

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 to 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 allows 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 - ESNS (e.g., Jive, Yammer, IBM Connections, Socialcast, Chatter) to illustrate our research ideas. ESNS are social networking systems that are implemented inside the boundary of organizations with a major purpose to support 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; knowledge management processes and workplace learning are among the most important two (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 to know 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 which allows employees to contribute and continuously retrieve the 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) 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 were mentioned to help manage knowledge due to their unique advantages, e.g., ease of use, structured content, collaboration, tracking and revision capabilities (Grace 2009). They are also regarded to contribute to knowledge management in supporting knowledge management practices, generating various types and high-quality of knowledge resources, and overcoming knowledge management barriers (Aisenberg Ferenhof, Durst, and Hesamamiri 2016).

Enterprise social media not only promote the knowledge activities, but also enhances organizational learning directly and/or indirectly via the knowledge management processes. Learning activities under social media context is believed to be an “informal learning” (Marsick and Volpe 1999) or “new social learning” (Bingahm and Conner 2010). It is predominantly unstructured, experiential, and noninstitutional that happens as employees carry out their daily work; it also encourages knowledge transfer and connects people in a way consistent with how they naturally interact. The 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 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 of

continuous learning is one of the organizational advantages that knowledge management can help to obtain. Organizational learning is 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 put in place by which knowledge can be captured, shared, and understood.

Recently, more and more researchers started to focus on the relationship between social media and knowledge management, which may improve organizational learning from e-learning to social-learning (Ma and Chan 2014). This 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 that ESNS play in various organizational processes is in its infancy (Leonardi, Huysman, and Steinfield 2013). There is 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, this research attempts to be a pioneering study to investigate the effect of the 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 since they have been proved to be the most critical knowledge management initiatives under the “social” context (Thomas and Akdere 2013; Ray 2014). Meanwhile, ESNS usage and knowledge management processes were treated as two distinctive factors leading to the effective organizational learning independently and collaboratively. Four theories suitable to explain the features and context of ESNS were selected from the theoretical pool of strategic management and sociology. We used these theories to support the hypotheses in the research model. In sum, 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? and (3). will knowledge management processes mediate the relationship between ESNS usage and organizational learning? The remainder of this paper is structured as follows: in the next section, the literature review of the key concepts is introduced first; this is followed by a separate session of the theoretical foundations. We then present

the research hypotheses and the research model. Next, the research methodology and the data analysis are introduced. At last, the research results are discussed and the conclusions are given.

2. Literature review

With regard to the benefits of enterprise social media and ESNS in particular, the literature has suggested efficiency, goal-oriented communication, avoidance of information overload and conflicts, effective knowledge transfer, establishing expert network, enhancing interpersonal connection, and increasing transparency, etc. (Richter et al. 2013; Leonardi, Huysman, and Steinfield 2013). This 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 are using Yammer, including 85% of the Fortune 500 (Zhang, Lv, and Yu 2015).

2.1. ESNS and Yammer

For the need 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, e.g., 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 the 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, there are also a number of the works discussing the 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, and Tvaronaviciene (2016) revealed the difficulties to adopt the innovative ESNS in 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. With respect to Yammer, several case studies have used Yammer as an example to explore the impact of enterprise social networking on

knowledge management. For example, Riemer, Scifleet, and Reddig (2012) uncovered 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 (Yammer) can be used for improving advertising knowledge management in advertising agencies. However, Yammer's impact on organizational learning is yet to be explored. In the following paragraphs, we further introduced the literature on the key concepts and the relationships between the 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 where 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 where a large amount of tacit knowledge need to be shared through interpersonal interaction (Helms, Cranefield, and van Reijssen 2017). 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 the participation in a collective knowledge generation processes through experience sharing, 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 effect 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. Their results 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, and the proper use of social media tools enhances the learning environment and improves productivity. Meanwhile, Palacios-Marqués, Devece-Carañana, and LIopis-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 that extend observer's reach beyond their immediate work group members. Nevertheless, extant research has centred on the effect of enterprise social media other than ESNS (in particular) on the organizational learning process, and the empirical studies of such 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 them 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 is not until recent years, management and organizational researchers began to link these two important concepts together and

studied their impact on various organizational performance. For example, Lyles (2014) has 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 there is a strong bond or close relationship 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 below: (1). While the topics of knowledge management and organizational learning have received growing attention from social media researchers, the focus of prior research was generally on the investigation of enterprise social media/ESNS's influence on the knowledge management and organizational learning separately (e.g., Majchrzak et al. 2013; Thomas and Akdere 2013; Von Krogh 2012); and there is a lack of empirical research on the above topics (Baxter and Connolly, 2014) trying 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). (2). There are many studies only focusing 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). The relationships between these three were however rarely explored. (3). Researchers in MIS are just beginning to understand ESNS, most often by describing how they might affect organizational performance (e.g., Lefteriotis and Giannakos 2014); little research has been done to examine 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 research has addressed the contribution of social media and enterprise social media usage in different fields; however, few (e.g., Fulk and Yuan 2013) of them intended to study the effect of ESNS in particular. The specific measurement of ESNS usage (e.g., Richter et al. 2013) is also rare 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 social media tools have on individual learning within organizations or the impact on the organization (Schein 2014). Since 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 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 the fact 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 in the gap in the extant literature by understanding and empirically testing the causal relationships between ESNS usage, knowledge management and organizational learning. In addition, together with other few studies (e.g., Fulk and Yuan 2013), this research examines specifically the influence of ESNS usage on the organizational outcomes and use Yammer (Yammer 2016)’s function as an exemplary measure to operationalize ESNS usage (Richter et al. 2013). Knowledge management processes, mainly reflected by knowledge creation and knowledge sharing are treated as mediators between ESNS usage and organizational learning. What is more, 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, for example the motivation of knowledge management, the effectiveness of enterprise social network, and how organizational learning could happen after using ESNS. Since 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 become one of the major challenges of this study. To cater for the needs of our key research focus – ESNS usage, we explored the theories that have been appropriately applied in the enterprise social media context. First,

motivated by Fulk and Yuan (2013), the Information Public goods theory and the Social Capital Theory were chosen, since the former focuses more on the motivational aspects of knowledge sharing and creation and the latter is particularly relevant to the capabilities of ESNS for linking people with knowledge activities. Social Capital Theory also serves as an additional explanation of the Information Public Goods theory under the ESNS context, since “even the motivated sharers can face obstacles if they don’t have appropriate interpersonal connections via social network” (Fulk and Yuan 2013). Second, when searching for theories to support organizational learning, the Social Cognitive Theory (Bandura 1986) came to our view. Social Cognitive 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”. We therefore believe the Social Cognitive Theory is the most appropriate theory to reflect the exact nature of social learning (Schein 2014). Last, the Knowledge-based View is used to emphasize the importance of knowledge management toward organizational preformation (learning in this case). It functions as a complement or further support to the Social Cognitive Theory when explaining the relationship between knowledge management processes and organizational learning.

To recap, due to the complexity of the research background, multiple theories were used to explore the phenomenon under investigation. These theories focusing on different facets of the research process are believed to 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

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 believes 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 to contribute to conventional knowledge repositories (knowledge creation). For example, experts nowadays can engage in the knowledge conversations rather than paying the cost of codifying knowledge for input to a formal repository. ESNS usage can also bring the benefits for collective knowledge sharing by increasing individual reputation (via showing social identity), 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 is existing; however, even the most motivated knowledge worker may face obstacles if he/she doesn't have appropriate interpersonal connections to create and share knowledge (Hinds and Pfeffer 2003). Social Capital Theory (SCT1) can somehow fill in 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 can you 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 since 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; and 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 out knowledge they possess.

3.3. Social Cognitive Theory

The individual learning theories have a significant impact on the concept of organizational learning, since learning can flow from individual to group and eventually spread out in 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, Social Cognitive Theory (SCT2) fits in the context most. SCT2 integrates both social and cognitive processes to understand motivation, emotions and actions (Bandura 1986). It recognized that 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 the 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 were rewarded, other members in the company can quickly learn from the modeling effect, and adjust their behaviors. SCT2 applies successfully in the traditional social networking environment, where people can physically meet and observe each other's behavior, and learning happened 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, e.g., 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 could apply 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; they deserve monetary or non-monetary rewards, which are observable by other members; 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 relationship between ESNS usage and organizational learning and knowledge management processes and organizational learning.

3.4. Knowledge-based view

Knowledge-based view (KBV) shedding light on its relationship with 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 knowledge-based view of the firm postulates 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 will significantly improve 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 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 get from the social relationships. In the social network, people contribute to knowledge creation since 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 via using 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. Last, Sigala and Chalkiti (2015) and Leonardi (2014) also revealed that ESNS could help to create new meta-knowledge. Based on the above discussion, we proposed 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 fulfil their knowledge tasks in a relatively informal way (Paroutis and Al Saleh 2009). The unrestricted sharing of knowledge is one of the good examples. 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, since the experts and novices can feel free to engage in the "knowledge conversations" rather than paying 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 came to 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 are two types of learnings in an organization: formal learning and informal learning. Formal learning involves a higher degree of organizational control and 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), and the learning behavior via social media belongs to this 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 observational learning, and ESNS usually have the function of “reviewability” and “visibility” (Wagner, Vollmar, and Wagner 2014), which allow the co-workers to observe others’ behavior via the social platform. After the cognitive process, individual employee learned from the modelling effect, and the learning ability will be spread out to the entire organization through online and/or offline, formal and/or informal social network. Alternatively, it will pass through the knowledge spiral process (Nonaka 1994) – learning flows from individual, to the group and to the organizational level. No matter which path it may go through, the usage of ESNS will eventually lead to the organizational level of learning. Besides the nature of informal learning, ESNS also allow employees to get access to diverse knowledge sources, which is easier for them to learn (Tushman and Scanlan 1981). Empirical support could be found in Huang et al. (2010) that ESNS is not only a tool to increase communications and broaden branding efforts but also a means to improve learning within their organizations. H3 was generated based on the above discussions.

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 theory of KBV and SCT2. Based on KBV, knowledge is identified as the most strategically significant resource of the firm (Grant 1996), and the 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 could help organizations achieve sustainable competitive advantages, and 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, in which the learning capacity is developed (Bruner 1996). Based on Nonaka and Von Krogh (2009), firms' performance differs largely because organizational knowledge creation gives rise to the unique organizational knowledge systems. And according to the Balanced Scorecard model (Kaplan and Norton 1992) and KBV, organization's learning ability is one of the important performance indicators to evaluate organizational performance. Therefore, we proposed 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 happen at any place and under any circumstance in organizations, and 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 to encourage people to share knowledge, and the ability of knowledge sharing is one of the predictive factors of organizational learning (Cheng 2013). Based on these, the last hypothesis was proposed as below.

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 were 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 company will use in promoting innovation and organizational performance (Damanpour 1992); for age, the older the company is, the more experience and competencies the company will have to foster organizational learning (Sørensen and Stuart 2000); and for industry, some industry (manufacturing, consulting and designing) is believed to be keener on 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 will learn from each other via the ESNS platform (H3, H4 and H5). At last, KBV emphasizes the importance of knowledge management processes in organizational learning (H4 and H5).

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5. Data collection and data analysis

5.1. Data collection

To test the research model, a web-based online survey was conducted to collect the data. The invitations were sent to the LinkedIn enterprise social media group members individually. The members (from all over the world) were either the fans of ESNS tools or the current enterprise users of these tools. To be a qualified participant of the survey, the respondent must fulfil the following two requirements: 1. He/she is currently employed (so that the registration of the ESNS is legitimate); 2. He/she must use the ESNS regularly for at least half a year (so that the effect of using ESNS 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. Since the specific type of ESNS we would like to test in this study is Microsoft Yammer, we excluded the respondents who are not the Yammer users. Therefore, the total number of data set becomes 151 (with the first and the second wave of the respondents). To test the non-response bias, we adopted the successive wave analysis technique (Armstrong and Overton 1977; Rogelberg and Stanton 2007). In the first wave, 102 valid data were collected over a period of three months; and a follow-up of 49 data points were collected in the second wave. The first wave and the second wave of the 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 the respondents. Therefore, the non-response bias is not likely to be a potential threat to the sample.

For the profile of the sample, over 80% of the respondents came from the medium and large-sized companies with more than 3 years old. More than 50% of them work in Finance, IT, consulting services and Education industries. Over 70% of them have used ESNS at least once a week, and they tend to hold a junior position (70%) with at least a Bachelor degree (80%). Table 2 shows the demographic information of the respondents. As with all self-reported data, there is a potential for the common method bias (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. Exploratory factory analysis results showed six factors are present and 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 the items, and sent them to a small group of employees in Hong Kong who are currently using ESNS in their companies. We also consulted faculty members on the selection and phrasing of the items for each construct. After collecting the feedbacks from both parties, one item from ESNS (ESNS3) was dropped, since 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. The face and content validity could be guaranteed in this way. 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 the measures.

5.2.1. ESNS usage

The measure of ESNS usage is related to how it is being used. The literature on ESNS measures was relatively rare at the time of the study, we however borrowed the typical actions of collaboration from Richter et al. (2013) and the other/specific functions of Yammer (Yammer 2016) to measure ESNS usage. Here, we use Yammer as an exemplary case to measure 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 these common features are shared by Yammer users as well as any other typical ESNS used in the organizations. In addition, ESNS usage was treated 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), individual vs. organizational (Heisig 2009); knowledge can be created via the processes of socialization, externalization, combination and internalization (Nonaka and Takeuchi 1995); the four core knowledge management processes include knowledge creation, storage, sharing and application (Alavi and Leidner 2001). From the strategic management perspective, KBV becomes the most influential theory to explain the strategic importance of knowledge toward organizational performance. When it comes to the social media (as a supportive technology to knowledge management) context, the most important two knowledge management processes become knowledge creation and knowledge sharing (Ray 2014). In the following, the measure of these two important constructs are discussed.

Knowledge creation is defined as the process of generating new knowledge by applying existing knowledge to scenarios that have not been faced before (Ray 2014). The existing measure of knowledge creation mainly resides in the management and organizational behaviour fields, for example 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 were usually at the firm level (e.g., Lopez-Nicolas and Soto-Acosta 2010) and does not differentiate knowledge creation from knowledge sharing (Bryant and Terborg 2008). The measure under the ESNS context is however 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 the scale items was based on Nonaka and Von Krogh (2009)'s knowledge creation theory. The items in this study reflect different functional dimensions of knowledge creation (e.g., new products, services, technologies, skills, operational ideas etc.), as well as the 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”). Since we focus on knowledge creation, the items for knowledge sharing, alliance with other firms/external parties, and the items reflecting group or organizational level of knowledge creation in Bryant and Terborg (2008), Razi and Karim (2011) and

Nonaka and Von Krogh (2009) were filtered out. We specifically tailored our measures to the context of knowledge creation activity after using ESNS by the internal employees. After a pilot test, the repetitive items were combined, and 8 items were eventually confirmed to measure knowledge creation in the present study.

5.2.3. Knowledge Sharing

Knowledge sharing is defined as organizational members providing and receiving knowledge with other members within the same organization (Yu et al. 2013). In the literature, knowledge sharing was basically measured by the following 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 both knowledge sharing activities, we specifically selected the studies that operationalized knowledge sharing from both perspectives (e.g., know-where and know-whom could reflect the implicit nature of knowledge or simply metaknowledge). We borrowed the 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. The sharing of work reports, manuals, methodologies belongs to the first category and the sharing of know-how, know-why, know-whom or know-where, work experiences and expertise belongs to the second category. Since ESNS enables the sharing of both tacit and explicit knowledge, for the purpose of this research, we did not distinguish 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 the organizational learning. He described organizational learning as 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 them in their empirical works. Since their measures on organizational learning are the most classic, comprehensive and widely cited instruments to scale organizational learning, this study adopted the measure of Jiménez-Jiménez and Sanz-Valle (2011). Organizational learning is a second-order formative construct measured from four sub-dimensions (four behavioural dimensions of the organizational learning processes) with a total of 13 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 the test of 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. Since the model contains 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).

The convergent validity was examined by checking the composite reliability and average variance extracted (AVE) from the measures (Hair et al. 1998). Table 4 shows that all the composite reliabilities are above the threshold of 0.707 (Chin 1998), and most of the AVEs pass the recommended value of 0.5 (Fornell and Larcker 1981). To verify the discriminant validity, the squared root of the AVEs were used to compare with the correlations between constructs (Fornell and Larcker 1981). Table 5 shows all the squared roots of the AVEs are greater than the level of the correlations involving the construct. The factor loadings are also heavily loaded on its own construct than other constructs (Table 6). This shows a good discriminate validity of the current measures. At

last, the outer weights of the formative variable-ESNS usage are shown in Table 7. 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 the path coefficients between the major constructs are significant at 0.01 level: ESNS usage significantly influence knowledge creation ($t=9.648$) and knowledge sharing ($t=5.538$), therefore, H1 and H2 are supported; ESNS usage also has a positive and direct impact on organizational learning ($t=3.103$) (H3 supported); both knowledge creation and knowledge sharing after ESNS usage influence organizational learning ($t=4.812$; $t=4.350$) (H4 and H5 are supported). The R square values of the 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 all the independent variables (ESNS usage, KC, and KS) in the model explained 38.8 percent of the variance in the dependent variable (OL). At last, the three control variables (size, age, and industry) have no significant effects on the organizational learning. This means the three demographic variables in the model has no significant contribution in explaining organizational learning.

Insert Figure 2 about here

5.5. The 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's (1986) approach, a construct is believed to be 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 effect of the independent variables 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 involvement of the mediator. Otherwise, the mediator is believed to have a partial mediation effect (Baron and Kenny 1986). The results of the multiple regressions are presented in Table 8 and Table 9.

Insert Table 8 about here

Insert Table 9 about here

In Table 8 and Table 9, a consistent pattern of the partial mediation effect was found on knowledge creation and knowledge sharing. First, the path coefficients between ESNSU and KC (0.524), and between ESNSU and KS (0.474) are significant at 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 value of the path coefficients (0.420 and 0.469) of ESNSU 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 conditions one, two, three and four are all satisfied in these paths. The result revealed 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, Sobel test (Sobel 1982) was conducted. The Z-values (4.95 for KC and 4.14 for KS) are significant at 0.01 level, which confirmed 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 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) could bring to the company. Meanwhile, as part of the service innovation, the aggregated knowledge at the individual level could further encourage the learning behaviour – the knowledge absorptive capability (King 2009) in the new social context. The objective of this study is to understand the factors likely to influence knowledge management processes and organizational learning with the 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 supported all the hypotheses in the research model.

First, since ESNS usage is the focus of this study, we specifically examined the outer weights of ESNS usage. The data analysis results revealed that joining a conversation with co-workers (weight=0.395) and searching for experts or knowledge in your company (weight=0.390) are the most important reasons for employees to use ESNS. While, create, connect and manage groups are relatively less important functions 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, the frequent ESNS usage will stimulate employees' creativity and service innovation toward knowledge (H1, T-value: 9.436). In other words, the more employees spend their time using ESNS, the more knowledge they will create for 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 that creating and exchanging knowledge through social network could bring benefits and rewards to the knowledge creator (Jones, Hesterly, and Borgatti 1997). It also echoes to the call for a further understanding of the impact of social computing technologies on the new form of service innovation inside the company. Finally, our results are consistent with the extant literature (e.g., Wagner, Vollmar, and Wagner 2014; Razmerita, Kirchner, and Nabeth 2014) that social media in general help with knowledge creation instead of diminish knowledge creation.

Third, ESNS usage will also encourage employees to share the existing tacit and explicit knowledge within the organization (H2, T-value: 7.903). Though for the purpose of the current research, we did not differentiate tacit knowledge from explicit knowledge, the data analysis results revealed that ESNS usage will promote both knowledge sharing modes. While explicit knowledge could be exchanged among employees by swapping ideas and comments on the discussion board; tacit knowledge could be documented and shared via enterprise social networks, where the experts in a certain domain could be easily found (Schmidt and Hunter 1993; Panahi, Watson, and Partridge 2012). This result is also consistent with Leonardi, Huysman, and Steinfield (2013) that ESNS help employees to share both instrumental knowledge (mainly explicit in nature) and metaknowledge (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 the employees. They enjoy the emotional and social benefits from the “transportation” of knowledge from one to another. They also do not need to pay extra cost in the “knowledge conversations”. Knowledge as a public good is shared equally among all organizational members in an ideal open organization. SCT1 also supports this result, since SCT1 is about “who you know” and how to leverage the social capitals (Fulk and Yuan 2013); it helps to further explain the movement, intensity level and direction of knowledge sharing.

Fourth, ESNS usage is proved to be positively related 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. While negative relationship has been found in the education field between students’ social media usage and individual learning (e.g., Dunn 2011; Vural 2015), this research however did not find such a relationship between ESNS usage and organizational learning. The major reason might be employees using internal social networking tools are more task-oriented, and the content itself is more serious and work-related. They tend to make the best of the working hours to search for experts or knowledge and join a conversation with colleagues. They will be more careful when posting and replying messages via ESNS (since the platform is transparent to all employees); they are also the better

controllers of time and resources on ESNS than students. H3 is also well founded in SCT2 which purports observational learning. With the function of “reviewability” and “visibility” (Wagner, Vollmar, and Wagner 2014), the co-workers can observe other’s behavior via the transparent social platform. Individual employee learned from the modelling effect, and the learning ability will be spread out to the entire organization through the social network.

Last, H4 (T-value: 3.204) and H5 (T-value: 2.585) were supported by our empirical study, both knowledge creation and knowledge sharing will 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 could help companies achieve sustainable competitive advantages, and organizational learning is one of the measures of these advantages. From the perspective of SCT2, once the behavior of knowledge creation and knowledge sharing were rewarded, the other organizational members could learn from their peers, and organizational learning could happen. H4 and H5’s results 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 showed the significant mediating effects of both constructs.

To conclude, our data analysis results were inspiring: over 38% of the organizational learning attributes to employees’ ESNS usage and knowledge management activities; and 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, more and more researchers start 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, with a question - “will enterprise social networking

systems promote knowledge management and organizational learning” in mind made several contributions to the theory and practice of ESNS usage.

First, it emphasizes the significance of ESNS usage in organizations. Our study proved that ESNS usage has a significant and positive influence on the organizational level of processes and outcomes. This result extended our understanding on the positive impact of ESNS usage: the adoption of online social networks will not only fulfil 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 the recent studies on social media supported knowledge management; this study successfully distinguishes the concept of ESNS usage from that 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 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 is proved to have a positive instead of a negative effect on organizational learning. There have been arguments on 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, it has been unclear whether the adoption of ESNS will bring more benefits in the organizational level of learning. The current study, based on SCT2 and the empirical results confirmed that employees’ ESNS usage will enhance organization’s learning ability as a whole.

Fourth, it is among the first studies to employ multiple theories to address the same or different research questions under the social context. For example, IPGT and SCT1 have both been used to explain the impact of ESNS usage on knowledge management activities; and SCT2 were employed to address the relationships toward organizational learning. It is also among the first attempts in the literature to apply the traditional sociology theory (SCT2) in the online media environment. It demonstrates the generalizability of SCT2 in the social media or new online media context.

Last, the mediating effects of knowledge creation and knowledge sharing were confirmed. Social media usage, knowledge management activities and organizational learning have been mentioned together or interchangeably. However, few studies have explicitly and clearly put knowledge management in a right position when both social media usage and knowledge management activities are present in the organization. This study confirms that both ESNS usage and knowledge management will lead to organizational learning, and knowledge management processes mediate the employees' ESNS usage toward organizational learning.

7.2. Implications for practice

The findings of this study have significant managerial implications for internal social media policy makers or IT managers who are in charge of handling 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. The study results proved that the usage of ESNS will not necessarily lead to the loss of productivity or enthusiasm to create and share new knowledge. Instead, employees tend to use the new technology in the new social environment to improve themselves continuously to achieve 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); since with the appropriate usage, ESNS could bring positive organizational outcomes for the company.

Second, this research encourages the usage of ESNS in the knowledge management processes. Traditionally, knowledge management is a formal, collective, top-down organizational process which allows employees to contribute and retrieve the knowledge from the knowledge bases or repositories. ESNS usage as an informal, personal, bottom-up and voluntary approach complements the traditional knowledge management processes in this research. In other words, if both ESNS and knowledge management systems are in place, companies can consider launching both ESNS and knowledge management systems at the same time to enhance organizational learning. Managers should treat ESNS usage as the booster or enabler of knowledge management.

Third, to promote organizational learning, companies should also pay attention to the knowledge creation and knowledge sharing activities. The concept of knowledge management is not outdated nowadays; it still finds its place when ESNS rushed into the organization. These formal organizational mechanisms (e.g., knowledge creation and sharing) could not only facilitate organizational learning directly, but also function as a significant complement for the ESNS usage.

8. Limitations and future research

While efforts were made to minimize potential problems in the present study, several limitations still exist. First, as a cross-sectional survey, this study shares the same potential problem with other similar type of the 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 in the future studies. Second, this study suffered from the common problem of data collection via a web survey. The participants were recruited via email invitations and the survey was administrated online. The nonprobability sampling methods of online survey have attracted those who are interested in discussing ESNS issues in their organizations, but have ignored the people who have ESNS practices in their companies, but did not participate in the survey. Third, organizational learning was reported by the perception of the individual employee, 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 the 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 not only precisely measure the constructs but also 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 itself. In the future, we would like to call for suitable measures designed specifically for the organizational learning process under the Enterprise 2.0 context. Fifth, our study focuses on only one type of enterprise social media-ESNS, and tested the sample with Yammer users only; future research are needed to test the effect of other types of enterprise social media (e.g., blog, wiki) on knowledge management and organizational learning. Sixth, this research did not focus on the specific feature or affordance of ESNS usage, more research

attention should be paid to investigate the in-depth nature of ESNS usage and discover its impact on business practice. Last, all the independent variables only explained over 38% of the variance in the organizational learning. We would like to explore more factors (e.g., communication, engagement, transparency of information, trust, etc.) influencing the organizational learning in the new social context. We would also appeal for more theories to prop up various enterprise social media or ESNS related research in the further.

9. Conclusion

Social computing facilitates service innovation, which emerges from the interactions within a network of actors (Lusch and Nambisan 2015). This study intended to study the effectiveness of the internal social networking tools in promoting new forms of service innovation (competence of knowledge management and organizational learning). Based on 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, it investigates the causal relationships between ESNS usage, knowledge management processes and organizational learning. The research results validated that ESNS usage is an important antecedent of knowledge creation and knowledge sharing. It is also a significant 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 to the call for new theories in social computing and service innovation. It is among the first to use multiple theories to understand the effects of ESNS usage on two dimensions of service innovation – knowledge management and organizational learning. It is also one of the pioneer empirical studies to test the ESNS usage on organizational level of outcomes (organizational learning), and to verify the mediating role of knowledge management processes in the organizational learning. For the practical implications, this study somehow eliminates the management's concern on the frequent usage of enterprise social networking systems, since the usage could stimulate knowledge creation and knowledge sharing, and eventually help organizations to learn in the long run.

10. References

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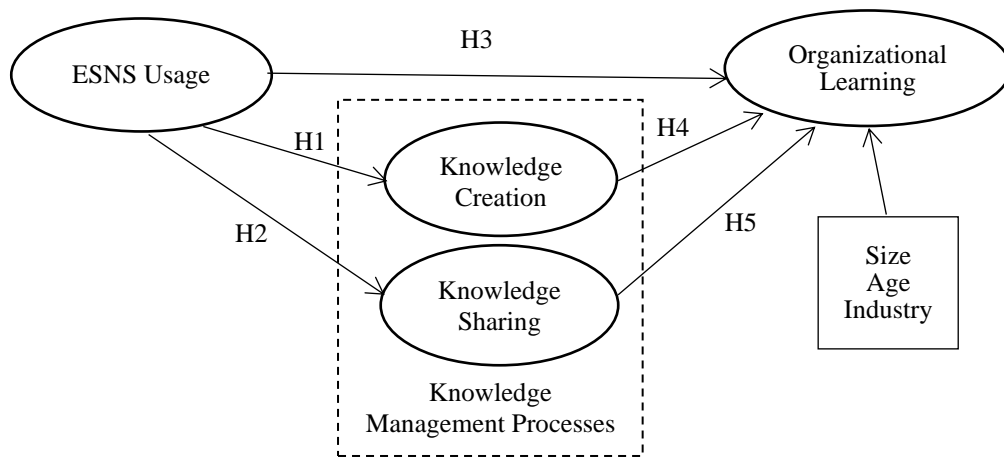
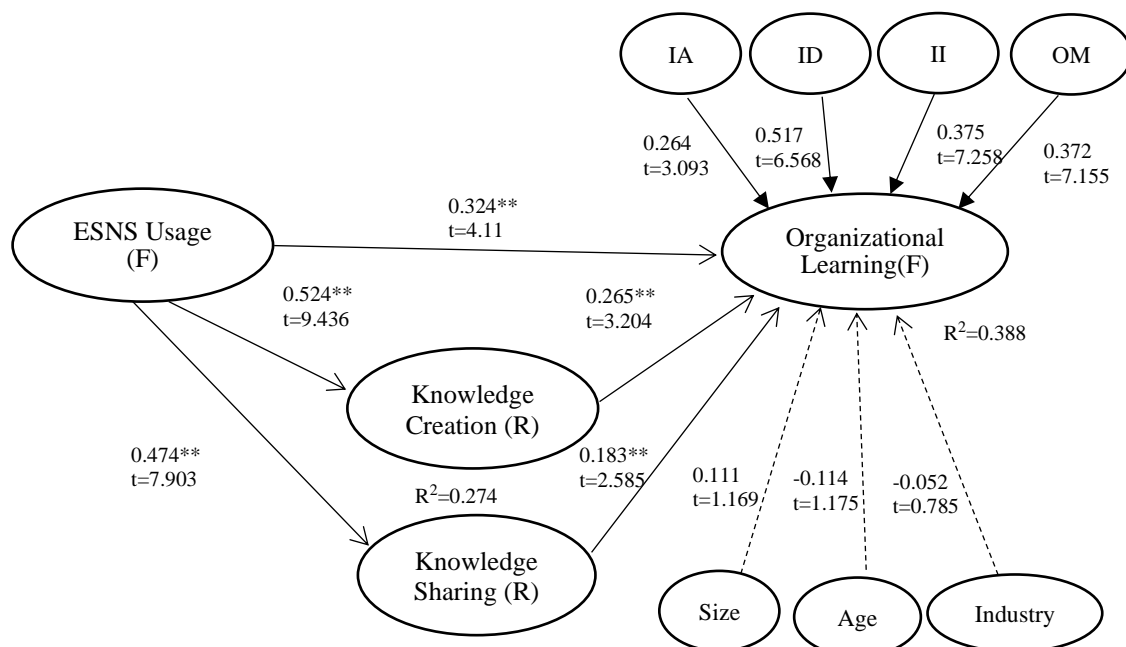


Figure 1. Research model



$$R^2=0.225$$

Figure 2. Results of second order PLS Analysis

Notes: (1). Solid lines mean path coefficients are significant; dotted lines mean not significant.

(2). R=Reflective; F=Formative ** p<0.01

(3). IA= Information acquisition; ID=Information distribution; II=Information interpretation;
OM=Organizational memory

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 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 to contribute to conventional knowledge repositories (knowledge creation). It can also bring the benefits for collective knowledge sharing by increasing individual reputation (via showing social identity), enhancing emotional closeness and target sharing with a subset of the 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, Hesterly, and Borgatti 1997). ESNS usage can increase interactivity, which could promise a rich source of social capital; and 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 out knowledge they possess.
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. If the actions (e.g., ESNS usage, knowledge creation and knowledge sharing) were rewarded, other members in the company can quickly learn from the modeling effect, and adjust their behaviors.
Knowledge-based View Theory (KBV)	H4: Knowledge creation-organizational learning H5: Knowledge sharing-organizational	KBV emphasizing knowledge as the most strategically significant 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 believes that knowledge management

	learning	processes could help organizations achieve sustainable competitive advantages, and organizational learning is identified as a quantifiable improvement in sustainable competitive advantages (Cavaleri, 1994).
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Table 1. Theories and supported hypotheses

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-<3 years	13.9%	Everyday	20.2%
3-<5 years	17.2%	Position	
5-<10 years	29.1%	Entry-level	22.4%
10-<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 2. Demographic information of the respondents

Constructs	Measurements	Sources
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<p>Enterprise Social Networking System (ESNS) usage (1 = never; 5 = always)</p>	<p>How often do you use ESNS to do the following things?</p> <ol style="list-style-type: none"> 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 the files or documents online 5) Search for experts or knowledge in your company 	<p>Richter et al. (2013); Yammer (2016)</p>
<p>Knowledge Creation (1 = totally disagree; 5 = totally agree)</p>	<p>After you began to use 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 to perform 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 to find new strategies and opportunities 8) I am involved in searching and sharing new values and 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 since you began to use 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) The employees of our company attend fairs and exhibitions regularly 2) There is a consolidated and resourceful R&D policy 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 to guarantee the sharing of the best practices among the different fields of the activity 5) There are individuals in our company who take part in several teams or divisions and who also act as links between them 6) There are individuals responsible for collecting, assembling and distributing internally employees' suggestions 7) Meetings are periodically held to inform all the employees about the latest innovations in the company <p>Information interpretation</p> <ol style="list-style-type: none"> 8) All the members of our company share the same aim to which they feel committed 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 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 	<p>Jiménez - Jiménez and Sanz-Valle (2011) Jiménez - Jiménez and Cegarra-Navarro (2007)</p>

	some kind of network or tools (e.g., Intranet, ESNS, etc.) 13) Databases are always kept up-to-date	
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Table 3. Questions and measures

Notes: * item deleted from further analysis

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 4. Reliability and AVEs

	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

Table 5. Correlation between constructs

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

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 6. Results of confirmatory factor analysis

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 7. Outer weights of ESNS usage

	Mediating variable	Dependent variable	
	Knowledge creation	Model 1	Model 2
<u>Independent variables</u>			
<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 8. Test results of the mediating effect of knowledge creation

	Mediating variable	Dependent variable	
	Knowledge sharing	Model 1	Model 2
<u>Independent variables</u>			
<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

Table 9. Test results of the mediating effect of knowledge sharing

