

Paper presented at the 20th Pacific Asia Conference on Information Systems (PACIS 2016), Chiayi, Taiwan, June 27 - July 1, 2016

Short form of the title: Enterprise social networking systems, knowledge management, and organizational learning.

Will enterprise social networking systems promote knowledge management and organizational learning? An empirical study

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Abstract

Nowadays, enterprise social media practitioners and researchers are keen to know how the enterprise usage of social media can be converted into the improved organizational performance. Meanwhile, organizational learning has long been considered as one of the measures of organizational performance. This paper investigated the impact of enterprise social networking systems usage on knowledge management processes and organizational learning; in particular, we examined the mediating role of knowledge creation and knowledge sharing. Four theories from sociology and strategic management were used to build the hypotheses in the research model. An online survey was conducted to empirically test the model. Our study results showed that enterprise social networking systems usage directly and indirectly influence organizational learning; and that knowledge management processes (knowledge creation and sharing) mediate the path between the two. This study contributes to the existing literature on enterprise social media for three reasons. First, it is among the first to connect the three independent concepts (social media, knowledge management and organizational learning) and explore their relationships in one theoretical framework. Second, this work also specifically examines the influence of enterprise social networking systems (Yammer in this case) on organizational processes and outcomes. Third, this is a pioneering study that employs multiple theories to address the research questions under the organizational social media context. Therefore, the research gives implications for both practitioners and scholars who are interested in understanding the effectiveness of enterprise social networking systems usage in the modern organizations today.

Keywords: Social media, Enterprise Social Networking Systems, knowledge creation, knowledge sharing, organizational learning

1. Introduction

Nowadays, organizations are becoming more reliant on the ever-changing and ever-expanding enterprise social media tools to help their internal members communicate, share knowledge, and learn (Thomas and Akdere 2013). The term “enterprise social media” is defined as a set of enterprise-wide, Internet-based technologies that allow users to easily create, edit, evaluate, and/or link to content or to other content creators (Majchrzak et al. 2013). These usually include applications, such as wikis, blogs, social tagging systems, social bookmarking systems, microblogs, and enterprise social networking systems (ESNS). For the purpose of this study, similar with Full and Yuan (2013), we mainly focus on one type of enterprise social media (i.e., ESNS) to illustrate our research ideas. Some examples of ESNS include Jive, Yammer, IBM Connections, Socialcast, and Chatter. ESNS are social networking systems that are implemented inside the boundary of organizations with the major purpose of supporting social networking within the organization and only organizational members can access these systems. They include the functions of posting comments, updating status, suggesting connections, searching for people or topics, and visualizing social networks (Fulk and Yuan 2013). We believe the study on ESNS is most relevant to the current research context because the networking aspects of ESNS are directly related to knowledge management processes. Moreover, many previous studies have shown that ESNS have a significant effect on organizational consequences (Monge and Contractor 2003; Fulk and Yuan 2013).

Enterprise social media usage has positive effects on various work-related outcomes, with knowledge management processes and workplace learning as the two most important outcomes (Thomas and Akdere 2013). According to Andriole (2010), knowledge management is the second most important reason to employ Web 2.0, which is a natural result of the deployment of social media. In the new social environment, enterprises are increasingly more interested in knowing how the social and collaborative dimensions of social software can be leveraged to support the traditional knowledge management activities (Razmerita, Kirchner, and Nabeth 2014). “Knowledge management” is defined as a systematic and integrative process of coordinating organization-wide activities of acquiring, creating, storing, sharing, developing, and deploying knowledge by individuals

and groups in pursuit of organizational goals (Rastogi 2000). The four core knowledge management processes include knowledge creation and acquisition, knowledge storage and retrieval, knowledge transfer and sharing, and knowledge application (Alavi and Leidner 2001). Traditionally, knowledge management is a formal, collective, top-down organizational process that allows employees to contribute and continuously retrieve knowledge from the knowledge bases or knowledge repositories. Compared with knowledge management, enterprise social media usage is more informal, personal, bottom-up, and voluntary (Annabi and McGann 2013). Practitioners like Bradley and McDonald (2011, 1) have explicitly explained the differences between these two. They described knowledge management as “what company management tells me I need to know, based on what they think is important” and social media as “how my peers show me what they think is important, based on their experience and in a way that I can judge for myself.” The modern enterprise social media tools have been mentioned to help manage knowledge due to their unique advantages, such as ease of use, structured content, collaboration, tracking, and revision capabilities (Grace 2009). They also contribute to knowledge management in supporting knowledge management practices, generating various types of high-quality knowledge resources, and overcoming knowledge management barriers (Aisenberg Ferenhof, Durst, and Hesamamiri 2016).

Various forms of enterprise social media not only promote the knowledge activities, but also enhance organizational learning directly and/or indirectly via the knowledge management processes. Learning activities under the social media context are believed to be a kind of “informal learning” (Marsick and Volpe 1999) or “new social learning” (Bingham and Conner 2010). This kind of learning is predominantly unstructured, experiential, non-institutional, and occurs as employees carry out their daily work; it also encourages knowledge transfer and connects people in a way that is consistent with how they naturally interact with one another. Such learning activities with social media are the new generation of learning in the open organizations where social media is not only used as a tool for communication but also as a means to improve organizational learning (Huang et al. 2010).

Knowledge management is also closely related with organizational learning. Based on the knowledge-based view, knowledge management is identified as a critical capability providing organizations with a source of competitive advantage (Sabherwal and Sabherwal 2007). The ability to achieve continuous learning is one of the organizational advantages that knowledge management can help obtain. Meanwhile, “organizational learning” refers to the way companies build, supplement, and organize knowledge and routines around their activities and cultures (Dodgson 1993). Learning is much more effective if a system (e.g., ESNS) is established through which knowledge can be captured, shared, and understood.

Recently, more and more researchers have focused on the relationship between social media and knowledge management, which may improve organizational learning from e-learning to social-learning (Ma and Chan 2014). The current study sets its scope to only one type of enterprise social media (ESNS) and uses Microsoft Yammer as an illustration of such. In the literature, the understanding of the role ESNS play in various organizational processes is in its infancy (Leonardi, Huysman, and Steinfield 2013). There exists a paucity of both well-founded empirical research to sufficiently address the essence of ESNS on organizational processes and outcomes, and the suitable theories to explain the impact of ESNS usage in the organization. In view of these, the current research attempts to be a pioneering study to investigate the effect of ESNS usage on the effectiveness of knowledge management processes and organizational learning. Among the four typical knowledge management processes (Alavi and Leidner 2001), we only considered the processes of knowledge creation and knowledge sharing as they have been proven to be the most critical knowledge management initiatives under the “social” context (Thomas and Akdere 2013; Ray 2014). Meanwhile, we treated ESNS usage and knowledge management processes as two distinctive factors that lead to effective organizational learning both independently and collaboratively. From the theoretical pool of strategic management and sociology, we selected four theories that can explain the features and contexts of ESNS. We applied these theories to support the hypotheses in the research model. In summary, this study proposed the following research questions:

(1) Will ESNS usage influence the knowledge management processes (knowledge creation and knowledge sharing) in the organization?

(2) Will ESNS usage directly influence organizational learning?

(3) Will knowledge management processes mediate the relationship between ESNS usage and organizational learning?

The remainder of this paper is organized into sections. In the next section, the literature review of the key concepts is introduced first. This is followed by a separate discussion of the theoretical foundations. We then present the research hypotheses and the research model. Next, the research methodology and the data analysis are introduced. Finally, the research results are discussed and the conclusions are given.

2. Literature review

The literature has suggested the following benefits of enterprise social media in general and ESNS in particular: efficiency, goal-oriented communication, avoidance of information overload and conflicts, effective knowledge transfer, establishment of an expert network, enhancement of interpersonal connections, and increased transparency, among others (Richter et al. 2013; Leonardi, Huysman, and Steinfield 2013). The current research focuses on the positive impact of the internal adoption of ESNS; in particular, we examined the effectiveness of one of the most famous ESNS tools: Microsoft Yammer. Yammer is one of the most popular commercial ESNS. Over 500,000 businesses around the world use Yammer, including 85% of the Fortune 500 companies (Zhang, Lv, and Yu 2015).

2.1. ESNS and Yammer

For the purpose of the current research, we specifically studied the influence of ESNS on knowledge management and organizational outcomes. Today's ESNS usually provide the aggregated functions of different social networking sites, such as profile, instant messaging, blogging, and self-managed online communities (Smock et al. 2011). They are treated as part of the strategies to achieve organizational knowledge management goals (Fulk and Yuan 2013), and as new vehicles to connect knowledge users in searching appropriate content and people (Leonardi 2014). While many prior

studies have stressed the importance of enterprise social media in general, a number of works have discussed topics related to ESNS specifically. For instance, Turban, Bolloju, and Liang (2011) studied the opportunities and risks of enterprise social networking in general; Zemaitaitiene, Tiskute, Tvaronaviciene (2016) revealed the difficulties involved in adopting an innovative ESNS in an enterprise; Richter et al. (2013) used a case study of Yammer to measure the success of ESNS; and Mäntymäki and Riemer (2016) examined the effectiveness of enterprise social networking from the perspective of knowledge management. Several case studies have used Yammer as an example in exploring the impact of enterprise social networking on knowledge management. For example, Riemer, Scifleet, and Reddig (2012) found that Yammer is an information-sharing channel, a space for crowdsourcing ideas, a place for finding expertise and solving problems, and a conversation medium for context and relationship building. Similarly, El Badawy and Zakarian (2014) found that internal social media (e.g., Yammer) can be used for improving advertising knowledge management in advertising agencies. However, Yammer's impact on organizational learning has yet to be explored. In the following paragraphs, we further introduced the literature on the key concepts and the relationships between these key concepts.

2.2. ESNS and knowledge management

Knowledge management is a direct consequence of ESNS usage. For years, knowledge management has been tagged as a mechanistic process wherein people contribute to the knowledge base and retrieve it when needed. With the emergence of Web 2.0 or Enterprise 2.0, knowledge management as a concept is being re-energized through people connecting, creating, and distributing user-generated content via informal networks and communities (Von Krogh 2012). Social network technologies are said to be a perfect match with the socialization and the bottom-up approach in the second wave of knowledge management, in which a large amount of tacit knowledge must be shared through interpersonal interactiona (Helms, Cranefield, and van Reijssen 2017). Indeed, ESNS have revolutionized how employees handle knowledge (Bebensee, Helms, and Spruit 2011): they enable the sharing, storage, and synthesis of knowledge from various sources to create new meta-knowledge; they also allow members' participation in collective knowledge generation processes via experience

sharing and by criticizing various theories and findings within communities of practices (Sigala and Chalkiti 2015). In addition, ESNS function as an expertise locator for employees in the social network to find the documented skills and experiences in the knowledge management context (Rivera-pelayo et al. 2013).

2.3. ESNS and organizational learning

Learning through social media is often referred to as Web 2.0-based learning or social learning, which allows individuals to consume information and create content through social media tools (Meister and Willyerd 2010). The extant literature has explored the effects of enterprise social media tools (as a whole or a special type in particular) on several forms of organizational learning (e.g., vicarious learning, situated learning). For instance, Schein (2014) conducted five semi-structured qualitative interviews to understand the value of integrating social media tools into organizational learning processes. The results of that study supported the use of social theory of learning and social learning theory to explain the social learning process of the organization. Through a survey of 15 internal social media users, Nguyen (2014) revealed that social media technologies play an important and growing role in organizational learning; moreover, the proper use of social media tools enhances the learning environment and improves productivity. Meanwhile, Palacios-Marqués, Devece-Carañana, and Llopis-Albert (2016) examined the co-effect of online social networks and organizational learning capability on innovation performance in 202 Spanish hotels. Leonardi (2014) further stressed that ESNS may enable vicarious learning through passive exposure to communications between others, which extend observer's reach beyond their immediate work group members. Nevertheless, extant research has largely focused on the effect of enterprise social media other than ESNS (in particular) on the organizational learning process, and the empirical studies on this topic are relatively scarce, especially in the field of Management Information Systems (MIS) (Baxter and Connolly 2014).

2.4. Knowledge management and organizational learning

The concept of organizational learning proliferated during the last thirty years. Its practices involve diversified perspectives of organizational management and recognize a wide range of variables

determining the learning results. Organizational learning and knowledge management are often referred to each other in their definitions and practices; however, they are also pursued as independent themes in research. The links between the two concepts tend to be “forgotten” in the literature by scholars who seek to contribute to separate schools of thought in terms of the fundamental assumptions about knowledge, information, environment, and learning (Meier 2011). It was not until recently, however, that management and organizational researchers began to link these two important concepts together and studied their impact on various organizational performance. For example, Lyles (2014) studied how organizational learning and knowledge creation interact with each other to create organizational innovation. Washika and Tamer (2014) examined the role of knowledge management in creating a culture of learning in Dubai companies. Many studies supported the view that a strong bond or close relationship exists between knowledge management and organizational learning (e.g., Allame et al. 2011). Under the social learning context in the organization, few studies (e.g., Thomas and Akdere 2013) have been conducted to explore the exact nature and the relationship between these two.

Based on the above discussions of the prior research, the gaps in the literature are summarized as follows. (1) While the topics of knowledge management and organizational learning have received growing attention from social media researchers, prior research generally focused on the investigation of the distinct influences of enterprise social media/ESNS on knowledge management and organizational learning (e.g., Majchrzak et al. 2013; Thomas and Akdere 2013; Von Krogh 2012). Moreover, empirical research on the above topics (Baxter and Connolly 2014) that have attempted to triangulate the preliminary discussion results from the prior qualitative or conceptual studies (e.g., Wagner, Vollmar, and Wagner 2014; Razmerita, Kirchner, and Nabeth 2014; Jeon, Kim, and Koh 2011; Roblek et al. 2013; Fulk and Yuan 2013; Huang and Güney 2012) remain lacking. (2) Many studies have focused only on the concepts of social media, knowledge management, or organizational learning as three independent concepts in the new social learning environment (Zhang et al. 2015). However, the relationships among these three have been rarely explored. (3) Researchers in MIS are just now beginning to understand ESNS, most often by describing how they might affect

organizational performance (e.g., Lefteriotis and Giannakos 2014). Thus far, few studies have examined how ESNS are implicated in various organizational processes (e.g., communication, knowledge creation, and knowledge sharing) (Leonardi, Huysman, and Steinfield 2013; Huang and Güney 2012; Breunig 2016). (4) Prior studies have addressed the contribution of social media and enterprise social media usage in different fields; however, few (e.g., Fulk and Yuan 2013) studied the effect of ESNS in particular. In addition, the specific measurement of ESNS usage (e.g., Richter, et al. 2013) has been rarely explored in the literature. (5) Studies on organizational learning under the social media context is an emerging topic. The traditional organizational learning theory does not acknowledge the influence of social media tools on individual learning within organizations nor the impact on the organization (Schein 2014). Given that organizational learning with social media involves both the cognitive and social aspects of the individual, more theories focusing on different facets of organizational processes are needed. (6) For the knowledge management processes, many researchers have pointed out that knowledge creation and knowledge sharing are the most critical factors under the “social” context (Thomas and Akdere 2013; Ray 2014); however, few of them have tested the mediating role of knowledge management between ESNS usage and organizational performance.

Given that the concepts of ESNS, knowledge management, and organizational learning are closely associated in the era of Enterprise 2.0, the current study intends to fill the gap in the extant literature by understanding and empirically testing the causal relationships between ESNS usage and knowledge management and organizational learning. In addition, together with a few other studies (e.g., Fulk and Yuan 2013), the current research specifically examines the influence of ESNS usage on the organizational outcomes and use Yammer’s (Yammer 2016) function as an exemplary measure to operationalize ESNS usage (Richter et al. 2013). Knowledge management processes, which are mainly reflected by knowledge creation and knowledge sharing, are treated as mediators between ESNS usage and organizational learning. Furthermore, new social and management theories are employed to study the impact of ESNS on various organizational processes (knowledge management and organizational learning).

3. Theoretical foundations

This study involves the understanding of different dimensions of the key concepts mentioned above, for example, the motivation of knowledge management, the effectiveness of enterprise social network, and how organizational learning occurs after using ESNS. As the topics on knowledge management and organizational learning have a long history in management and sociology theory and practice, selecting a parsimonious set of theories to support our research assumptions is one of the major challenges of this study. To cater to the needs of our key research focus (i.e., ESNS usage), we explored the theories that have been appropriately applied in the enterprise social media context. First, motivated by Fulk and Yuan (2013), we chose Information Public Goods theory (IPGT) and Social Capital Theory (SCT1) as the former focuses more on the motivational aspects of knowledge sharing and creation and the latter is particularly relevant to the capabilities of ESNS to link people with knowledge activities. SCT1 also serves as an additional explanation of the IPGT under the ESNS context, because “even the motivated sharers can face obstacles if they don’t have appropriate interpersonal connections via social network” (Fulk and Yuan 2013, 27). Second, when searching for theories to support organizational learning, we also considered Social Cognitive Theory (SCT2) (Bandura 1986). This theory is suitable to address the learning behavior of the employees being connected by the online social network. It considers both the individual and intrinsic cognitive factors and the surrounding relational and environmental social factors when investigating individual learning (Khang, Han, and Ki 2014; Kwahk and Park 2016). ESNS provide a transparent social platform for employees to “observe” and “learn.” Therefore, we believe SCT2 is the most appropriate theory that can reflect the exact nature of social learning (Schein 2014). Finally, the Knowledge-based View (KBV) is used to emphasize the importance of knowledge management toward organizational preformation (learning in this case). It functions as a complement that further supports SCT2 when explaining the relationship between knowledge management processes and organizational learning.

In summary, due to the complexity of the research background, multiple theories have been used to explore the phenomenon under investigation. These theories focusing on different facets of the research process provide a complementary and comprehensive view of the effect of ESNS on

knowledge management and organizational learning. The theories, hypotheses supported, and the major arguments are summarized in Table 1.

3.1. Information Public Goods Theory

IPGT (Hollingshead, Fulk, and Monge 2002; Fulk et al. 2004) focuses on the motivational aspect of knowledge management processes, e.g., why people need to contribute and share knowledge within a collective. It posits that knowledge as an organization-level public good is produced through collective action (Hollingshead, Fulk, and Monge 2002). No member of the collective can be excluded from enjoying the benefits of the good, and the use of the good by any member of the collective does not diminish the amount of the good available to other members (Hardin 1968). The value of the public information good depends on the contributions of individuals; and individuals in return tend to contribute to the public good if they perceived its content to be valuable (Mäntymäki and Riemer 2016). The core of IPGT is that individual participation relies on individual perceptions of personal and organizational gain, and it is based on a calculation that balances the benefits of the collective good against the cost of participating in it (Marwell and Oliver 1993). ESNS usage can help mitigate some of the costs identified in relation to the motivations that contribute to conventional knowledge repositories (knowledge creation). For example, experts nowadays can engage in the knowledge conversations rather than pay the cost of codifying knowledge to be stored in a formal repository. ESNS usage can also bring the benefits for collective knowledge sharing by increasing individual reputation (via showing social identity) as well as enhancing emotional closeness and target sharing with a subset of the participants (Fulk and Yuan 2013).

3.2. Social Capital Theory

IPGT assumes knowledge as a public good exists; however, even the most motivated knowledge worker may face obstacles if he/she does not have appropriate interpersonal connections to create and share knowledge (Hinds and Pfeffer 2003). SCT1 can somehow fill this gap. SCT1 has been widely used to explain the importance of social networks in influencing knowledge processes (Parise 2009). Social capitals are the resources embedded in a social structure and reside in relationships among individuals and connections within communities (Lin 2001). It is about “who you know” and how you

can leverage the social capitals (Fulk and Yuan 2013); it sets up a social navigation mechanism to find relevant people and content (Parise 2009). Ties among organizational members are very important for knowledge seeking, knowledge transfer, and knowledge sharing (Reagans and McEvily 2003). People are also motivated to contribute to knowledge creation as such behavior may lead to social rewards, e.g., approval, status, and reputation (Jones, Hesterly, and Borgatti 1997). One of the major characteristics of ESNS is increased interactivity, which could promise a rich source of social capital. Once employees have a richer source of social capital, especially when they become the key influencer in the social graph, they begin to intentionally or unintentionally create and spread the knowledge they possess.

3.3. Social Cognitive Theory

The individual learning theories have a significant impact on the concept of organizational learning, as learning can flow from individual to group and eventually spread out to the entire organization via the institutionalizing process (Nonaka 1994). In the current research, organizational learning is not only treated as the pure collectivity of individual learning, but also the dynamic sharing and experiencing process within the organization. Among many individual learning theories, SCT2 fits the context the most. SCT2 integrates both social and cognitive processes to understand motivation, emotions, and actions (Bandura 1986). It recognizes that a human possesses five basic cognitive capabilities: symbolizing capability, forethought capability, vicarious capability, self-regulatory, self-reflective and inherent (Wang and Ahmed 2003). The main learning mode that SCT2 purports is observational learning. For example, by using the vicarious capability, a person can learn a behavior by observing the actions of others and the consequences of those actions. In organizations, if the actions are rewarded, other members in the company can quickly learn from the modeling effect, and adjust their behaviors. SCT2 can be successfully applied to the traditional social networking environment, where people can physically meet and observe each other's behavior, and learning happens naturally through the mass communication and interaction. There are, however, few researchers (Khang, Han, and Ki 2014; Kwahk and Park 2016) who have mentioned the application of SCT2 in a technology-facilitated virtual interaction platform as in the case of ESNS. For example,

based on SCT2, Khang, Han, and Ki (2014) examined the relationship between social cognitive determinants and social media usage. In this paper, we believe that the traditional sociology theory can be applied to the online media environment due to the following reasons: (1) online social networking mimics the offline social networking environment where people interact with each other; (2) contribution or participation online can also be counted, and they deserve monetary or non-monetary rewards, which are observable by other members; and (3) people can easily and more transparently monitor other's behaviors via the social network platforms. To summarize, SCT2 is used in the current research to support the assumed relationship between ESNS usage and organizational learning and knowledge management processes and organizational learning.

3.4. Knowledge-based view

KBV, which sheds light on the relationship between knowledge and firm performance (Nonaka and Von Krogh 2009), considers knowledge as the most strategically significant resource of a firm (Kogut and Zander 1992). It extends the traditional resource-based view (Barney 1991) in that it shifts the attention from tangible resources to more intangible ones, for which knowledge is the prime example. Nonaka and Konno (1998) states that the KBV of the firm assumes that knowledge is the only resource that provides sustainable competitive advantage, and therefore, the firm's attention and decision making should focus primarily on knowledge and the competitive capabilities derived from it. The capability of organizational learning is one of the "institutional capabilities" (Liebeskind 1996) that makes full use of the accumulated knowledge in the boundary of organizations. It plays an important role in the sustainability of the competitive advantage. Therefore, based on KBV, we believe that knowledge management processes can significantly improve a company's organizational learning capability.

4. Research hypotheses and model

4.1. ESNS and knowledge management

4.1.1. ESNS usage and knowledge creation

Knowledge is socially constructed and meaning is created through ongoing social interaction (Eisenhardt and Santos 2002). SCT1 has been adopted by various studies to examine organizational knowledge-creation activities (e.g., Chiu, Hsu, and Wang 2006; Nahapiet and Ghoshal 1998). Creating and exchanging knowledge through a social network could bring individual, structural, cognitive, and relational capital to the knowledge creator (Jones, Hesterly, and Borgatti 1997). The more the person creates and shares knowledge, the more social resource he/she could gain from the social relationships. In a social network, people contribute to knowledge creation as it could demonstrate self-related expertise, enhance reputation, and emphasize their centrality in the social graph (Wasko and Faraj 2005). In the empirical studies, Razmerita, Kirchner, and Nabeth (2014) proved that by using an online social network, personal and collective knowledge can be connected in a symbiotic manner, and the integration can effectively encourage knowledge creation at different levels. Finally, Sigala and Chalkiti (2015) and Leonardi (2014) also revealed that ESNS could help create new meta-knowledge. Based on the above discussion, we propose H1.

H1: ESNS usage is positively related to knowledge creation.

4.1.2. *ESNS usage and knowledge sharing*

The internal use of ESNS can help employees fulfill their knowledge tasks in a relatively informal way (Paroutis and Al Saleh 2009). The unrestricted sharing of knowledge is a good example of this. Social networking technologies allow knowledge sharing through the creation of informal users' networks, thus allowing users to collaborate with each other by freely expressing their own opinions (Constantinides and Fountain 2008). This kind of organization-wide knowledge sharing is described by Majchrzak et al. (2013) as an online communal knowledge conversation instead of an intermittent, centralized knowledge management process (in the traditional KM process). ESNS have been proved to enhance intra-organizational knowledge sharing in general (Jeon, Kim, and Koh 2011); unleash passion among employees to engage in knowledge sharing (Paroutis and Al Saleh 2009) and change the way individuals are engaged in knowledge sharing (Majchrzak et al. 2013). The relationship between ESNS usage and knowledge sharing can be best explained by IPGT (Hollingshead, Fulk, and Monge 2002; Fulk et al. 2004), which focuses on the motivational aspect of knowledge management

processes. It is based on a calculation that balances the benefits of the collective good against the cost of participating in it (Marwell and Oliver 1993). In the social context, given that the experts and novices can feel free to engage in the “knowledge conversations” rather than pay for the extra cost of codifying knowledge for input to a formal repository, they tend to find more benefits in the collective knowledge sharing, e.g., reduce social loafing, encourage interactive and positive conversational context, and have a feeling of emotional closeness with colleagues (Fulk and Yuan 2013). Based on the above discussions, we propose the second hypothesis.

H2: ESNS usage is positively related to knowledge sharing.

4.2. ESNS and organizational learning

With ESNS, the importance of continued learning, rather than knowledge itself, is critical for the organization (Hemsley and Mason 2014). There exists two types of learning in an organization: formal and informal learning. Formal learning involves a higher degree of organizational control, whereas informal learning is most self-directed and incidental (Efimova and Swaak 2002). The informal learning represents up to 70% of job-related learning (Center for Workforce Development 1998). Learning behavior via social media belongs to the latter category. Based on SCT2, Janowica-Panjaitan and Noorderhaven (2008) found that informal learning behaviors characterized by “collegiality [and] reciprocity” (Wenger 2000, 243) have a consistently positive effect on the learning outcome, but formal learning behavior does not have. SCT2 purports that observational learning and ESNS usually have the function of “reviewability” and “visibility” (Wagner, Vollmar, and Wagner 2014), which allow co-workers to observe others’ behavior via the social platform. After the cognitive process, individual employees learn from the modeling effect, and such learning ability will spread out to the entire organization through online and/or offline as well as formal and/or informal social networks. Alternatively, the learning will pass through the knowledge spiral process (Nonaka 1994), that is, learning flows from individual, to the group, and to the organizational level. No matter which path it may go through, the usage of ESNS eventually leads to the organizational level of learning. Apart from the nature of informal learning, ESNS also allows employees to gain access to diverse knowledge sources, which makes it easier for them to learn (Tushman and Scanlan 1981). Empirical

support could be found in Huang et al. (2010), who argued that ESNS are not only a tool to increase communication and broaden branding efforts but also a means to improve learning within organizations. Hence, we propose H3 based on the above discussion.

H3: ESNS usage is positively related to organizational learning.

4.3. Knowledge management and organizational learning

Companies should utilize organizational knowledge to enhance organizational learning and performance. Cho, Cho, and McLean (2009) suggested that a primary function of learning within an organization is the sharing of existing knowledge and the creation of new knowledge. The hypotheses between knowledge management processes and organizational learning are majorly supported by the KBV and SCT2 theories. Based on KBV, knowledge is identified as the most strategically significant resource of the firm (Grant 1996), and effective knowledge management is regarded as an organizational capability to support the organization's development, maintenance, and application of core competencies and organizational learning (Zack 1999). KBV believes that knowledge management processes can help organizations achieve sustainable competitive advantages. Here, organizational learning is identified as a quantifiable improvement in sustainable competitive advantages (Cavaleri 1994). From the perspective of SCT2, the behavior of knowledge creation and knowledge sharing can be observed by other members in both online and offline social contexts. If such behaviors are encouraged or rewarded, a gradual cognitive process could occur among the members and their behaviors will be changed. At this time, organizational learning could happen.

4.3.1. Knowledge creation and organizational learning

How knowledge creation and sharing can be connected with organizational learning is of fundamental significance to organizations. Knowledge is a source of creativity and innovation. Some research specifically emphasized the significance of knowledge creation in organizational learning. They argued that knowledge can be co-constructed through discussion and collaboration, through which the learning capacity is developed (Bruner 1996). Based on Nonaka and Von Krogh (2009), firms' performances differ largely because organizational knowledge creation gives rise to the unique

organizational knowledge systems. According to the Balanced Scorecard model (Kaplan and Norton 1992) and KBV, an organization's learning ability is one of the important performance indicators to evaluate organizational performance. Therefore, we propose H4.

H4: Knowledge creation is positively related to organizational learning.

4.3.2. *Knowledge sharing and organizational learning*

Knowledge sharing plays a critical role in organizational learning. This process occurs in different organizational settings, such as informal inter-firm relations, communities of practices, and product development team (Costanzo and Tzoumpa 2008). In the current research context, knowledge sharing could occur at any place and under any circumstance in organizations, and is thus not limited to the knowledge sharing via the online social platform, e.g., ESNS. The relationship between knowledge sharing and organizational learning has been confirmed by a series of empirical research. For example, Gandhi (2004) asserted that the most important aspect of knowledge management is that it encourages people to share knowledge, and the ability of knowledge sharing is one of the predictive factors of organizational learning (Cheng 2013). Based on these, we propose the last hypothesis is proposed.

H5: Knowledge sharing is positively related to organizational learning.

Based on the above arguments and the theoretical foundations, the research model of the study is drawn and listed in Figure 1. In Figure 1, firm size, age, and industry are used as the control variables toward organizational learning (Jiménez-Jiménez and Sanz-Valle 2011). For firm size, it is believed that the bigger the company is, the more resources the company tends to use in promoting innovation and organizational performance (Damanpour 1992); for age, the older the company is, the more experience and competencies the company has in fostering organizational learning (Sørensen and Stuart 2000); and for industry, some industries (manufacturing, consulting, and designing) are believed to be more motivated to pursue knowledge management and organizational learning than others. The theories used to support each hypothesis are summarized in Table 1. Both IPGT and SCT2 are related to the motivational issues of using ESNS, and the consequences of ESNS usage are the

knowledge management activities (H1 and H2). SCT1 explains why and how people learn from one another via the ESNS platform (H3, H4, and H5). Finally, KBV emphasizes the importance of knowledge management processes in organizational learning (H4 and H5).

Insert Figure 1 about here

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5. Data collection and data analysis

5.1. Data collection

A web-based online survey was conducted in collecting data to be used in testing the research model. Invitations were individually sent to the LinkedIn enterprise social media group members. The members (from all over the world) were either fans or current enterprise users of ESNS tools. To be a qualified participant of the survey, the respondent must fulfill the following two requirements: (1) they must be currently employed so that the registration of the ESNS is legitimate, and (2) they must use the ESNS regularly for at least half a year so that the effect of ESNS usage on knowledge management processes and organizational learning can be shown. About 1,500 invitations were sent out within 5 months, and 320 members responded to our survey (with a response rate of 21.3%). After the data cleansing, a total of 263 valid data points could be used for the final data analysis. In this study, we tested Microsoft Yammer as a specific type of ESNS; therefore, we excluded the respondents who were not Yammer users. Hence, the total number of data set was 151 (with the first and the second wave of the respondents). We adopted the successive wave analysis technique in testing the non-response bias (Armstrong and Overton 1977; Rogelberg and Stanton 2007). In the first wave, 102 valid data were collected over three months and a follow-up of 49 data points were collected in the second wave. The first and second waves of respondents were compared based on the three demographic variables: size, age, and industry. The Chi-square values (size=0.53, age=1.03,

industry=0.59) of the three variables showed no significant differences between the first wave and the second wave of respondents. Therefore, the non-response bias is not likely to be a potential threat to the sample.

For the sample profile, over 80% of respondents came from the medium and large-sized companies over 3 years old. Over 50% of respondents work in Finance, IT, consulting services, and Education industries. Over 70% of respondents have used ESNS at least once a week and tend to hold a junior position (70%) with at least a Bachelor's degree (80%). Table 2 shows the demographic information of the respondents. As with all self-reported data, a potential for the common method bias exists (Podsakoff et al. 2003). To test the potential existence of common method bias, Harman's one-factor test (Podsakoff et al. 2003) was performed on the six reflective constructs in the theoretical model. Results of the exploratory factory analysis showed six factors that are present and that the most variance explained by one factor is 25.7% (<50%). This indicates that common method bias is not likely to contaminate the result.

Insert Table 2 about here

5.2. Measurements

Based on the literature review, we designed the original set of items, and sent them to a small group of employees in Hong Kong. These employees are currently using ESNS in their companies. We also consulted faculty members on the selection and phrasing of items for each construct. We dropped one item from ESNS (ESNS3) after collecting feedback from both parties, as Yammer's function on communication and collaboration with outside parties are generally not considered as a function for internal ESNS usage. The final version of the questionnaire is shown in Table 3. Hence, the face and content validity could be guaranteed. All the four constructs were measured by using a 5-point Likert scale and at the individual level of analysis. The answers to these questions reflect the respondent's personal perception of the investigated issues. Table 3 shows the questions and measures.

5.2.1. *ESNS usage*

Measuring ESNS usage relates to the manner of its use. The literature on ESNS measures was relatively rare at the time of the study; however, we borrowed typical actions of collaboration from Richter et al. (2013) and other/specific functions of Yammer (Yammer 2016) in measuring ESNS usage. In this paper, we used Yammer as an exemplary case in measuring how ESNS is being used. We intended to understand the frequency of ESNS usage for creating and managing groups, joining a conversation, communicating with outsiders, sharing documents, and searching for experts or knowledge in the company. We believe Yammer users share these common features as well as any typical ESNS used in organizations. In addition, we treated ESNS usage as a formative variable reflecting different dimensions of the activities through enterprise social networking platforms.

5.2.2. *Knowledge creation*

Knowledge management as an academic discipline has a long history with different dimensions and theories (A. F. Ragab and Arisha 2013). For example, knowledge has multiple forms: tacit vs. explicit (Nonaka and Takeuchi 1995) and individual vs. organizational (Heisig 2009). Knowledge can be created via processes of socialization, externalization, combination, and internalization (Nonaka and Takeuchi 1995), and the four core knowledge management processes include knowledge creation, storage, sharing, and application (Alavi and Leidner 2001). From the strategic management perspective, KBV is considered the most influential theory to explain the strategic importance of knowledge toward organizational performance. In the context of social media (as a supportive technology to knowledge management), knowledge creation and knowledge sharing are the two most important knowledge management processes (Ray 2014). In the following, the measurement of these two important constructs is discussed.

“Knowledge creation” is defined as the process of generating new knowledge by applying existing knowledge to previously unknown scenarios (Ray 2014). The existing measure of knowledge creation mainly resides in the management and organizational behavior fields, such as in intra-firm (with the co-workers) (e.g., Bryant and Terborg 2008) and inter-firm (with the business partners) (e.g., Jiang and Li 2009) knowledge creation. Most of these measures are usually at the firm level (e.g., Lopez-

Nicolas and Soto-Acosta 2010) and do not differentiate knowledge creation from knowledge sharing (Bryant and Terborg 2008). However, the measure under the ESNS context is rare. To operationalize the construct, we borrowed the empirical measures from Jiang and Li (2009), Bryant and Terborg (2008), and Razi and Karim (2011). The theoretical domain for scale items is based on Nonaka and Von Krogh (2009)'s knowledge creation theory. In this study, items reflect different functional dimensions of knowledge creation (e.g., new products, services, technologies, skills, and operational ideas, among others) as well as features of the four knowledge creation processes (e.g., socialization–“I am involved to find new strategies and opportunities,” combination–“I intend to create new products and services”). We filtered out items for knowledge sharing, alliance with other firms/external parties and items reflecting group or organizational level of knowledge creation in Bryant and Terborg (2008), Razi and Karim (2011), and Nonaka and Von Krogh (2009) as we focus on knowledge creation. We specifically tailored our measures to the context of knowledge creation activity after using ESNS by internal employees. After a pilot test, the repetitive items were combined, and eight items were eventually confirmed to measure knowledge creation in the present study.

5.2.3. *Knowledge sharing*

“Knowledge sharing” is defined as the process through which organizational members provide and receive knowledge with other members within the same organization (Yu et al. 2013). In the literature, knowledge sharing was basically measured by three methods: (1) a general measure to reflect the overall knowledge sharing situation in the organization (e.g., Cao and Xiang 2012); (2) a specific measure of the quality and quantity of knowledge sharing (e.g., Chang and Chuang 2011); and (3) a measure of both tacit and explicit knowledge sharing (e.g., Yu et al. 2013).). Since social network enables the sharing of both tacit and explicit knowledge, and both instrumental knowledge and metaknowledge (Leonardi, Huysman, and Steinfield 2013), to reflect the nature of all these knowledge sharing activities, we specifically selected the studies that operationalized knowledge sharing from these perspectives (e.g., know-where and know-whom could reflect the implicit nature of knowledge or simply metaknowledge). We borrowed measures from Yu et al. (2013) and Bock et

al. (2005) to operationalize knowledge sharing after ESNS usage. In their works, knowledge sharing was measured from two perspectives: explicit knowledge sharing and implicit/tacit knowledge sharing. Sharing of work reports, manuals, methodologies belong to the first category and the sharing of know-how, know-why, know-whom or know-where, work experiences, and expertise belong to the second category. For the purpose of this research, we did not distinguish between the two sub-dimensions of knowledge sharing activities, and measure knowledge sharing activities on an overall basis.

5.2.4. *Organizational learning*

Organizational learning is regarded more as a process than a static stock (Sinkula, Baker, and Noordewier 1997). Huber (1991) is among the first to explore a complete understanding of organizational learning, which the author described as comprising four major processes: information acquisition, information distribution, information interpretation, and organizational memory. Based on Huber (1991)'s work, Jiménez-Jiménez and Sanz-Valle (2011), Jiménez-Jiménez and Cegarra-Navarro (2007), and other organizational learning researchers operationalized the four processes, and tested these in their empirical works. The current study adopted the measure of Jiménez-Jiménez and Sanz-Valle (2011). This is because their measures on organizational learning are the most classic, comprehensive, and widely cited instruments in measuring organizational learning. Organizational learning is a second-order formative construct measured from four sub-dimensions (four behavioral dimensions of the organizational learning processes) with thirteen items.

Insert Table 3 about here

5.3. *Assessment of the measurement model*

The instruments were input into SmartPLS 3.0 (Ringle, Wende, and Becker 2015) for testing the measurement model and the structural model. Following the two-stage analytical procedures (Anderson and Gerbing 1988), the confirmatory factor analysis was first conducted to test the

measurement model. As the model contained one second-order variable (organizational learning), we created superordinate second-order construct using factor scores for the first-order constructs (Chin, Marcolin, and Newsted 2003). The second-order construct was treated as a formative variable measured from four sub-dimensions (IA, II, ID, and OM).

Convergent validity was examined by checking the composite reliability and average variance extracted (AVE) from measures (Hair et al. 1998). Table 4 shows that all composite reliabilities are above the threshold of 0.707 (Chin 1998), and most AVEs pass the recommended value of 0.5 (Fornell and Larcker 1981). In order to verify the discriminant validity, the squared roots of the AVEs were then used to compare with the correlations between constructs (Fornell and Larcker 1981). Table 5 shows that all squared roots of the AVEs are greater than the level of correlations involving the construct. The factor loadings are also heavily loaded on its own construct than other constructs (Table 6). This shows a good discriminant validity of current measures. Finally, the outer weights of the formative variable-ESNS usage are shown in Table 7. As can be seen, ESNSU2 and ESNSU5 carry the heaviest weights (0.395 and 0.390) in explaining ESNS usage.

Insert Table 4 about here

Insert Table 5 about here

Insert Table 6 about here

Insert Table 7 about here

5.4. Assessment of the structural model

As shown in Figure 2, all path coefficients between major constructs are significant at the 0.01 level. As can be seen, ESNS usage significantly influences knowledge creation ($t=9.648$) and knowledge sharing ($t=5.538$), thereby supporting H1 and H2. ESNS usage also has a positive and direct effect on organizational learning ($t=3.103$), thus supporting H3. Moreover, both knowledge creation and knowledge sharing after ESNS usage influence organizational learning ($t=4.812$; $t=4.350$), thereby supporting H4 and H5. The R square values of two mediators (KC and KS) are 0.274 and 0.225, respectively, and the R square of the dependent variable—organizational learning is 0.388. This means that all independent variables (ESNS usage, KC, and KS) in the model explained 38.8% of the variance in the dependent variable (OL). Finally, the three control variables (size, age, and industry) have no significant effects on the organizational learning. This means that the three demographic variables in the model have no significant contribution in explaining organizational learning.

Insert Figure 2 about here

5.5. Mediating effects of knowledge creation and knowledge sharing

The mediating effects of knowledge creation and knowledge sharing were tested using a series of regression models. Following Baron and Kenny (1986)'s approach, a construct is considered a mediator when the following conditions are held: (1) the independent variables affect the mediator in the first regression, (2) the independent variables are shown to affect the dependent variable in the second regression, (3) the mediator affects the dependent variable in the third regression, and (4) the independent variables' effect on the dependent variable must be less in the third equation than in the second. A full mediation effect is demonstrated when the independent variable has no effect on the dependent variable due to the mediator's involvement. Otherwise, the mediator is supposed to partially affect mediation (Baron and Kenny 1986). Results of the multiple regressions are presented in Tables 8 and 9.

Insert Table 8 about here

Insert Table 9 about here

In Tables 8 and 9, a consistent pattern of the partial mediation effect is found on knowledge creation and knowledge sharing. First, path coefficients between ESNSU and KC (0.524), and between ESNSU and KS (0.474) are significant at the 0.01 level. Second, ESNSU significantly influences OL in both regressions with a path coefficient of 0.553. Third, both KC (0.475) and KS (0.400) affect OL significantly in the third regression (model 2), and the absolute values of ESNSU's path coefficients (0.420 and 0.469) are significantly lower than that of the second regression in model 1. Meanwhile, the path coefficient of ESNSU-OL is still significant after involving the mediator (KC or KS) in the third regression equations. This means that these paths satisfy conditions one, two, three, and four. The results reveal that knowledge creation and knowledge sharing both have a partial mediation effect between ESNSU and organizational learning. To further assess the significance of the mediating effect of KC and KS, we conducted a Sobel test (Sobel 1982). The Z-values (4.95 for KC and 4.14 for KS) are significant at the 0.01 level, thus confirming the mediating effects of both KC and KS in the paths.

6. Discussion

The special issue of social computing and service innovation emphasizes the significance of social computing technologies in building special organizational competences and in creating novel opportunities for the internal or external actors of the organization (Lusch and Nambisan 2015). Creating and sharing knowledge is one of the most important organizational competences social computing (especially ESNS) can bring to the company. Meanwhile, as part of the service innovation, the aggregated knowledge at the individual level can further encourage the learning behavior (the knowledge absorptive capability) (King 2009) in the new social context. The current study aims to understand the factors that are likely to influence knowledge management processes and

organizational learning with ESNS tools. To test the conceptual model, five hypotheses were used to investigate the causal relationship between ESNS usage and organizational learning, and the mediating effects of the knowledge management processes in the path. The data analysis results support all the hypotheses in the research model.

First, as ESNS usage is the focus of this study, we specifically examined the outer weights of ESNS usage. The data analysis results reveal that joining a conversation with co-workers (weight=0.395) and searching for experts or knowledge in the company (weight=0.390) are the most important reasons why employees use ESNS. However, the functions of creating, connecting, and managing groups are relatively less important for Yammer users. In the structural model, these two functions (joining a conversation and searching for experts or knowledge) also contribute most in explaining the knowledge management processes and organizational learning.

Second, frequent ESNS usage can stimulate employees' creativity and service innovation toward knowledge (H1, T-value: 9.436). Specifically, the extra time employees spend in using ESNS gives them additional knowledge in creating a variety of work-related purposes (e.g., new way to perform tasks, new operational ideas, innovative processes, etc.). This result is sufficiently explained by SCT1, which posits that creating and exchanging knowledge through a social network can bring benefits and rewards to the knowledge creator (Jones, Hesterly, and Borgatti 1997). This result also echoes the need for a further study on the impact of social computing technologies on the new form of service innovation inside the company. Likewise, our results are consistent with the extant literature (e.g., Wagner, Vollmar, and Wagner 2014; Razmerita, Kirchner, and Nabeth 2014), which generally believes that social media help with the knowledge creation instead of diminish knowledge creation.

Third, ESNS usage also encourages employees to share the existing tacit and explicit knowledge within the organization (H2, T-value: 7.903). Although we did not differentiate tacit knowledge from explicit knowledge for the purpose of the current research, the data analysis results revealed that ESNS usage helps promote both knowledge sharing modes. While explicit knowledge can be exchanged among employees by swapping ideas and comments on the discussion board; tacit knowledge can be documented and shared via enterprise social networks, where experts in a certain

domain can be easily found (Schmidt and Hunter 1993; Panahi, Watson, and Partridge 2012). This result is also consistent with that of Leonardi, Huysman, and Steinfield (2013), who argued that ESNS help employees share both instrumental knowledge (mainly explicit in nature) and meta-knowledge (mainly tacit in nature). From the theoretical perspective, this result is best explained by IPGT. Under the informal environment of ESNS usage, sharing knowledge is more relaxing and natural to employees. Hence, employees enjoy the emotional and social benefits of the “transportation” of knowledge from one to another. They also do not need pay extra cost in “knowledge conversations.” Knowledge as a public good is shared equally among all organizational members in an ideal open organization. SCT1 also supports this result, as SCT1 is about “who you know” and how to leverage social capitals (Fulk and Yuan 2013); SCT1 also helps to further explain the movement, intensity level, and the direction of knowledge sharing.

Fourth, ESNS usage has been proven to positively relate with organizational learning (H3, T-value: 4.11). This result, again, is consistent with the prior literature (e.g., Huang et al. 2010; Jennex 2009), which proposed a positive relationship between social media usage and organizational learning. Although a negative relationship is found in the education field between students’ social media usage and individual learning (e.g., Dunn 2011; Vural 2015), the current research does not find such a relationship between ESNS usage and organizational learning. The major reason might be that employees using internal social networking tools are task-oriented, and the content itself is serious and work-related. Employees tend to make the best of the working hours to seek experts’ opinion, find new knowledge, and join a conversation with colleagues. Employees will be careful when posting and replying messages via ESNS (since the platform is transparent to all employees); likewise, employees also control time and resources on ESNS better than students. H3 is also well founded in SCT2, thus signifying observational learning. With the function of “reviewability” and “visibility” (Wagner, Vollmar, and Wagner 2014), co-workers can observe others’ behavior via the transparent social platform. Individual employees learn from the modeling effect, and the learning ability is shared to the entire organization using social network.

Finally, H4 (T-value: 3.204) and H5 (T-value: 2.585) are supported by our empirical study; hence, both knowledge creation and knowledge sharing can lead to organizational learning. Theoretical foundation could be found from KBV and SCT2. KBV considers knowledge as the most strategically important resource of a firm (Kogut and Zander 1992). Knowledge management can help companies achieve sustainable competitive advantages, and organizational learning is one of the measures of these advantages. From the perspective of SCT2, once the behaviors of knowledge creation and knowledge sharing are rewarded, other organizational members can learn from their peers, which can then lead to organizational learning. The results of H4 and H5 are also consistent with the literature in the corresponding domains (e.g., Bruner 1996; Gandhi 2004; and Cheng 2013). Finally, the mediating effects of knowledge creation and knowledge sharing were tested using a series of regression models (Baron and Kenny 1986), the results demonstrated the significant mediating effects of both constructs.

To conclude, our data analysis results are inspiring, with over 38% of the organizational learning attributed to employees' ESNS usage and knowledge management activities. Furthermore, ESNS usage (as an informal learning process) and knowledge management activities (as a formal learning process) are compatible during the organizational learning process.

7. Implications for theory and practice

7.1. Implications for theory

Recently, researchers have increasingly begun to focus on the relationship between enterprise social media and knowledge management, which may improve organizational learning from e-learning to social-learning (Ma and Chan 2014). This research, which aimed to answer one important question (“Will enterprise social networking systems promote knowledge management and organizational learning?”) has made several contributions to the theory and practice of ESNS usage.

First, our study emphasizes the importance of ESNS usage in organizations and proves that ESNS usage significantly and positively influences processes and outcomes on the organizational level. This result extends our understanding of the positive impact of ESNS usage, that is, adopting online social networks will not only accomplish customer-, market-, and strategy-oriented organizational

objectives, but also enhance employees' internal learning and knowledge management activities (as part of the internal service innovation).

Second, there is a significant trend in recent studies on social media supported knowledge management; the current study successfully distinguishes the concept of ESNS usage from the concept of knowledge management and confirms the causal relationship between these two. ESNS usage as a bottom-up approach is not only different from knowledge management (as a formal and top-down process), but is also a significant enabler of knowledge management initiatives. This result somehow dispels the doubt on the questionable "marriage" between ESNS and knowledge management in the organizational context (Bradley and McDonald 2011).

Third, ESNS usage has been proven to have a positive instead of a negative effect on organizational learning. Arguments have been raised regarding the negative effects of ESNS usage on individual performance (e.g., Li, Webber, and Cifuentes 2012) and students' learning outcomes (e.g., Dunn 2011). In the literature, whether the adoption of ESNS brings extra benefits in the organizational level of learning remains unclear. Based on SCT2 and the empirical results, this study confirms that employees' ESNS usage enhances the entire organization's learning ability.

Fourth, this study is among the first to employ multiple theories in addressing similar or different research questions under the social context. For example, IPGT and SCT1 are both used in explaining the impact of ESNS usage on knowledge management activities; likewise, SCT2 is employed to address the relationships toward organizational learning. This study is also among the first to apply a traditional sociology theory (SCT2) in the online media environment, thus demonstrating SCT2's generalizability in the social media or new online media context.

Finally, the mediating effects of knowledge creation and knowledge sharing are confirmed. Social media usage, knowledge management activities, and organizational learning are mentioned together or interchangeably. However, few studies have explicitly and clearly set knowledge management in a right position where both social media usage and knowledge management activities are present in the organization. This study's findings confirm that both ESNS usage and knowledge management can

lead to organizational learning, and that knowledge management processes mediate employees' ESNS usage toward improved organizational learning.

7.2. Implications for practice

This study obtains results that provide important managerial implications for internal social media policy makers or IT managers who handle ESNS-related issues.

First, this study eliminates the management's concern on the frequent usage of enterprise social networking systems for organization's internal usage. Results prove that ESNS usage does not necessarily lead to the loss of productivity or enthusiasm to create and share new knowledge. Instead, employees tend to use new technology in the new social environment for self-improvement or continuous collective learning. When evaluating the needs of implementing ESNS, IT managers or social media policy makers should embrace the idea of ESNS adoption (though with a careful control on the privacy and abuse issues) as the proper usage of ESNS can bring positive organizational outcomes.

Second, this research encourages ESNS usage in knowledge management processes. Traditionally, knowledge management is a formal, collective, top-down organizational process that allows employees in contributing and retrieving knowledge from bases or repositories. In this study, ESNS usage as an informal, personal, bottom-up, and voluntary approach complements traditional knowledge management processes. Specifically, when both ESNS and knowledge management systems are in place, companies can consider launching both ESNS and knowledge management systems simultaneously to enhance organizational learning. Managers must, therefore, treat ESNS usage as the booster or enabler of knowledge management.

Third, companies must also pay attention to activities that create and share knowledge to promote organizational learning. The concept of knowledge management is not outdated nowadays; therefore, knowledge management can still find its place when ESNS is introduced into the organization. These formal organizational mechanisms (e.g., knowledge creation and sharing) can not only directly facilitate organizational learning, but also function as an important complement for ESNS usage.

8. Limitations and future research

In this study, several limitations still exist, despite the efforts made in minimizing potential problems. First, as a cross-sectional survey, this study shares the same potential problem with other similar type of survey studies—depict a phenomenon (e.g., KC, KS, OL) that evolve overtime; therefore, a longitudinal study with data collected over multiple periods is suggested for future studies. Second, this study suffered common problem of data collection via a web survey. Participants were recruited via email invitations and the survey was administrated online. The nonprobability sampling methods of online survey attracted participants interested in discussing ESNS issues in their organizations, but ignored the people practicing ESNS in their companies and did not participate in the survey. Third, organizational learning is reported using employee's perception; however, personal perception on the organizational issues may not accurately reflect the organizational reality. For the ideal case and future research, we suggest collecting data in a real organizational setting, and inviting both ordinary employees and managers (who are more knowledgeable on organizational issues) to participate in the survey. By doing this, we can precisely measure the constructs and avoid a certain level of common method bias. Fourth, as mentioned by prior research (e.g., Jiménez-Jiménez and Cegarra-Navarro 2007), measuring organizational learning as a dynamic process is a challenging task in itself. In the future, we propose for suitable measures specifically designed for the organizational learning process under the Enterprise 2.0 context. Fifth, our study focuses on a lone type of enterprise social media—ESNS with Yammer users as the tested sample; future research should test the effects of other types of social media (e.g., blog, wiki) on knowledge management and organizational learning. Sixth, this research does not focus on the specific feature or affordance of ESNS usage; hence, further research attention must be paid in investigating the in-depth nature of ESNS usage and discover its impact on business practice. Finally, all independent variables only explained over 38% of the variance in organizational learning. Thus, we propose that future studies explore more factors (e.g., communication, engagement, transparency of information, trust, etc.) that influence the organizational learning in the new social context. We also propose an appeal for further theories in enhancing various enterprise social media or future ESNS-related research.

9. Conclusion

Social computing facilitates service innovation, which in turn, emerges from the interactions within a network of actors (Lusch and Nambisan 2015). This study aims to investigate the effectiveness of internal social networking tools in promoting new forms of service innovation (competence of knowledge management and organizational learning). On the basis of the four theories in sociology and strategic management, this paper built a conceptual model to understand the predictive factors of organizational learning in the new social context. Specifically, we investigated the causal relationships between ESNS usage, knowledge management processes, and organizational learning. Research results validated that ESNS usage is an important antecedent of knowledge creation and knowledge sharing. ESNS usage is also an important contributor to organizational learning. Knowledge creation and knowledge sharing both mediate the path between ESNS usage and organizational learning. For the implication to theory, this paper echoes the need for new theories in social computing and service innovation. To the best of our knowledge, this study is among the first to use multiple theories in understanding the effects of ESNS usage on two dimensions of service innovation: knowledge management and organizational learning. Likewise, this study is also one of the pioneers in testing the outcomes of ESNS usage on organizational level (organizational learning) and in verifying the mediating role of knowledge management processes in organizational learning. For practical implications, this study somehow eliminates the management's concern on the frequent usage of enterprise social networking systems as the usage can stimulate knowledge creation and knowledge sharing and eventually help in the long-term learning outcomes of the organizations.

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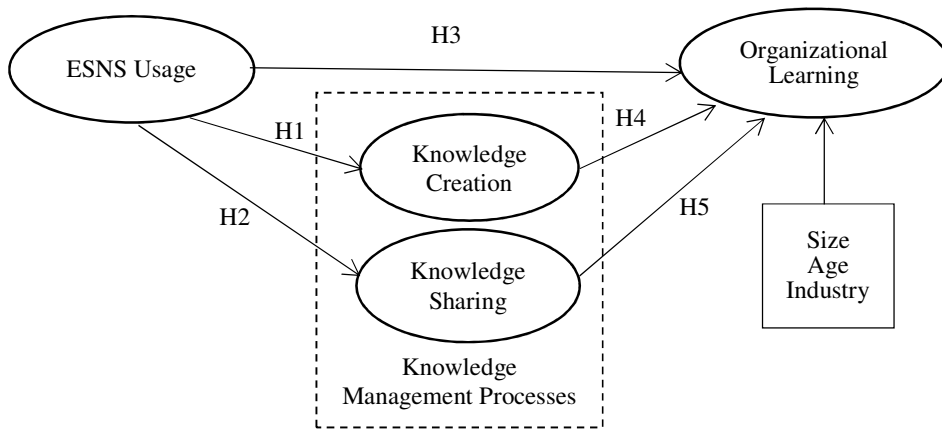


Figure 1. Research model

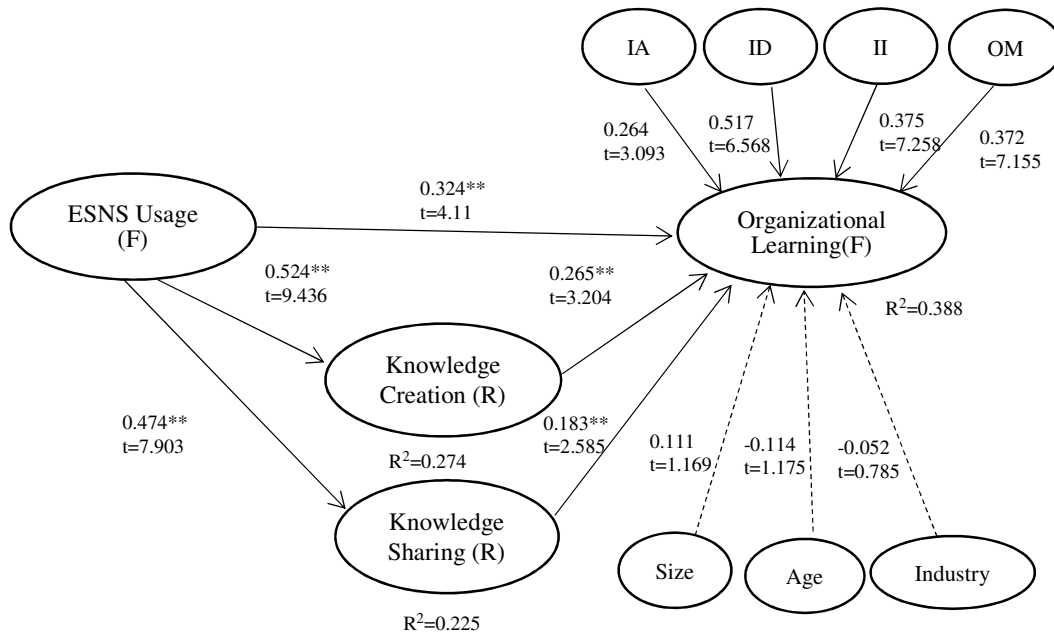


Figure 2. Results of the second-order PLS Analysis

- Notes: (1) Solid lines mean path coefficients are significant; dotted lines mean coefficients are insignificant.
 (2) R=Reflective; F=Formative; ** p<0.01
 (3) IA= Information acquisition; ID=Information distribution; II=Information interpretation;
 OM=Organizational memory

Table 1. Theories and supported hypotheses

Theories	Supported Hypotheses	Major arguments
Information Public Goods Theory (IPGT)	H1: ESNS usage-knowledge creation H2: ESNS usage-knowledge sharing	IPGT focuses on the motivational aspect of knowledge management processes: Why people need to contribute and share knowledge within a collective. Individual participation relies on individual perceptions of the gain and is based on a calculation that balances benefits of the collective good against the cost of participating in it (Marwell and Oliver, 1993). ESNS usage can help mitigate some of the costs identified in relation to motivations that contribute to conventional knowledge repositories (knowledge creation). ESNS usage can also bring benefits for collective knowledge sharing by increasing individual reputation (via showing social identity) and enhancing emotional closeness and target sharing with a subset of participants (Fulk and Yuan, 2013).
Social Capital Theory (SCT1)	H1: ESNS usage-knowledge creation H2: ESNS usage-knowledge sharing	SCT1 explains the importance of social networks in influencing knowledge processes (Parise, 2009). Social ties among organizational members are very important for knowledge seeking, transfer, and sharing (Reagans and McEvily, 2003). People are also motivated to contribute to knowledge creation, since such behavior may lead to social rewards, e.g., approval, status, and reputation (Jones et al., 1997). ESNS usage can increase interactivity, which promises a rich source of social capital; and once employees have a richer source of social capital, especially when people become the key influencer in social graph, they begin to intentionally or unintentionally create and share knowledge.
Social Cognitive Theory (SCT2)	H3: ESNS usage-organizational learning H4: Knowledge creation-organizational learning H5: Knowledge sharing-organizational learning	SCT2 integrates both social and cognitive processes to understand individual learning behavior via social network (Bandura, 1986). The main learning mode that SCT2 purports is the observational learning– a person can learn by observing the actions of others and the consequences of those actions. When actions (e.g., ESNS usage, knowledge creation and knowledge sharing) are rewarded, other members in the company can quickly learn from the modeling effect, and adjust their behavior.
Knowledge-based View Theory (KBV)	H4: Knowledge creation-organizational learning H5: Knowledge sharing-organizational learning	KBV, which emphasizes knowledge as the most strategically important resource of the firm (Kogut and Zander, 1992), is used to explain the important roles of knowledge creation and sharing in enhancing organizational performance. KBV posits that knowledge management processes can help organizations achieve sustainable competitive advantages, and organizational learning is identified as a quantifiable improvement in sustainable competitive advantages (Cavaleri, 1994).

Table 2. Demographic information of the respondents

Demographic information and percentage			
Company Size		Frequency to use ESNS	
Small	17.2%	Once a month	7.7%
Medium	37.7%	Two–three times a month	16.8%
Large	45.0%	Once a week	26.0%
Company Age		A couple of days a week	29.3%
0 to <3 years	13.9%	Everyday	20.2%
3 to <5 years	17.2%	Position	
5 to <10 years	29.1%	Entry-level	22.4%
10 to <20 years	24.5%	Non-management	27.5%
≥20 years	15.2%	Junior management	23.9%
Industry		Middle-level management	19.6%
Manufacturing	4.6%	Senior management	6.6%
Finance	15.9%	Years in position	
Transportation and logistics	6.0%	< 0.5 year	19.4%
Wholesale and retail services	6.0%	0.5 year to <1 year	21.1%
Health care	6.0%	1 year to <3 years	31.5%
Media	7.9%	3 years to <5 years	18.6%
Technology and telecommunication	15.9%	5 years to <10 years	5.9%
Utilities	5.3%	≥10 years	3.5%
Consulting services	13.9%	Education level	
Education	10.6%	High school or below	3.0%
Government and non-profit making	7.9%	Non-degree tertiary	16.0%
		Degree	55.1%
		Postgraduate or above	25.9%

Table 3. Questions and measures

Constructs	Measurements	Sources
Enterprise Social Networking System (ESNS) usage (1 = never; 5 = always)	How often do you use ESNS to do the following things? 1) Create, connect, and manage groups 2) Join a conversation with co-workers 3) *Communicate and collaborate with business contacts outside your company’s network 4) Share and retrieve files or documents online 5) Search for experts or knowledge in your company	Richter et al. (2013); Yammer (2016)

<p>Knowledge Creation (1 = totally disagree; 5 = totally agree)</p>	<p>After you began using ESNS, to what extent do you agree with the following statements:</p> <ol style="list-style-type: none"> 1) I have a strong motivation for knowledge creation. 2) I always create new ways of performing tasks. 3) I constantly generate new operational ideas. 4) I regularly create innovative processes. 5) I intend to create new products and services. 6) I intend to explore new technologies and skills. 7) I am involved in finding new strategies and opportunities. 8) I am involved in searching and sharing new values or thoughts with colleagues. 	<p>Jiang and Li (2009) Bryant and Terborg (2008) Razi and Karim (2011)</p>
<p>Knowledge Sharing (1 = never; 5 = always)</p>	<p>How often do you share the following explicit and tacit knowledge with your organizational members when you began using ESNS?</p> <ol style="list-style-type: none"> 1) Work reports and official documents 2) Manuals, methodologies, and models 3) Work experience or know-how from work 4) Contextual knowledge or know-why from work 5) Expertise from the education or training 6) Know-where or know-whom 	<p>Yu et al. (2013) Bock et al. (2005)</p>
<p>Organizational Learning (1 = totally disagree; 5 = totally agree)</p>	<p>Please reflect your personal perception of the following statements: I think...</p> <p>Information acquisition</p> <ol style="list-style-type: none"> 1) Employees of our company attend fairs and exhibitions regularly. 2) A consolidated and resourceful R&D policy exists in our company 3) New ideas and approaches on work performance are experimented continuously. <p>Information distribution</p> <ol style="list-style-type: none"> 4) Our company has formal mechanisms that guarantee the sharing of the best practices among different fields of activity. 5) There are individuals in our company who take part in several teams or divisions and act as links between them. 6) There are individuals responsible for internally collecting, assembling, and distributing employees' suggestions. 7) Meetings are periodically held to inform all employees about the latest innovations in the company. <p>Information interpretation</p> <ol style="list-style-type: none"> 8) All members of our company share a similar aim that they feel committed to. 9) Employees share knowledge and experiences by talking to each other. 10) Teamwork is a very common practice in our company. <p>Organizational memory</p> <ol style="list-style-type: none"> 11) Our company has directories or e-mails that are filed according to the field they belong to, so as to find an expert on a concrete issue at any time. 12) There is access to our databases and documents through some kind of network or tools (e.g., Intranet or ESNS). 13) Databases are always updated. 	<p>Jiménez - Jiménez and Sanz-Valle (2011) Jiménez - Jiménez and Cegarra-Navarro (2007)</p>

Notes: * item deleted from further analysis

Table 4. Reliability and AVEs

Measures		Items	Composite reliability	AVE
Knowledge creation (KC)		8	0.910	0.670
Knowledge sharing (KS)		6	0.890	0.574
Organizational learning	Information acquisition (IA)	3	0.856	0.664
	Information distribution (ID)	4	0.861	0.608
	Information interpretation (II)	3	0.846	0.647
	Organizational memory (OM)	3	0.849	0.652

Table 5. Correlation between constructs

	KC	KS	IA	ID	II	OM
KC	0.819					
KS	0.265	0.758				
IA	0.389	0.207	0.815			
ID	0.234	0.252	0.056	0.780		
II	0.461	0.379	0.239	0.262	0.804	
OM	0.211	0.198	0.201	0.283	0.257	0.807

*Shaded numbers in the diagonal row are square roots of the AVEs.

Table 6. Results of confirmatory factor analysis

Construct	Items	1	2	3	4	5	6
KC	KC1	0.846	0.223	0.347	0.223	0.445	0.168
	KC2	0.829	0.261	0.317	0.253	0.408	0.216
	KC3	0.844	0.267	0.336	0.165	0.403	0.196
	KC4	0.837	0.208	0.321	0.145	0.382	0.148
	KC5	0.808	0.155	0.245	0.157	0.322	0.226
	KC6	0.825	0.152	0.358	0.210	0.379	0.186
	KC7	0.815	0.171	0.322	0.188	0.290	0.106
	KC8	0.832	0.302	0.326	0.201	0.412	0.147
KS	KS1	0.152	0.733	0.101	0.174	0.337	0.202
	KS2	0.211	0.770	0.174	0.139	0.317	0.127
	KS3	0.266	0.817	0.171	0.289	0.339	0.176
	KS4	0.245	0.713	0.192	0.099	0.318	0.161
	KS5	0.112	0.735	0.174	0.149	0.237	0.126
	KS6	0.209	0.773	0.138	0.260	0.175	0.107
IA	IA1	0.329	0.177	0.781	0.078	0.203	0.108
	IA2	0.283	0.144	0.836	0.039	0.147	0.213
	IA3	0.339	0.185	0.828	0.022	0.236	0.169
ID	ID1	0.211	0.167	0.012	0.828	0.292	0.224
	ID2	0.182	0.242	0.081	0.774	0.165	0.274
	ID3	0.182	0.220	0.077	0.800	0.216	0.209
	ID4	0.148	0.152	-0.001	0.714	0.129	0.170
II	II1	0.337	0.262	0.115	0.297	0.805	0.203
	II2	0.441	0.381	0.227	0.207	0.844	0.256
	II3	0.328	0.264	0.245	0.115	0.763	0.151
OM	OM1	0.036	0.054	0.045	0.187	0.039	0.770
	OM2	0.223	0.199	0.194	0.26	0.242	0.840
	OM3	0.214	0.196	0.214	0.229	0.291	0.810

Table 7. Outer weights of ESNS usage

Construct	Items	Weights	Standard Deviation	T-statistics
ESNS usage	ESNS1	0.140	0.119	1.175
	ESNS2	0.395	0.125	3.149
	ESNS3	0.296	0.121	2.450
	ESNS4	0.390	0.120	3.243

Table 8. Test results of the mediating effect of knowledge creation

	Mediating variable		Dependent variable	
	Knowledge creation		Organizational learning	
Independent variables			Model 1	Model 2
<u>Independent variables</u>				
ESNSU	0.524**		0.553**	0.420**
<u>Mediating variable</u>				
Knowledge creation				0.255**
R ²	0.274		0.306	0.353

Note: *p < 0.1; ** p < 0.01

Table 9. Test results of knowledge sharing's mediating effect

	Mediating variable		Dependent variable	
	Knowledge sharing		Organizational learning	
Independent variables			Model 1	Model 2
<u>Independent variables</u>				
ESNS	0.320**		0.553**	0.469**
<u>Mediating variable</u>				
Knowledge sharing				0.178**
R ²	0.225		0.306	0.311

Note: *p < 0.1; ** p < 0.01