Cook, 1994). Thus, empowered employees perform their roles volitionally and sometimes exceed their customary job duties to achieve better performance and outcomes at work (Kirkman & Rosen, 1999) and to improve the functioning of the organization (Menon, 2001). Previous research has used psychological empowerment to explain proactive behaviors in which individuals voluntarily engage in the desired activities, including proactivity (Kirkman & Rosen, 1999) and organizational citizenship behavior (Raub & Robert, 2007).

Knowledge sharing also represents a form of proactivity. Considering that psychological empowerment motivates employees in their performance of an array of proactive tasks across multiple domains within job roles, specific psychological empowerment would influence knowledge sharing. Psychological empowerment is necessary for an examination of knowledge-sharing behavior in the context of KMS. For this reason, we propose KMS user empowerment as a conceptual extension of psychological empowerment in the context of KMS usage. Psychological empowerment theory explains that KMS user empowerment, influenced by the work environment (e.g., job design), leads to work outcomes (e.g., proactivity) (Thomas & Velthouse, 1990). As for the work environment, this study considers job characteristics and technology (i.e., KMS) characteristics.

2.3. Work environment: job and technology characteristics

Job characteristics theory, proposed by Hackman and Oldham (1975), provides a framework that explains how job characteristics influence workers' motivation. Their original version of this theory proposed a model of “core” job dimensions in which three psychological states (i.e., experienced meaningfulness, experienced responsibility, and knowledge of results) affect five work-related outcomes (i.e., motivation, satisfaction, performance, absenteeism, and turnover).

In the present study, we use job significance, job autonomy, and task feedback as the core job dimensions of job characteristics theory (Hackman & Oldham, 1975). In accordance with the theory, core job dimensions can be divided into two categories. Specifically, task-related core job dimensions include skill variety, job identity, and job significance; those related to the management of the job include job autonomy and task feedback. According to Gagné et al. (1997) and Kraimer et al. (1999), job significance involves more important factors than skill variety and job identity; they present job significance, job autonomy, and task feedback as core job characteristics. Therefore, this research examines these three factors for their potential impact on KMS user empowerment.

Job characteristics theory (Hackman & Oldham, 1975) explains how core job characteristics (e.g., job significance, autonomy, and task feedback) are likely to be associated with the meaning and self-determination of psychological empowerment (Humphrey, Nahrgang, & Morgeson, 2007). Job characteristics are designed to measure the objective aspects of jobs, whereas psychological empowerment reflects individuals' psychological reactions to their work environment (Kraimer et al., 1999). Thus, job characteristics have been identified as playing a key role in determining perceptions of empowerment (Spreitzer, 1995; Thomas & Velthouse, 1990). The core job characteristics of job significance, job autonomy, and task feedback should also promote a feeling that one has an impact within one's work unit. This is because of the increased opportunity that the unit gives to make personal choices regarding methods to accomplish tasks that are seen as important to the organization (Seibert et al., 2011). The perception of job significance, job autonomy, and task feedback on one's work enhances the proactive use of KMS at work. Thus, extending the logic of the job characteristics model, we expected that the three core job characteristics would be associated with KMS user empowerment.

As for the use of KMS as technology, KMS itself is part of the work environment and then can influence users' motivation in knowledge sharing. Although having sophisticated KMS does not guarantee success in KMS initiatives, technological capabilities are important (Cross & Baird, 2000). This study selects two main technological characteristics of KMS: ease of KMS use and KMS

usefulness, which are the two main factors in the technology acceptance model (TAM) (Davis, 1989). Both of these influence an individual's motivation to use a system, which, in turn, explains the individual's intention to use the system.

Similarly, Spreitzer (1995) proposed that psychological empowerment gives employees the ability and authority to complete work and to improve their performance. Therefore, ease of KMS use and KMS usefulness were proposed as the two technological factors that reflect a user's belief in knowledge sharing and elucidates the relationship with KMS user empowerment.

3. Research model and hypotheses

Psychological empowerment theory (Spreitzer, 1995) explains that the work environment leads to the development of an active motivational orientation, which in turn leads to proactivity and organizational citizenship behavior. This reasoning forms the theoretical framework for this study. Fig. 1 shows the proposed research model, which investigates how work environments affect KMS user empowerment, which then leads to users' knowledge-sharing behavior (i.e., knowledge contribution and knowledge seeking). As Seibert et al. (2011) suggested and as was, discussed earlier in the section on psychological empowerment theory, this study modeled KMS user empowerment as a second-order reflective construct for cognition (competence of KMS user, impact of KMS usage, meaning of KMS usage, and self-determination of KMS user). This study attempts to verify the effect of knowledge contribution on proactive behavior and subsequently on knowledge seeking. This verification explains the feedback loop of knowledge sharing. The voluntary behaviors in knowledge sharing are captured by actual recorded data so as to exclude users' perceptual biases.

3.1. Relationship between knowledge contribution and knowledge seeking

A KMS is designed to effectively support organizational knowledge management activities. Although KMS is by its nature an IT-based system, its continuance issues differ distinctly from those of other IS: Successful KMS continuance requires that system users be willing to codify and share their knowledge while also seeking out and reusing the codified knowledge (Kankanhalli et al., 2011; Watson & Hewett, 2006). This knowledge-sharing process turns into a “virtuous circle”: the more information that accumulates in the KMS, the more useful the system will be to knowledge seekers. Usage of KMS by knowledge seekers may produce positive feedback, increase contributor recognition, and eventually lead to more contributions (Watson & Hewett, 2006). Unless contributors are willing to provide content to a KMS, its usefulness for knowledge reuse cannot take place. Thus, from the perspective of knowledge contributors, KMS usage is the first step toward knowledge advantage through KMS (Kankanhalli, Tan, & Wei, 2005a). Therefore, knowledge contribution behavior should encourage knowledge-seeking behavior.

H1. *Knowledge contribution has a positive impact on knowledge seeking.*

3.2. Consequences of KMS user empowerment

Psychological empowerment raises individuals' conviction of their self-efficacy, determines their initiation of an activity, and increases their persistence in task performance (Bandura, 1997). Gardner and Siegall (2000) posit that psychologically empowered employees have a high sense of self-efficacy and receive authority and responsibility over their jobs; they engage in upward influence and see themselves as innovative. Thus, psychological empowerment leads to positive outcomes of effectiveness, work satisfaction, and lessened job-related stress. From a psychological empowerment perspective, KMS user empowerment should encourage the two knowledge-sharing behaviors.

As for proactive knowledge contribution, previous research has found that individuals highly confident of their competence are motivated to contribute knowledge in concert with other people (Kankanhalli et al., 2005b; Wasko & Faraj, 2005). This perception of enhanced self-efficacy can motivate employees to contribute their knowledge to others (Chen et al., 2012; Yilmaz, 2016). Therefore,

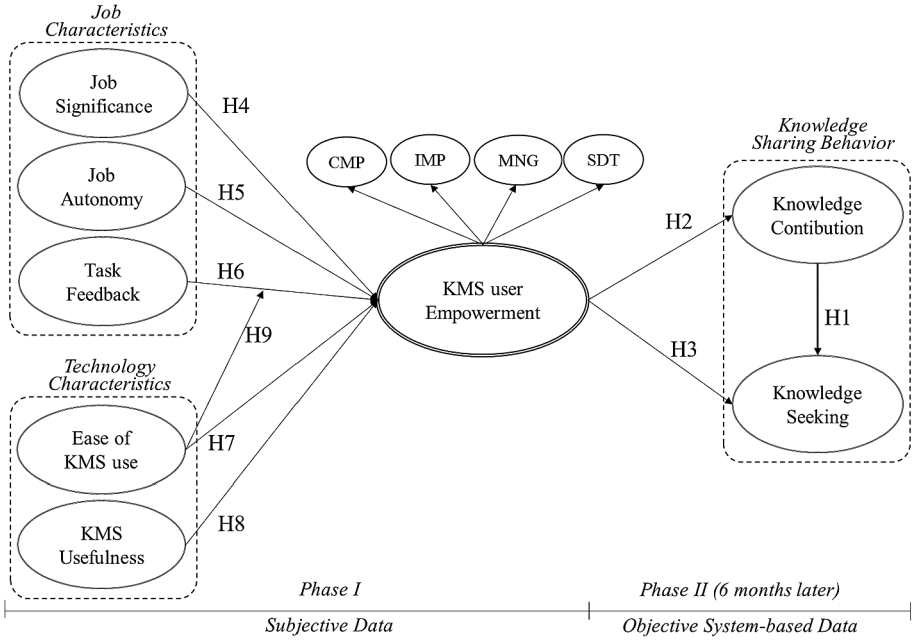

Fig. 1. Research Model. Notes: 1. KMS user empowerment is modeled as a 2nd order reflective construct based on its four dimensions (CMP, IMP, MNG, and SDT). 2. CMP = Competence of KMS user, IMP = Impact of KMS usage, MNG = Meaning of KMS usage, SDT=Self-determination of KMS user.

self-motivated knowledge contributors are likely to be proactive in sharing their knowledge to support their tasks. Therefore, KMS user empowerment should motivate employees to proactively contribute knowledge for colleagues.

H2. *KMS user empowerment has a positive effect on knowledge contribution.*

As for knowledge seeking, knowledge seekers need the skills and capability to search for knowledge they deem valuable and useful. Employees can learn from the experience of others and improve their expertise (Wasko & Faraj, 2005). This is related to the motivation for knowledge growth (i.e., the belief that one's competence can be improved) (Gray & Meister, 2004). An empowered individual should proactively perform his or her work and overcome the obstacles in performing tasks (Spreitzer, 1995). Competency in seeking knowledge (i.e., self-efficacy and self-determination) makes them likely to perform well (Quigley, Tesluk, Locke, & Bartol, 2007). Previous studies found that self-efficacy and self-determination influence knowledge-seeking behavior (Bock et al., 2006; Quigley et al., 2007; Wang & Hou, 2015). When KMS user empowerment is strong, knowledge seekers may be convinced of the value of seeking knowledge and then proactively seek knowledge in a KMS in performing their task. Therefore, KMS user empowerment should motivate employees to proactively seek knowledge in the KMS context.

H3. *KMS user empowerment has a positive effect on knowledge seeking.*

3.3. Antecedents of KMS user empowerment

Regarding environmental work factors related to a job, this study identified three constructs representing job characteristics: job significance, job autonomy, and task feedback. Job significance refers in this research to the perception that a KMS user's task positively affects other users (Hackman & Oldham, 1980). Employees working on jobs with high task significance produce outputs that have strong, positive impacts on others (Spreitzer, Janasz, De., & Quinn, 1999). When a job has high significance, employees experience the meaningfulness of the work, which increases motivation, improving performance (Hackman & Oldham, 1980). Employees motivated by job significance are more attentive to their work and committed to it. Employees who perceive the significance of a job devote their energy to performing their work and making the outcome more meaningful. Thus, job significance may affect an individual's motivational orientation, especially within the meaning of the psychological empowerment dimension, toward performing their work (Kraimer et al., 1999). When they perceive the significance of their job, they may recognize the value of KMS usage (i.e., meaning of KMS usage) in performing their work. Thus, job significance should increase an individual's motivational orientation toward the use of KMS in performing tasks in the context of KMS.

H4. *Job significance has a positive effect on KMS user empowerment.*

Job autonomy refers to the degree to which a job endows a KMS user with the discretion and independence to schedule his or her work and determine how it is to be done (Hackman & Oldham, 1980). Job autonomy offers control at work, which allows employees to freely manage their work environment to make it less threatening and more rewarding (Reeve, 1996). If employees have job autonomy, they can effectively perform their work based on their effort and initiative instead of on instructions from other employees or on a job manual from the organization (Caza, 2012). Thus, job autonomy allows employees to determine when, where, and how work is to be done. Previous studies tended to be more concerned with the effect of job autonomy on internal work motivation such as self-determination (Kraimer et al., 1999; Spreitzer, 1996). An employee who feels he or she has work autonomy can decide how to effectively use KMS (e.g. self-determination of KMS user) and when to share knowledge through it. Therefore, job autonomy should increase an individual's motivational orientation toward the use of KMS in performing tasks in the context of KMS.

H5. *Job autonomy has a positive effect on KMS user empowerment.*

Task feedback refers to the extent to which a job gives a KMS user information about the effectiveness of his or her performance (Hackman & Oldham, 1980). When workers receive clear, actionable information about their work performance, it encourages their engagement in their work and increases their intrinsic motivation (Hon & Rensvold, 2006). An individual develops a feeling of competency when given positive task feedback (Bandura, 1997). Thus, task feedback may increase an individual's motivational orientation, especially his or her sense of competence, and affects the dimensions of psychological empowerment that an employee feels toward work (Kraimer et al., 1999; Spreitzer, 1996). Employees who receive positive feedback and encouragement may also sense that they can generate positive feelings of competence in performing their tasks competently (i.e., competence) (Gist & Mitchell, 1992). With task feedback, an individual is motivated to achieve a greater degree of correspondence between his or her competence and task expectation (Kraimer et al., 1999). Task feedback also provides information about the results of an individual's efforts. Thus, task feedback enables an individual to engage in improving his or her task outcomes by using the system (i.e., impact) (Liden, Wayne, & Sparrowe, 2000). Task feedback encourages employees to effectively determine the outcome of their work. When employees receive task feedback on their work, they know the competence of KMS users and the impact of KMS usage. Therefore, task feedback should increase individuals' motivational orientation toward the use of KMS in performing tasks in the context of KMS.

H6. *Task Feedback has a positive effect on KMS user empowerment.*

Ease of use of technology and the usefulness of technology are crucial determinants in IS preadoption and postadoption stages (Davis, 1989). Ease of use is defined as the degree to which a person believes that using a particular system would be “free of effort” (Davis, 1989, p. 82). Usefulness is defined as the degree to which a person believes that using a particular system would enhance his or her job performance (Davis, 1989, p. 82). That is, the user perceives the system to be an effective way of performing the task(s). Given that effort is a finite resource, users are more likely to accept an application perceived to be easier to use (Davis, 1989).

Thus, technology, such as tools that help users effectively and easily perform their assigned work, enhances active work motivation (Amichai-Hamburger, McKenna, & Tal, 2008). According to Füller, Mühlbacher, Matzler, and Jaweckl (2009) and Shankar, Cherrier, and Canniford (2006), IT tools may be considered empowering technology. IT can support the needs of users before empowering the user. If sufficient knowledge tools can fulfill users' information needs in KMS activities, such as facilitating the retrieval of data, providing abundant data, and keeping data up-to-date to execute tasks effectively, users will favor such tools and also consider them compatible with their work. Shared knowledge is judged important based on its effectiveness and ease of use, and its value will influence people's motivation to share (Ipe, 2003). Ease of sharing is also likely to influence people's willingness to share. IT

also must support the needs of users before empowering the user. A motivational state, such as symbolic adoption that has demonstrated its explanatory value beyond the TAM in voluntary contexts (Karahanna, Agarwal, & Angst, 2006), is influenced by usefulness and ease of use (Hung et al., 2015; Wang & Hsieh, 2006). Therefore, both ease of KMS use and KMS usefulness should increase an individual's motivational orientation toward the use of KMS in performing tasks in the context of KMS.

H7. *Ease of KMS use has a positive effect on KMS user empowerment.*

H8. *KMS usefulness has a positive effect on KMS user empowerment.*

People can get a high degree of personal freedom and autonomy through using IT. Users perform their work more easily with IT, which means IT could automate the work in an organization. If users use IT in their work, they can complete their tasks quickly. Job autonomy is expected to determine whether employees have the opportunity to access KMS at work. Thus, employees with high job autonomy can easily control their intellectual assets (i.e., knowledge) and have decisional latitude in scheduling and implementing work (Hackman & Oldham, 1980). High job autonomy allows employees to determine when, where, and how work is to be done. Because IT support employees effectively perform their tasks, ease of KMS use characteristics can increase their autonomy. Therefore, ease of KMS use should increase the effect of job autonomy on an individual's motivational orientation toward the use of KMS in performing tasks.

H9. *The effect of job autonomy on KMS user empowerment will increase as the ease of KMS use increases.*

4. Research methdology

4.1. Target organization and system

The target organization is an IT service company with more than 14,000 employees. The organization specializes in convergent and integration services with expert knowledge in information communication technology (ICT) for corporations and government agencies. This company seeks to manage by relying on specific managers or employees and encourages all employees to show their ability through sharing knowledge. The company implemented its KMS in January 1997. All of its employees can log in to the system to share their knowledge, collaborate, and communicate with each other.

It is a secure KMS with a number of search tools. These include integrated retrieval, search for detailed queries, search for attributes of knowledge, and internal organizational mapping. It has a function for automatically categorizing tags according to frequency of use. Users can access information on project progress, output, and managers. A task-relevant dictionary explains basic terms and technical terms in the relevant business area, and there is a cyber cafe for meetings to vitalize knowledge exchange. Recent upgrades have made all these functions available via mobile. Now all employees use this KMS voluntarily, which has an average of more than 3000 knowledge items registered in 70 subcategories each month.

4.2. Data collection

This study used two-phase data collection. In the first phase, we used a survey to collect subjective data from the employees of the target company to use mainly for the independent variables. Six months later in a second phase, we collected objective data for the knowledge-sharing behavior. We also conducted interviews with users to gain more in-depth information. Participants' data were matched with survey data (Phase I) and actual computer-recorded data of knowledge sharing in the KMS (Phase II) by a personal pseudonymous ID (Gebauer, Söllner, & Leimeister, 2013).[1] This temporal design is consistent with the causal chain in the psychology literature, which considers motivations and behavior as sequential and not simultaneous (Mitchell & Daniels, 2003, pp. 225–254). Moreover, by proximally separating the measures of motivation and behavior, we diminished the potential concern about common method biases (Podsakoff, MacKenzie, Lee, & Podsakoff, 2003).

With the help of the human resources management team of the organization, we randomly selected 400 employees across different units and positions and distributed the survey to them. Over the two stages, we collected 183 complete and valid responses (See Table 1). Thirty-eight percent of the respondents were female, and 71.6% were male. The average respondent was 27 years old (42% in their 20s, 46% in their 30s, and 12% in their 40s).

4.3. Instrument development

Knowledge-sharing behavior has been measured by two different approaches. The first is the use of subjective data on an individual's readiness to perform a given behavior (Kankanhalli, 2005a,b; Watson & Hewett, 2006). These perceptual measurement methods use inaccurate proxies for actual behavior, especially in the context of voluntary behavior. The second approach uses objective data on the quantity of knowledge sharing. The quantity of knowledge-sharing behavior is generally categorized by frequency, duration, diversity, and volume (He & Wei, 2009; Pee & Chua, 2016; Wasko & Faraj, 2005). However, the quantity of knowledge sharing is measured by a user's self-reported information via questionnaires (He & Wei, 2009; Pee & Chua, 2016; Wasko & Faraj, 2005). Researchers must be mindful of the possibility that self-reported usage may be inflated (Kankanhalli et al., 2005b). In contrast, the system-based data are appropriate to capture a user's actual action (Koh & Kim, 2004). For this reason, in this study, we consider that the volume of knowledge posting and viewing activities are the two major knowledge-sharing activities in KMS.

Items selected for the other constructs were primarily adapted from prior studies to ensure content validity. The measurement items for job significance, job autonomy, and task feedback were all adapted from Hackman and Oldham (1975). As for the four constructs of KMS user empowerment (Competence of KMS user, Impact of KMS usage, Meaning of KMS usage, Self-determination of KMS user), they were formulated with reference to the scale developed by Kim and Gupta (2014) and further modified as appropriate. The four items for the ease of KMS use construct were adapted from Van der Heijden (2004). KMS usefulness was measured by four-item measures adapted from Davis (1989). All items were measured on a seven-point Likert-type scale, ranging from (1) “strongly disagree” to (7) “strongly agree” (see Appendix).

5. Data analysis and results

5.1. Instrument validation

We conducted data analysis in accordance with the two-stage methodology using structural equation modeling (SEM) (Anderson & Gerbing, 1988). We have conducted measurement model testing in the first stage and structural model testing in the

[1] All participants were assigned a personal pseudonymous ID, which was designed for the privacy of personal data.

Table 1
Descriptive statistics of respondents.

Demographic variable		Frequency	Percentage
Gender	Male	131	71.6
	Female	52	28.4
Age (years)	20–29	76	41.5
(Mean: 27.6	30–39	85	46.4
Std. Dev.: 45.09)	40<	22	12
Position	Frontline employees	74	40.4
	Middle managers	69	46.0
	Manager	17	12.6
Tenure (years)	<3	8	45.9
(Mean: 4.5	3–6	55	30.1
Std. Dev.: 216.2)	6–9	19	10.4
	9–12	7	3.8
	12–15	12	6.6
	15<	6	3.3
Knowledge sharing	Contribution	(Mean: 4.0, Std. Dev: 45.4)	
	Seeking	(Mean: 7.0, Std. Dev: 57.7)	
Total		183	100

Table 3
Correlations between latent constructs.

	CMP	IMP	MNG	SDT	JSF	JAT	TFB	EOU	UFN	CNT	SKG
CMP	**0.94**										
IMP	0.65	**0.95**									
MNG	0.59	0.79	**0.94**								
SDT	0.52	0.43	0.54	**0.91**							
JSF	0.27	0.12	0.17	0.27	**0.91**						
JAT	0.28	0.17	0.22	0.27	0.26	**0.85**					
TFB	0.31	0.16	0.20	0.29	0.44	0.52	**0.92**				
EOU	0.62	0.64	0.64	0.58	0.16	0.24	0.24	**0.91**			
UFN	0.58	0.77	0.74	0.51	0.13	0.12	0.16	0.75	**0.93**		
CNT	0.28	0.24	0.29	0.15	0.08	0.12	0.08	0.24	0.16	-	
SKG	0.37	0.34	0.34	0.17	0.14	0.24	0.11	0.31	0.19	0.68	-

Notes:
1. Leading diagonal shows the squared root of AVE of each construct.
2. CMP = Competence of KMS user, IMP = Impact of KMS usage, MNG = Meaning of KMS usage, SDT = Self-determination of KMS user, JSF = Job significance, JAT = Job autonomy, TFB = Task feedback, EOU = Ease of KMS use, USF = KMS usefulness, CNT=Knowledge contribution, SKG=Knowledge seeking.

second under full consideration of SEM guidelines (Gefen, Straub, & Boudreau, 2000; 2011). For the SEM, we chose the partial least squares (PLS) method because it is especially suitable for analyzing multistage models such as ours and for when the measures for constructs are obtained from archival data (Gefen, Rigdon, & Straub, 2011). Several variables, including the dependent variable in our study, were extracted from the archival data of KMS.

To validate the measurement model, we assessed its convergent and discriminant validity (Fornell & Larcker, 1981). The standardized path loadings of all items were significant and exceeded 0.7. The composite reliability (CR) and Cronbach's (for all constructs) exceeded 0.7. The average variance extracted (AVE) for each construct was greater than 0.5. Thus, convergent validity was supported (see Table 2).

We then assessed the discriminant validity of the measurement model. According to a correlation matrix, the square root of AVE for each construct exceeded the correlations between the construct and other constructs (see Table 3). As suggested by Anderson and Gerbing (1988), we conducted a second test of discriminant validity by using a process of constrained confirmatory factor analysis. This test found all χ^2 statistics significant, indicating that the measurement model was significant. Hence, discriminant validity of the instrument was established. Some high correlations between constructs in Table 3 signal the possibility that multicollinearity might be a problem in this research. To detect multicollinearity, we assessed the variance inflation factors (VIFs) and tolerance values of the constructs. The results showed that the highest VIF was 2.27 and that the lowest tolerance value was 0.44. This indicated that multicollinearity was not a serious issue.

We obtained factor scores for each of the first-order KMS user empowerment dimensions (competence of KMS user, impact of KMS usage, meaning of KMS usage, and self-determination of KMS user). Then we used these scores as reflective indicators of the second-order construct (KMS user empowerment). The path coefficients from KMS user empowerment underlying first-order factors as reflective indicators (the factor loadings) were 0.81, 0.85, 0.87, and 0.69, respectively, and all significant at the 0.01 level. Thus, the convergent validity of this set of the four dimensions of KMS user empowerment was supported. The composite reliability and Cronbach's α of KMS user empowerment were 0.90 and 0.85, respectively; both were above the suggested threshold of 0.70. To check for discriminant validity, the calculated AVE (0.61) exceeded 0.50, indicating a majority of the variances in the first-order dimensions were shared with the second-order latent construct. Overall, these results supported the reflective measurement model of KMS user empowerment as a second-order factor, with its four dimensions being the first-order indicators.

5.2. Hypotheses testing

We tested the structural model by applying a bootstrapping resampling technique with 183 cases, 500 bootstrap samples, and no sign change option (see Fig. 2). The results indicate that knowledge contribution (H1) and KMS user empowerment (H3) have significant effects on knowledge seeking, explaining 53% of its variance. KMS user empowerment (H2) also has a significant effect on knowledge contribution, explaining 17% of its variance. As for the effects of task and technological characteristics, job significance (H4), job autonomy (H5), ease of KMS use (H7), and KMS usefulness (H8) have significant effects on KMS user empowerment. They explain 67% of its variance. Ease of KMS use also moderates the relationship between task feedback and KMS user empowerment, supporting H9. We conducted an additional test by adding gender, age, tenure, and KMS usage experience as control variables. We

Table 2
Convergent validity testing.

Construct	Mean (S.D.)	Std. Loading of each item	AVE	CR	α
Competence of KMS user	3.83 (1.38)	0.93 0.95, 0.95	0.88	0.97	0.96
Impact of KMS usage	3.18 (1.43)	0.94, 0.96 0.93	0.90	0.97	0.96
Meaning of KMS usage	4.51 (1.42)	0.93, 0.96 0.96	0.88	0.97	0.95
Self-determination of KMS user	3.71 (1.57)	0.90,.92, 0.91	0.83	0.95	0.93
Job significance	5.31 (1.10)	0.92 0.93, 0.87	0.82	0.93	0.89
Job autonomy	4.76 (1.24)	0.82 0.87 0.87	0.73	0.89	0.82
Task feedback	5.08 (1.13)	0.92, 0.92 0.91	0.84	0.94	0.91
Ease of KMS use	3.99 (1.41)	0.92, 0.93 0.94 0.87	0.84	0.95	0.93
KMS usefulness	3.85 (1.44)	0.94, 0.95, 0.92, 0.92	0.87	0.97	0.95

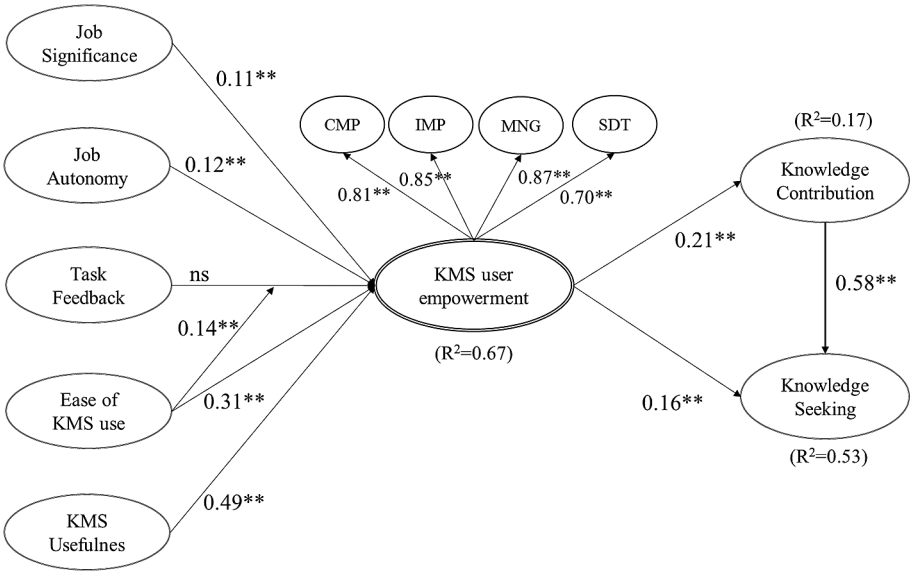

Fig. 2. Hypotheses testing results. Notes: 1. No control variables were significantly to the two knowledge-sharing behaviors. 2. CMP = Competence of user, IMP = Impact of KMS usage, MNG = Meaning of KMS usage, SDT = Self-determination of user.

found an insignificant effect of control variables on two knowledge-sharing behaviors.

Post-hoc analyses were conducted to test the mediating effect of KMS user empowerment on the relationship between work environment and knowledge sharing. The mediation test shows that according to the guidelines of Baron and Kenny (1986), KMS user empowerment fully mediates the effects of two job factors (job significance, job autonomy) and two technological factors (KMS usefulness, ease of KMS use) on knowledge sharing. Based on the application of Sobel test, we further found that KMS user empowerment was an especially significant mediator of the effect of the technological characteristics (ease of KMS use, $z = 3.97$, $p < 0.01$; KMS usefulness, $z = 3.58$, $p < 0.01$) on knowledge contribution. KMS user empowerment mediated the relationship between technological characteristics (ease of KMS use, $z = 3.11$, $p < 0.01$; KMS usefulness, $z = 2.91$, $p < 0.01$) and knowledge seeking. In contrast to previous research on adoption of technology with the direct effects of usefulness and ease of use (Davis, 1989; Venkatesh, Morris, Davis, & Davis, 2003), this study highlights the importance of the critical psychological state of motivation (i.e., KMS user empowerment) in leading to technology usage behavior (i.e., knowledge sharing in the context of KMS).

6. Discussion and implications

6.1. Discussion of findings

We made three key findings based on our development of KMS user empowerment as a high-order construct reflecting an individual user's motivational orientation toward knowledge-sharing behavior. First, we found significant relationships between KMS user empowerment and two distinct knowledge sharing activities: contribution and seeking. Prior research presented important factors of knowledge sharing from the separate perspectives of knowledge contribution (e.g., Bock et al., 2005; Hsu et al., 2007; Kankanhalli et al., 2005b; Wasko & Faraj, 2005) and knowledge seeking (e.g., Bock et al., 2006; Kankanhalli et al., 2005a; Watson & Hewett, 2006). These are rarely discussed in tandem as parts of a cohesive model. We sought to fill this gap. The results show that KMS user empowerment increases the knowledge contribution and knowledge seeking. Thus, KMS user empowerment plays a key role in the knowledge-sharing process.

Second, this research highlights the use of objective data in measuring the outcomes of spontaneous actions in sharing knowledge. Earlier studies in knowledge sharing focused on knowledge-sharing behavior as subjectively measured by intention and perceptual behavior data collected by questionnaires (e.g., Bock et al., 2005; He & Wei, 2009; Hsu et al., 2007). However, these perceptual measurement methods (e.g., self-reported knowledge-sharing behavior) casually substituted actual knowledge-sharing behavior (e.g., computer-recorded data on knowledge-sharing behavior), but we cannot be certain it actually occurred unless it was actually measured, especially in the context of voluntary use (Tsai & Bagozzi, 2014). This study shows a more objective result of the relationship between KMS user empowerment and knowledge sharing than prior studies achieved. Demonstrations of proactive knowledge-sharing behavior should use objective system-based data rather than subjective data.

Third, this study found that in the knowledge-sharing process, knowledge contribution behavior led to knowledge-seeking behavior. Although most previous researchers (Chang & Chung, 2011; Chen & Hung, 2010; Hung et al., 2015) mentioned two distinct behaviors in knowledge sharing and the relationships between them, there has been little research on these distinct behaviors. This relationship is a chicken and egg question that could depend on when KMS was adopted. In the pre-adoption stage, knowledge contribution took priority to enrich a KMS (Kankanhalli et al., 2005a,b), but in the postadoption stage, knowledge seeking moved to the forefront (Watson & Hewett, 2006). Thus, for this reason this study is among the first with evidence of the significant impact of knowledge contribution on knowledge seeking in the postadoption stage. Moreover, this finding implies that knowledge seeking can be activated directly based on KMS empowerment and indirectly through achieving more knowledge contributions.

Fourth, this study found two significant antecedents of KMS user empowerment in terms of job characteristics: job significance and job autonomy. Although knowledge is acquired and codified according to an employer's job activity, job characteristics have rarely been considered in previous studies as being among the antecedents of sharing knowledge. Most previous research tested

the impact of job characteristics on general motivation (i.e., intrinsic and extrinsic motivation) in terms of knowledge sharing (Foss, Minbaeva, Pedersen, & Reinholt, 2009), but this research focused on the specific active work motivation (i.e., KMS user empowerment) in understanding proactive knowledge-sharing behavior. Thus, this study is among the first to find the impact of job characteristic factors on KMS user empowerment as a way to elaborate on proactive knowledge-sharing behavior.

Fifth, this study found two significant antecedents of KMS user empowerment in terms of technological characteristics in work environments: ease of use of KMS and usefulness of KMS. These two technological factors are still mentioned as important determinants in personal decisions on adoption of KMS (Hung et al., 2015) as well as other systems in pre- and post-adoption stages from the perspective of TAM and continuance usage of IT (Bhattacherjee, 2001). Technology supports users in effectively and easily performing their assigned tasks, and then enhances their motivational state as symbolic adoption (Wang & Hsieh, 2006). The findings of this study explain how the significant role of ease of use and usefulness of KMS relate to active motivations enhancing proactive knowledge-sharing behavior. Moreover, this study further found that the ease of KMS use moderates the relationship between job autonomy and KMS user empowerment. Technological characteristics themselves are great tools that can enhance the effect of job autonomy in psychologically empowering users in their attitudes toward the use of KMS.

However, unlike in the existing literature, this study did not find a significant effect of task feedback on KMS user empowerment (Kraimer et al., 1999; Liden et al., 2000). We interviewed the employees of the target company to find the potential reason for this lack. An assistant manager in the Solutions Department said, “Task feedback (e.g., information on employee evaluations) in our company focuses on how to strengthen our capability and is not directly related to my goal.” And the deputy general manager in the planning department said, “Using KMS itself is rarely related to job performance and personal goals.” These comments mean that task feedback is not sufficiently related to personal goals and does not directly contain the result of using KMS relevant to their job. Task feedback encourages individuals' engagement in their work and increases their intrinsic motivation (Fodor & Carver, 2000). Employees' performance is based upon their past performance and goals, as modified by the feedback that they have received (Bandura & Wood, 1989). Task feedback should be accurate and of high quality (Hon & Rensvold, 2006) rather than just simply positive. Thus, task feedback should clearly reflect personal goals, and the task feedback can lead to KMS user empowerment. This study further found a very interesting result in comparison with previous research on job characteristics, psychological empowerment, and technology adoption: the moderating effect of ease of KMS use on task feedback and KMS user empowerment. Ease of KMS use can supplement these shortcomings of task feedback. An employee can trace individual activities through information systems (i.e., KMS) and provide information about their performance. The more KMS is designed easy-to-use for employee, the better they can ascertain their performance on a task. Therefore, ease of KMS use helps employees recognize their task feedback and then exerts a subsequent influence on their empowerment.

6.2. Limitations and further research

The results of this study should be interpreted in the context of its limitation. We used psychological empowerment theory to identify antecedents of two knowledge-sharing behaviors. Nevertheless, we cannot exclude the possibility of the possible effect of other motivations on knowledge sharing. Intrinsic motivation and extrinsic motivation are effective factors in the willingness to share knowledge as well (Lin & Lo, 2015; Safa and Solms, 2016; Yan et al., 2016). In the future, the effects of these motivations should be examined as incorporated in this research model. In addition, in terms of the work environment affecting the development of KMS user empowerment, we examined two constructs representing job and technology characteristics. Further study may determine other antecedents representing diverse aspects of the work environment (e.g., organizational climate and culture, leadership style, and management championship) and examine their effects on KMS user empowerment. According to job characteristics theory, psychological states (e.g., KMS user empowerment) are dependent on the characteristics of the job and are moderated by an individual's internal desire for growth (Hackman & Oldham, 1975). Further study may investigate this moderating effect.

Our work offers several interesting avenues for further research. Our results show proactive knowledge-sharing behavior through KMS user empowerment. Proactive individuals may perform their tasks by going beyond formal guidelines and procedures and fulfill or exceed what is expected of them in their work roles (Spreitzer, 1995). For this reason, further study should verify the impact of KMS user empowerment on organizational and task performances (i.e., creativity, innovation, and work effectiveness). Another avenue for study is to look beyond adding knowledge to examine other quantities of knowledge sharing based on computer-recorded data, which is commonly used to measure time spent/duration, frequency of contribution, and the number of unique contributions/diversity (Pee & Chua, 2016). These quantities show different types of knowledge (Desouza, Awazu, & Wan, 2006). Also, the type of shared knowledge (e.g., tacit and explicit knowledge) should be considered.

Our research findings should be expanded and applied to knowledge sharing at the organizational level in further research. With the advent of Web 2.0 technologies, collective knowledge might become an important issue in knowledge management. Our research should expand the interplay between individual and collective knowledge in knowledge creation and learning at the organizational level. Collective knowledge as the outcome of shared individual knowledge tends to be a public good. Thus, the interplay between individual and collective knowledge faces a social dilemma (e.g. it seems unreasonable for individuals to contribute their individual knowledge, effort, and time when they can easily free-ride on what others have contributed). Previous research (Cabrera & Cabrera, 2002; Cress et al., 2006; Kimmerle et al., 2007; Razmerita, Kirchner, & Nielsen, 2016) explained that people tend not to contribute their knowledge while they enjoy others' knowledge in terms of social dilemma. In view of our findings, social dilemma (i.e. the resistance of knowledge sharing at the organizational level) should be explained by employees' autonomous behavior rather than the economic perspective. Future research also needs to examine the alleviation of social dilemma in knowledge sharing.

6.3. Implications for research

This study has several implications for research, especially because it is the first to address three aspects of knowledge sharing: (1) establishing KMS user empowerment as a common driver of two aspects of voluntary knowledge sharing (i.e., contributing knowledge and seeking knowledge) based on application of the psychological empowerment theory; (2) in testing, this research model adopted two-stage data collection consisting of subjective data and system-based data for objective measurement of proactive knowledge-sharing behavior; (3) testing the relationship between knowledge contribution behavior and knowledge seeking; and (4)

determining the salient antecedents of KMS user empowerment in terms of job and technological characteristics.

The main implication of this study for theory is the application of the psychological empowerment theory to the context of knowledge sharing. A few researchers have applied empowerment in the IS context: Kim and Gupta (2014) used psychological empowerment in examining IS diffusion. In the KMS context, users' proactive behavior is an important issue in knowledge sharing. However, prior studies have rarely covered active motivational factors in the context of knowledge sharing. In explaining two distinct proactive knowledge-sharing behaviors (i.e., knowledge contribution and knowledge seeking), past studies relied mostly on a limited set of variables that had been used to explain KMS in pre- and postadoption stages (e.g., general intrinsic and extrinsic motivational factors, organizational factors, and technical factors, etc.) or voluntary factors representing the willingness to share knowledge from only one side of contributions: self-efficacy (Chen et al., 2012; Yilmaz, 2016) and self-determination (Gagné, 2009; Wang and Hou, 2015). In contrast, knowledge-seeking behavior has not been examined from the perspective of proactive behavior. Although successful in explaining knowledge-sharing behavior, these traditional variables cannot accurately account for the willingness to share knowledge. Thus, KMS users have been required to have active motivation toward two proactive knowledge-sharing behaviors beyond mandatory usage. In the light of this shortcoming of prior research, a major contribution of the present study to the KMS literature is its introduction of KMS user empowerment as a driver of two distinct knowledge-sharing behaviors that reflect an active motivational orientation and authority in the KMS context.

Second, this study contributes to IS research by taking a comprehensive approach to the study of voluntary behavior in IS. In a voluntary setting, actual behavior, such as the quantity of knowledge-sharing behavior, is representative of typically voluntary KMS use (i.e., IS) (Delone & McLean, 2003). However, knowledge-sharing behavior is difficult to observe from an external perspective because of the nature of knowledge in relation to information (Davenport & Prusak, 1998). For this reason, self-reporting has been used as a fair way of measuring actual knowledge-sharing behavior. However, this subjective perceptual data is inflated by respondents who have a lack of objectivity. Thus, we proposed in this study the use of system-based data in a user's proactive behavior in KMS. This research gives scientific objectivity to the subject of actual behavior in a voluntary setting.

Third, the implication of this study is to take a comprehensive approach to the process of knowledge sharing. Although this study has contributed substantially to the understanding of two distinct knowledge-sharing behaviors elicited by one user that should be examined in one research model (Chang & Chung, 2011; Chen & Hung, 2010; He & Wei, 2009; Hung et al., 2015), few researchers have examined the relationship between knowledge contribution and seeking. Watson and Hewett (2006) merely determined that from the perspective of social exchange theory, knowledge reuse promoted knowledge contribution. However, they were subjected to enough valuable knowledge that had already been collected. The process of knowledge sharing remained unknown. Thus, this study has contributed by exploring the relationship between knowledge contribution behavior and knowledge-seeking behavior in a knowledge-sharing context.

Fourth, using job characteristics theory, this research attempted to examine what kinds of determinants lead to activating motivation for knowledge sharing in the context of KMS. Although knowledge is acquired and codified by an employee's job activity (Kelloway & Barling, 2000), previous studies have rarely considered job characteristics theory as being among the antecedents of sharing knowledge. Foss et al. (2009) investigated the relationship between job characteristics and motivation (i.e., extrinsic and intrinsic motivation). However, they applied it to a different context (i.e., motivation based on cost and benefits according to social exchange in order to lead to sharing knowledge) and considered extrinsic and intrinsic motivation but not work motivation. These types of motivation can lead to people's proactive behavior but cannot promote it, unlike active motivation. Pee and Chua (2016) examined the direct effect of job characteristics on contributing relevant knowledge in terms of duration, frequency, and diversity. Although these earlier studies contributed substantially to our understanding of job characteristics in knowledge sharing, our study investigated the previously unexplored area of the effect of job characteristics on psychological empowerment in users' proactive behavior to share knowledge. Thus, the findings of this study expand the body of knowledge in the KMS context by taking a comprehensive approach to work environmental factors, especially job characteristics.

This study further demonstrated the significance of technological characteristics (ease of KMS use, KMS usefulness) on KMS user empowerment. Ease of use and usefulness have been identified previously as salient determinants of IS acceptance and usage in accordance with TAM (Davis, 1989). In this study, these beliefs also evoke KMS user empowerment. Amichai-Hamburger et al. (2008) suggested users are empowered by the Internet, although this was not empirical research. According to Füller et al. (2009), IT helps users solve their problems freely. They indicated that experienced tool support has a positive effect on perceived empowerment in the co-creation context. However, such a relationship is hardly seen anywhere else in the IS research, especially in the context of knowledge sharing. This study further found the moderating effect of the ease of KMS use on the relationship between job characteristics (i.e., job autonomy) on psychological empowerment in the context of KMS. This has never been found in previous research. Thus, this study contributes to psychological empowerment and to the IS literature by explaining the role and effect of technology characteristics.

6.4. Implications for practice

For practitioners, promoting knowledge sharing remains a challenge in KMS, despite much research on the topic. To promote proactive knowledge sharing, it is important to develop KMS user empowerment as a way for knowledge workers to have a motivational-orientation toward KMS usage. This requires elements to ensure these workers are strongly motivated to contribute and seek knowledge. The results of this study offer suggestions for management in the design of the context of the work environment in terms of how the job and IT can affect the development of KMS user empowerment. This study especially offers suggestions to managers encouraging KMS user empowerment, which fell under the human resource departments for job design and the IS department for systems development, but both departments also have to work in tandem on this issue.

Managers of human resources departments should consider encouraging job significance and job autonomy in designing knowledge workers' jobs. In regard to job significance, management can develop job descriptions that highlight information about their role and organizational needs. Management also should continually communicate and share with them what, why, and how their job activities have a substantial impact on achieving the firm's goals. Therefore, knowledge workers with high job significance are motivated and will understand and want to use the KMS, which

will lead to their actively contributing and seeking knowledge to enrich the KMS. As for job autonomy, management can consider allowing employees more discretion in their work through job enrichment (Herzberg, 1968), which is a vertical expansion of the task set to be performed by employees. This increases the depth of the job and allows knowledge workers to have additional authority, independence, and control over the manner in which an activity is completed. This motivates employees about their development needs and growth goals. Knowledge workers with high job autonomy can be motivated to share their knowledge enthusiastically.

Second, this study also suggests how IS department management can develop strategies to increase the ease of KMS use and their KMS usefulness. Unlike other enterprise systems, KMS, which are based on an unstructured data and process, tend to require greater technical ability, knowledge, and skill to use. As for the ease of KMS use, managers of IS departments should consider user-friendly interfaces to increase flexibility. They should also reduce the complexity of KMS through the creation of self-administrated workspaces and allow users to organize their own specifications for sharing knowledge in KMS. As for the usefulness of KMS, the IS department should design the fit between the KMS and the tasks required of its knowledge worker. Thus, KMS should be developed so their functions and service help knowledge workers perform their tasks with little mental effort.

Third, this study suggests that both managers should keep in mind that KMS is able to effectively support task feedback in KM to promote KMS user empowerment and proactive knowledge sharing. When task feedback, which is one of the job characteristics factors for motivating employees to use KMS at work, is expressly recognized, it works best. However, it is hard to consistently and accurately determine and trace employee's personal performance and the outcome it achieves. Easy-to-use technologies in KMS are able to compensate for this disadvantage of task feedback according to this study result: the moderating effect of the ease of KMS use on task feedback and KMS user empowerment. KMS can easily provide employees real-time status of their work activity in KM. The increased ease of use of KMS helps employees to more freely and conveniently track their work performance information. Thus, the KMS, which is designed for ease of use, not only improves task feedback to make it function in KMS user empowerment, but also promotes active motivation (e.g., KMS user empowerment) in voluntary sharing knowledge. For this reason, both managers of the two departments should not overlook devising strategies together to design KMS to encourage KMS user empowerment.

Forth, this study also offers suggestions to management about what to manage in terms of the dimensions of user empowerment. Competence as a dimension of KMS user empowerment is remarkably and conceptually close to self-efficacy, which has been mentioned by several researchers on knowledge sharing in the context of IS (Chen et al., 2012). Unlike other organizational systems, KMS relies on voluntary user participation to create resources and reuse them and tends to require a greater level of personal capability (i.e., technical ability, knowledge and skill) to use KMS in organizational knowledge processes. To elaborate on KMS users' competence, management can offer users continued appropriate IT technical training programs to benefit their work and technical innovation. Training intervention can also increase users' self-determination for KMS user empowerment. Users who have no IT technical problems with KMS could decide when, what, and how to use KMS in their own way. In regard to the meaning and the impact of KMS use, management also need to have a managerial training program to fit between the KMS and the tasks users are required to do. When users understand why they need to use KMS and know how to achieve even more through KMS, it helps them become self-motivated KMS users.

Appendix. Measurement instrument

Construct	Items	Wording
Competence of user	CMP1	I am self-assured about my capabilities to use the KMS.
	CMP2	I have mastered the skills necessary for using the KMS.
	CMP3	I am confident about my ability to use the KMS
Impact of KMS usage	IMP1	Based on KMS usage, my impact on what happens at work is large.
	IMP2	Based on KMS usage, I have significant influence over what happens at work.
	IMP3	Based on KMS usage, I have a great deal of control over what happens at work.
Meaning of KMS usage	MNG1	The KMS I use is very important to me.
	MNG2	The KMS I use is meaningful to me.
	MNG3	My KMS activities are personally meaningful to me.
Self-determination of user	SDT1	I have significant autonomy in determining how I use the KMS for work.
	SDT2	I can decide on my own how to go about using the KMS for work.
	SDT3	I have considerable opportunity for independence and freedom in how I use the KMS for work.
Job significance	JSF1	This job is important in that the results of my work can significantly affect other peoples' ability to do their work.
	JSF2	This job is one where a lot of other people, in this organization and other organizations, can be affected by how well my work gets done.
	JSF3	This job itself is very significant and important in that it facilitates or enables other peoples' work.
Job autonomy	JAT1	I can usually do what I want for this job without consulting my direct supervisor.
	JAT2	I usually make my own decisions about what to do on my job.
	JAT3	I usually make my own decisions before I can take action.
Task feedback	TFB1	This job itself provides me information about my work performance. That is, the actual work itself provides clues about how well I am doing—aside from any feedback co-workers or supervisors may provide.
	TFB2	Just doing the work required by this job provides many chances for me to figure out how well I am doing.
	TFB3	After I finish a task, I know whether I performed it well.
Ease of KMS use	EOU1	I would find the system easy to use.
	EOU2	It would be easy for me to become skillful at using the system.
	EOU3	My interaction with the system would be clear and understandable.
	EOU4	It is easy to do what I want to do using the KMS.
KMS usefulness	USF1	Using the KMS has made my work easy.
	USF2	Using the KMS enables me to accomplish tasks more easily.
	USF3	Using the KMS increases my productivity.
	USF4	I would find the KMS useful in my job.
Knowledge-sharing behavior (objective system-based data)	Contribution	The number of knowledge items registered for 6 months
	Seeking	The number of knowledge-seeking actions for 6 months

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