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The effects of network sharing on knowledge-sharing activities and job performance in enterprise social media environments

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ABSTRACT

This study examines the influence of the tertius iungens orientation on knowledge-sharing activities and individual job performance within enterprise social media environments. The empirical analysis reveals that knowledge self-efficacy, social interaction ties, and the norm of reciprocity positively influence the tertius iungens orientation and knowledge-sharing activities in social media, while enjoyment of helping does not have a significant influence. In addition, the tertius iungens orientation has a significant impact on knowledge-sharing activities in social media, which in turn influences individual job performance. Based on the results of this analysis, this study discusses the research findings and proposes theoretical and practical implications of the study as well as the research's limitations.

1. Introduction

Social media environments offer unique features, including openness, two-way communication, and open-ended feedback. These characteristics have made it possible for large numbers of people to freely and easily share their thoughts, opinions, experiences, perspectives, information, and knowledge through social media (Kaplan & Haenlein, 2010). Given the importance of mobilizing knowledge resources through active and close relationships with coworkers (Borgatti & Cross, 2003), social media, by nature, can be useful in facilitating knowledge-sharing activities within organizations. Social media platforms are increasingly implemented in work organizations as tools for communication among employees (Leonardi, Huysman, & Steinfield, 2013). Leonardi et al. (2013, p. 2) call social media in work environments "enterprise social media," which they define as "web-based platforms that allow workers to (1) communicate messages with specific coworkers or broadcast messages to everyone in the organization; (2) explicitly indicate or implicitly reveal particular coworkers as communication partners; (3) post, edit, and sort text and files linked to themselves or others; and (4) view the messages, connections, text, and files communicated, posted, edited and sorted by anyone else in the organization at any time of their choosing." With the help of web technology, social media can be combined with various media tools, such as video, audio, or photos, and various communication tools, such as chat applications, audio/video conferencing programs, or feedback systems. Through social media, employees can easily share not only their explicit knowledge through written communication, but also their tacit knowledge, which may be difficult to express in written form. Social media can make shared knowledge richer and more abundant, which in turn promotes knowledge-sharing activities.

People who actively use social media gain knowledge and information that they can use to resolve problems they may encounter with coworkers or various others. Thus, in a social media context tertius iungens activity, which involves the introduction of unconnected individuals, can play an important role in information exchange and knowledge sharing. Hess (2013) has proposed that the role of the tertius iungens orientation in the news media involves "bridging and linking" to control the types of information shared between individuals, to connect people across cultural, social, and economic spaces, and to link people with others in positions of power. In the context of enterprises' social media efforts, tertius iungens activities are expected to lead to the development of

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strongly connected network structures (Obstfeld, 2005), in which knowledge and information are smoothly transmitted by introducing people who are not yet connected to one another. This can make knowledge sharing more efficient and effective.

This study examines how individuals' tertius iungens orientations affect knowledge-sharing activities and individual job performance. We propose a conceptual framework involving three-step cause and effect relationships, moving from the formation of tertius iungens to the activation of knowledge-sharing behavior, and then to the creation of job performance in social media environments. In the first step, we posit that individual and social factors affect the level of tertius iungens orientation through social media. Our hypotheses concerning this step are based on social cognitive theory and social capital theory. In the second step, knowledge-sharing activity is developed through the tertius iungens orientation and its antecedents. In the final step, the effect of the tertius iungens orientation on individual job performance is revealed through knowledge-sharing activities.

Our study makes significant theoretical contributions by revealing the important role of the tertius iungens orientation in the relationship between individual and social factors, knowledge-sharing activities, and job performance, and presents practical implications for companies' in-house social media strategies that make it possible to enhance individual job performance.

2. Theoretical background

2.1. Social media

The emergence of Web 2.0 has paved the way for the appearance of new forms of media, now commonly known as social media. An increase in smartphone users has also promoted the use of social media, and led people to naturally incorporate social media into their daily lives. The term “social media” refers to Internet-based applications that are used by people to share their opinions, thoughts, experiences, and perspectives (Kaplan & Haenlein, 2010). Rather than simply searching for and passively consuming information, social media users exhibit a tendency to create information in a cooperative manner, and to evaluate and share information (Lerman, 2007).

Social media is characterized by two-way communication. As a result, social media platforms have become entrenched as tools that are used to actualize participation, sharing, and openness online. The use of social media makes it possible to easily connect and bring people together through content. It not only helps to accumulate knowledge capital by enlarging human networks, but also builds social capital through the participation of people who share similar interests in related efforts. Previous studies on social media are summarized in Table 1.

Previous research on enterprises' social media environments has proceeded in two primary ways (Leonardi et al., 2013). One commonly studied research stream has focused on organizational communication with external parties, such as customers, vendors, and the public at large. Most companies using social media to communicate with external parties employ multipronged strategies that cross various social media platforms, e.g., Facebook and Twitter (Piskorski, 2011). Companies use social media to effectively manage relationships with partners and clients, and improve their corporate image (Wyld, 2008). Meanwhile, the other research stream, which is less commonly studied, explores how organizations employ social media for internal communications and social interaction within their enterprises (Leonardi et al., 2013). From an internal standpoint, companies have used social media as an effective tool with which to pursue ends such as the obtainment, exchange, and sharing of knowledge. For example, the British Broadcasting Corporation (BBC) has established “talk.gateway,” a social media site that its employees can use to upload questions, search for answers, and form relationships. This site, where employees can ask and answer questions related not only to daily life issues but also to organizational job duties, has grown to become one of the largest such communities, with 23,000 of the approximately 26,000 BBC employees as members (Cook, 2008). Vuori and Väisänen (2009) have conducted a study on how the use of social media within enterprises can contribute to the gathering and sharing of information and knowledge. Their study revealed that social media played a more important role in sharing knowledge and information than in gathering it. In addition, in a study of 175 employees, Lee and Kwahk (2010) empirically proved that the use of social media improved participation in the knowledge sharing and decision-making processes, and consequently improved job performance. Table 2 shows the differences between public and enterprise social media.

2.2. Social cognitive theory and social capital theory

Social cognitive theory has been used to help understand individual motivations and behaviors in various situations. Bandura (1986) asserts that individual behaviors are the result of interactions between the social environment and individual cognition. In other words, when learning and maintaining a specific behavioral pattern, people are influenced by individual and intrinsic cognitive factors, as well as by surrounding relational and environmental social factors.

As a result of social cognitive theory's emphasis on individual and intrinsic factors, many previous studies have paid attention to the notion of self-efficacy (Chen & Hung, 2010; Compeau & Higgins, 1995; Lin & Huang, 2008, 2010). Self-efficacy is defined as “the belief in one's capabilities to organize and execute a course of action that is required to manage prospective situations” (Bandura, 1977). In other words, self-efficacy is a person's belief in his or her ability to succeed in a particular situation, rather than a person's possession of specific skills. When members of an organization exhibit a high level of self-efficacy vis-à-vis knowledge, and have strong cognitive belief in their use of knowledge, their efforts to share knowledge are also heightened, and they exhibit a tendency to achieve individual outcomes by learning shared knowledge (Lin & Huang, 2008, 2010). Zimmermann and Ravishankar (2014) argue that knowledge transfer mechanisms can be better understood by considering knowledge senders' efficacy and outcome expectations, which are two potentially crucial motivational drivers of knowledge transfer. To this end, self-efficacy plays an important role in the achievement of self-set goals and, consequently, in the improvement of individual and organizational performance (Quigley, Tesluk, Locke, & Bartol, 2007).

From the perspective of social cognitive theory, the enjoyment of helping, more commonly referred to as altruism, is another important individual and intrinsic motivation for human behavior. According to Kollock (1999), people tend to enjoy helping others, and perceive that it is fair to help others face difficult problems through the contribution of knowledge. Furthermore, those who share knowledge within online environments, such as social media environments, have more opportunities to help others than those in offline environments (Wasko & Faraj, 2000). Cheung, Lee, and Lee (2013) theorize that community members make judgments about their knowledge-sharing behaviors by considering their normative expectations of knowledge sharing and enjoyment of helping other members. They have found that when community members are able to help other members in the ways that they expect, they feel satisfied, and this satisfaction further affects their intention to continue sharing knowledge in an online community

Table 1
Studies related to social media.

Researchers	Type of study	Sample	Study findings
Boyd & Ellison, 2008	Conceptual study	–	The characteristics, history, and definition of social network sites (SNS) are introduced.
Curtis et al., 2010	Empirical study	409 public relations (PR) practitioners from nonprofit organizations	Media adoption in PR-related work duties is assessed.
Kaplan & Haenlein, 2010	Conceptual study	–	The concept of social media is established, and a comparative analysis including other media is conducted.
Lee & Kwahk, 2010	Empirical study	175 employees	The use of social media is shown to positively influence job productivity with regard to knowledge sharing and participation in the decision-making process.
Leonardi et al., 2013	Conceptual study	–	Depending on the role that social media play within organizations, social media studies are categorized into three broad metaphors: enterprise social media as leaky pipe, echo chamber, and social lubricant.
Mangold & Faulds, 2009	Conceptual study	–	Social media are identified as new convergence media in the promotion mix.
Vuori & Väisänen, 2009	Conceptual study	–	Social media are determined to play an important role in obtaining and sharing information within enterprises, based on a comparative analysis of studies found in 143 journals.

Table 2
Public social media vs. Enterprise social media.

	Public social media	Enterprise social media
Main purpose	To present myself in a digital format, allowing them to provide details concerning myself and establish/maintain their network of relationships to fellow members (Ellison, Steinfield, & Lampe, 2007)	To share employee's expertise and support collaboration with other employees (Cummings & Reinicke, 2014)
Primary features	The ability to: - Connect with others - Share personal information - Send/receive messages - Provide "status" updates - Post comments - Personalize the site (Cummings & Reinicke, 2014)	- Incorporating visual components such as pictures of contacts - Active engagement such as status of contacts - Communication channel for maintenance of fringe relationships (e.g. staying in contact with former team members) (Shih, 2009).
Type of system	Hedonic system aiming to provide an enjoyable experience while filling a user's emotional needs (Premkumar, Ramamurthy, & Liu, 2008).	Both hedonic and utilitarian system aiming to increase employee effectiveness and efficiency for communication or knowledge sharing (DiMicco, Geyer, Millen, Dugan, & Brownholtz, 2009).
Research topic	- Privacy/risk taking (Fogel & Nehmad, 2009) - Site usage (Dwyer, Hiltz, & Widmeyer, 2008) - Communication (Wigand, Wood, & Mande, 2010) - Self-presentation (Donath, 2007)	- General organizational usage (Mislove, Marcon, Gummadi, Druschel, & Bhattacharjee, 2007) - Establishment and maintenance of organizational relationships (Dwyer, 2007). - Ongoing use of a social media including how users appropriate the technology in their interactions with known employees (DiMicco et al., 2009)

of practice.

According to social cognitive theory, a person's behaviors are influenced by individual cognitive and social factors. Existing studies related to social cognitive theory have often overlooked the importance of social factors' influence, and do not provide further explanations as to how social capital that develops within a social network influences individual behaviors. To fill in this gap, this study employs social capital theory as a tool with which to supplement social cognitive theory in explaining individual behaviors and performances. Lin (2001) defines social capital as "the resources embedded in a social structure that are accessed and mobilized in purposive action." Bourdieu and Wacquant (1992) explain that social capital is the sum of the actual or virtual resources that an individual or group accrues by virtue of possessing a durable network of more or less institutionalized relationships of mutual acquaintance and recognition. The differences in individuals' accrued social capital can explain why one person's performance is higher than others'. Amounts of social capital depend on the scale of a social network and the scope of individuals' social interactions within the network. By interviewing knowledge management system users, He, Qiao, and Wei (2009) have found that having strong ties in social relationships is a factor in the development of a mainly positive attitude toward knowledge creation in knowledge management systems. In addition, they have revealed that there is a significant difference of users' attitudes toward the usage of knowledge management systems between the group involving individuals with more social relationships and the group involving individuals with fewer social relationships. Chai and Kim (2012) have also noted that social ties have positive impacts on Internet social network users' sense of belonging, and lead users to be more willing and committed to maintaining relationships with other members. Therefore, factors such as social interaction ties, which represent the strength of relationships, the amount of time spent on interaction, and the frequency of communication among members, can play an important role in explaining individual behaviors and performances from the perspective of social capital theory.

The members of an organization also share knowledge through cooperation in their social networks. The heightening of knowledge-sharing activities is predicated on the extent to which a person can maintain close social relationships with others, and on the degree to which the norm of reciprocity functions when it comes to maintaining social relationships with others. Knowledge sharing is not achieved through a single person's efforts, and requires active interaction with other people who possess the necessary knowledge. Reciprocity is also one of the benefits of engaging in social exchange (Oh, 2012). Research has shown that most members of online communities expect that their contributions will result in future returns (Chiu, Hsu, & Wang, 2006). As such, the norm of reciprocity, which involves a sense of mutual

indebtedness, plays an important role in facilitating knowledge-sharing activities and the resulting accumulation of social capital.

Existing studies related to social cognitive and social capital theories are summarized in Table 3.

2.3. Tertius iungens: "the third party who joins"

The Latin term *tertius* refers to a "third party," while *iungens* is a derivation of *iungo*, which means to "join," "unite," or "connect." As such, tertius iungens can be taken to mean "the third party who joins." Tertius iungens orientation is a behavioral orientation that emphasizes the creation or facilitation of ties among people in one's social network by actively introducing dissimilar others (Obstfeld, 2005). This emphasis of tertius iungens can be contrasted with the strategic separation of parties found within Simmel and Wolff (1950) concept of tertius gaudens, or "rejoicing third", defined as an approach in which a third party profits or otherwise benefits from competition among two others. Because the two parties are not on good terms with one another, or simply have not met, the relationship between the two parties, as well as the information flow between them, can be controlled and influenced by the third party. In other words, Simmel and Wolff (1950) tertius gaudens can be regarded as a state of active separation between two parties who are connected through a third party.

The concepts of tertius iungens and tertius gaudens can be explained by using two different perspectives related to the formation of social capital: the network closure and structural hole perspectives. The network closure perspective revolves around the view that social capital is formed based on strong ties within a facilitating group. Thus, people with strong ties can benefit from the cooperation and support of others within the group (Coleman, 1988). By introducing two parties who do not know each other and who overcome estrangement in their relationship, tertius iungens approaches effectively create a structure of network closure that is characterized by strong ties. Within the network closure structure, social capital is more effectively created by network groups that boast strong ties. This perspective presupposes not only the smooth flow of knowledge and information, but also the establishment of norms and regulations that enable the protection of members from unilateral exploitation (Coleman, 1988).

In contrast, the structural hole perspective maintains that social capital is formed through a loosely tied network structure. Under this loose network structure, members gain advantages by serving as mediators who connect fragmented parts within the network (Burt, 2009). The concept of tertius gaudens is important in understanding the structural hole perspective within the field of social capital theory. Burt (2009) uses the concept of tertius gaudens, as developed by Simmel and Wolff (1950), to explain the social activities that emerge around structural holes. A structural hole involves a relationship of non-redundancy that exists between parties, and can be defined as a position that allows one actor to connect other actors who had not yet been linked within a network (Burt, 2009). Burt (2009) argues that a person who is positioned in a structural hole can easily access new information and knowledge because he or she can indirectly reach more people. He or she also has the advantage of being able to control the information obtained.

People who are involved with social media activities tend to hold various structural positions as they establish diverse relationships within their own networks. When performing tasks, people share knowledge through cooperation. However, the tertius gaudens orientation does not create the kind of harmonized behavioral environment between coworkers essential for knowledge-sharing activities. Because tertius gaudens approaches depend on structural holes, they aim to gain benefits by maintaining a state of disconnection between actors. In contrast, the tertius iungens orientation facilitates resource mobilization by introducing people who possess knowledge pertinent to others, or by directly providing individuals with knowledge. The tertius iungens orientation can thus be regarded as a behavioral orientation that emphasizes connections between parties within a specific social network. As such, people with a tertius iungens orientation

Table 3
Studies related to social cognitive theory and social capital theory.

Researchers	Type of study	Sample	Study findings
Chen & Hung, 2010	Empirical study	323 members of a community	The norm of reciprocity, interpersonal trust, self-efficacy, and perceived relative advantage are found to positively influence knowledge utilization through knowledge-contributing and knowledge-collecting behavior.
Cheung et al., 2013	Empirical study	408 school teachers	When members receive the reciprocity and help other members as they expected, they feel satisfied and their knowledge self-efficacy is also be enhanced. Both satisfaction and knowledge self-efficacy are found to further affect their intention to continue sharing knowledge.
Chiu et al., 2006	Empirical study	310 members of a community	Community-related outcome expectations, the norm of reciprocity, shared language, and shared vision are shown to influence knowledge quality and the quantity of knowledge sharing.
Chow & Chan, 2008	Empirical study	190 managers of enterprises	A social network and shared goals are found to influence the intention to share knowledge, through displayed attitudes to knowledge sharing and subjective norms for knowledge sharing.
Compeau & Higgins, 1995	Empirical study	1020 computer users	Computer self-efficacy significantly influences computer usage.
Lin & Huang, 2008	Empirical study	192 various industrial group members	KMS self-efficacy and personal outcome expectations significantly influence the usage of knowledge management systems.
Lin & Huang, 2010	Empirical study	162 MIS graduates working for enterprises	The knowledge contributions of self-efficacy significantly influence knowledge withholding through outcome expectations.
Oh, 2012	Empirical study	257 users in Yahoo! Answers	Altruism is the most influential motivation for knowledge sharing, while personal gain is the least. Enjoyment and efficacy are more influential than other social motivations, such as reputation or reciprocity.
Quigley et al., 2007	Empirical study	120 students taking business courses	Self-efficacy influences self-set goals and increases performance.
Wasko & Faraj, 2005	Empirical study	173 members of the National Legal Professional Association	Individual motivations, structural capital, cognitive capital, and relational capital are found to influence knowledge contributions.
Zimmermann & Ravishankar, 2014	Case study	30 German onshore headquarters employees	Social capital, in concert with knowledge senders' efficacy and outcome expectations, is an important antecedent of employees' ability and willingness to transfer knowledge.

can be expected to be actively involved in knowledge sharing. Previous studies on the tertius iungens orientation are summarized in Table 4.

3. Research model and hypothesis

The research model introduced in this study can be seen in Fig. 1. This study seeks to derive the factors that influence the tertius iungens orientation and knowledge-sharing activities from a social media environment. This endeavor, which is based on the social cognitive and social capital theories, employs both individual and social perspectives. While knowledge self-efficacy and enjoyment of helping are introduced as individual factors, social interaction ties and the norm of reciprocity are proposed as social factors. It also shows that these four factors, and the tertius iungens orientation, have effects on knowledge-sharing activities, which is directly related to individual job performance.

3.1. Establishment of tertius iungens orientation

In terms of how personal motivation and social environments affect the tertius iungens orientation, we consider the four factors that are hypothesized to be the antecedents of knowledge-sharing activities: knowledge self-efficacy, enjoyment of helping, social interaction ties, and the norm of reciprocity.

As described above, knowledge self-efficacy can be defined as confidence in one's capabilities to provide useful knowledge to others (Chen & Hung, 2010). Self-efficacy influences goal-directed behavior aimed at achieving given tasks. Busch (1996) has found that individuals with high self-efficacy tend to help others with tasks and create cooperative environments involving others. In other words, individuals who have confidence in their ability to conduct their job-related tasks or confidence in their knowledge of their particular fields facilitate cooperation by sharing their knowledge with others. Therefore, we can expect that individuals with high levels of knowledge self-efficacy will also have strong tertius iungens orientations when it comes to resolving tasks, making connections between others, and pooling knowledge to help others complete their tasks. Based on these assumptions, the following hypothesis is postulated:

H1. : *Knowledge self-efficacy positively influences the tertius iungens orientation.*

Second, when helping others is perceived as enjoyable, interesting, and as good behavior, people obtain satisfaction from helping others (Kollock, 1999). This enjoyment and satisfaction, as a kind of private reward, provides intrinsic motivation for behaviors related to helping people who face difficulties (Hippel & Krogh, 2003). A person who gladly helps other people and experiences a sense of enjoyment from doing so will search for various ways to help people who face difficulties. Such individuals are likely to spearhead helpful activities; for example, an individual introduces people who can help resolve problems or create new opportunities for each other so as to facilitate cooperation. We can then surmise that these individuals' behaviors are based on the enjoyment that they receive from helping others. Given this, the following hypothesis is introduced:

H2. : *Enjoyment of helping positively influences the tertius iungens orientation.*

Social interaction ties with others within a social network facilitate the activities of people who belong to the network (Coleman, 1990). These activities can lead to new opportunities to connect and introduce other people, which facilitates greater tertius iungens activity within the network. An individual who is well-connected with his or her surroundings in a social manner has a high likelihood of engaging in tertius iungens activities by introducing or connecting others for the benefit of the group to which he or she belongs (Leana & Van Buren, 1999). Therefore, we can conclude that individuals with strong ties to others exhibit strong tertius iungens orientations, which spurs them to connect people who need help. Based on this understanding, we present the following hypothesis:

H3. : *Social interaction ties positively influence the tertius iungens orientation.*

Finally, the norm of reciprocity applies to social regulations that are established with regard to relationships with other people, and generally applies to all cultures and relationships (Wu et al., 2006). The norm of reciprocity includes behavioral patterns that involve similar reactions to the kind or hostile actions of others (Chen &

Table 4
Studies related to tertius iungens.

Researchers	Type of study	Sample	Study findings
Gargiulo, Ertug, & Galunic, 2009	Empirical study	2263 employees of an investment bank	The influence of network closure differs depending on the roles played by the members of an organization (e.g., information provider/beneficiary).
Garriga, 2009	Case study	98 stakeholders in a natural gas distribution company	Tertius iungens strategy influences the cooperation process of stakeholders in enterprises.
Hess, 2013	Conceptual study	–	The roles of the tertius orientations are useful for understanding how the news media perform bridging (unique position of the news media to control the types of information shared between individuals and to connect people) and linking (the news media's role in linking people with those in positions of power).
Obstfeld, 2005	Empirical study	152 employees of an automotive manufacturer	Tertius iungens orientation significantly influences innovation involvement.
Oh, Choi, & Kim, 2005	Empirical study	3411 coauthors of 1573 papers in the IS field	While the structural hole influences researchers' performance, network closure does not significantly influence their performance.
Pathak, Wu, & Johnston, 2014	Conceptual study	–	Enactment of the tertius iungens strategy by brokers increases cooperation and its sustainability in a community supply network.
Shi, Markoczy, & Dess, 2009	Conceptual study	–	The mediation strategies of middle managers are broken down into four types that relate to tertius iungens and four types that relate to tertius gaudens.
Singh, 2008	Empirical study	75 managers	Tertius iungens positively influences the quality of relationships within a business-related network.

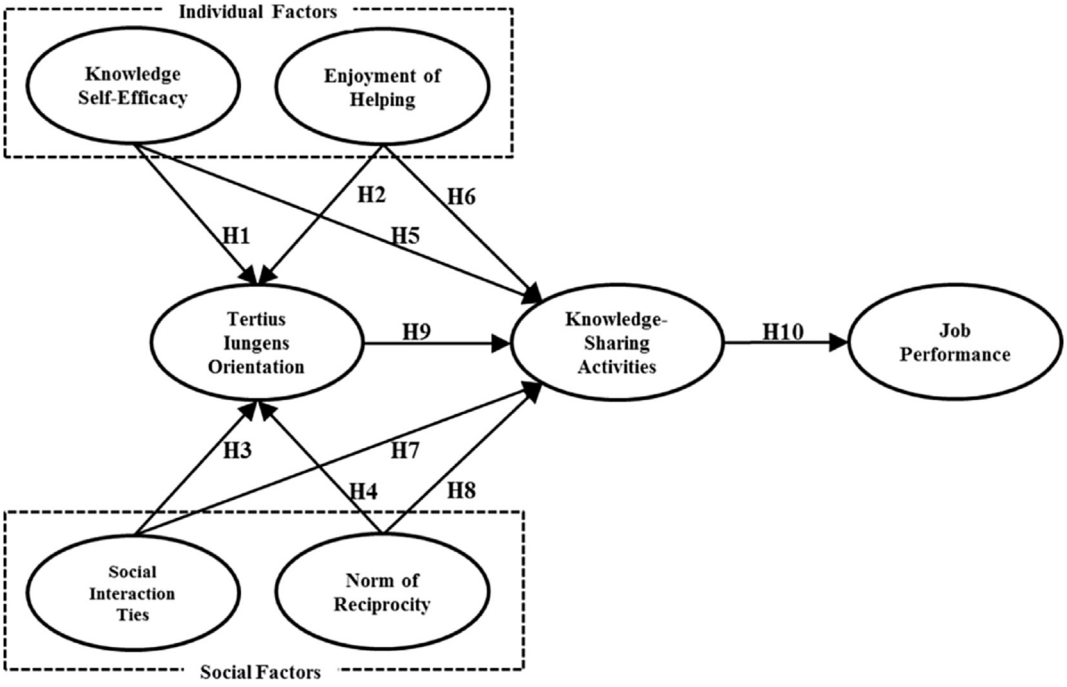

Fig. 1. Research model.

Hung, 2010). When someone exhibits hostile behavior, others react with similarly hostile behavior, and the same is true of kind or gracious behavior. The norm of reciprocity creates and preserves the cooperative behaviors that are needed within an organization and acts as a motivation in and of itself. As such, cooperative behaviors conducted according to the norm of reciprocity facilitate the development of the tertius iungens orientation, which revolves around helping others actively participate. A person who is strongly affected by the norm of reciprocity, and who is introduced to a new person or invited to participate in cooperative activity by a coworker, can thus be expected to actively conduct tertius iungens activities in that he or she will engage in similar behaviors toward others, such as introducing and inviting them to participate in cooperative activities. As such, we propose the following hypothesis:

H4. : *The norm of reciprocity positively influences the tertius iungens orientation.*

3.2. The effects of individual and social factors on knowledge-sharing activities

In this study, we consider two individual factors that determine the level of knowledge-sharing activities — knowledge self-efficacy and enjoyment of helping — based on social cognitive theory. Self-efficacy is defined as the individual belief in one's capabilities to conduct given tasks (Bandura, 1977). Self-efficacy can be construed as the confidence to produce successful results in a given environment, rather than the specific skills possessed by individuals. For this reason, those with high levels of self-efficacy perceive that they possess the capabilities, resources, and motivations needed to achieve given tasks or resolve problems. As far as knowledge-sharing activities are concerned, individuals who believe that they can provide valuable knowledge, or who possess high levels of self-efficacy regarding knowledge contribution, are more likely to provide and share their knowledge with others. Previous studies have shown that self-efficacy concerning knowledge contribution positively influences knowledge-sharing activities; self-efficacy has been found to positively influence knowledge-contributing and knowledge-collecting behaviors (Chen & Hung, 2010). People also exhibit a tendency to be less reluctant to provide knowledge when they possess higher levels of self-efficacy concerning that knowledge (Lin & Huang, 2010). In a study on the use of knowledge management systems to improve effective knowledge sharing, Lin and Huang (2008) have shown that the higher level of self-efficacy that a person possesses with regard to knowledge contribution, the more he or she tends to share knowledge within a knowledge management system. Lin (2007) has also empirically proved that knowledge self-efficacy positively influences attitudes toward knowledge sharing and knowledge-sharing intentions. From these study results, we can surmise that the higher an individual's knowledge self-efficacy is, the more he or she will engage in knowledge-sharing activities through social media. Thus, we propose the following hypothesis:

H5. : *Knowledge self-efficacy positively influences knowledge-sharing activities in social media contexts.*

In addition, enjoyment of helping can be considered from the perspective of altruism. Organ (1988) has defined altruism as the discretionary behavior of helping others who face problems. When organizational members develop an attachment to, and a sense of altruism toward, their organizational job duties, they can easily be motivated to share knowledge with other colleagues (Davenport & Prusak, 1998). Moreover, because altruistic individuals enjoy helping their coworkers in their capacity as members of an organization and are happy to participate in resolving problems, altruism can be said to foster intrinsic motivation to provide knowledge (Wasko & Faraj, 2000, 2005). Individual motivations, such as helping other people heighten their sense of pride, building self-esteem, gaining respect from others, and taking care of responsibilities, thereby lead to knowledge sharing, even among individuals who do not have any personal relationships or direct reciprocal relationships (Constant, Sproull, & Kiesler, 1996). Kankanhalli, Tan, and Wei (2005) assert that in the context of

knowledge sharing within online knowledge repositories, intrinsic factors such as enjoyment of helping facilitate knowledge-sharing activities. Meanwhile, Lin (2007) has empirically proved that the enjoyment of helping positively influences attitudes toward knowledge sharing and knowledge-sharing intentions. Given this, we can surmise that within social media environments, knowledge-sharing activities increase as the degree of enjoyment of helping increases. Therefore, we put forward the following hypothesis:

H6. : *Enjoyment of helping positively influences knowledge-sharing activities in social media contexts*.

In this paper, we consider two social factors that determine the level of knowledge-sharing activities – social interaction ties and the norm of reciprocity – based on social capital theory. Firstly, social interaction ties act as channels through which resources flow, such as knowledge and information (Tsai & Ghoshal, 1998). Many recent studies have found that improving close relationships with others facilitates effective knowledge sharing (e.g., Chow & Chan, 2008). Therefore, the more a person is connected to others, the more he or she can improve his or her ability to obtain relational resources (Nahapiet & Ghoshal, 1998). Repetitive interactions with others can provide opportunities to learn specialized knowledge from them (Lewis, 1999). Chiu et al. (2006) have determined that knowledge sharing increases as social interaction ties develop within an online environment. Therefore, we can surmise that the more social interaction ties are developed between users, the more knowledge-sharing activities within social media environments will increase. Based on this approach, the following hypothesis is proposed:

H7. : *Social interaction ties positively influence knowledge-sharing activities in social media contexts*.

The norm of reciprocity is a socially accepted rule under which individuals who provide resources, such as knowledge to others, can expect to receive reciprocation from others at a later date (Wu et al., 2006). It can be likened to a sense of mutual indebtedness under which people perform favors for one another. As long as supportive exchanges are guaranteed, people will return the favors that they receive from others (Wasko & Faraj, 2005). Knowledge sharing within online communities can be facilitated by the norm of reciprocity, accompanied by a strong sense of fairness (Wasko & Faraj, 2000). Chiu et al. (2006) have empirically proved that the norm of reciprocity positively influences the volume of knowledge sharing. Therefore, we can surmise that the norm of reciprocity can positively influence knowledge-sharing activities, even in online environments such as social media contexts. Based on these considerations, the following hypothesis is suggested:

H8. : *The norm of reciprocity positively influences knowledge-sharing activities in social media contexts*.

3.3. The effect of the tertius iungens orientation on knowledge-sharing activities

Obstfeld (2005) defined tertius iungens orientation as "a predisposition to bring people together in collaboration, including introducing disconnected others and forging stronger ties between others who may already have ties with one another." This is a concept related to an individual's predisposition, unlike tertius iungens activity, which is defined as a strategic orientation by which actors bring forth combinations and recombinations. Due to its behavioral orientation, in that it introduces and connects two dissimilar parties, tertius iungens orientation can be regarded as helping to foster cooperation by improving relationships between people (Obstfeld, 2005). Therefore, tertius iungens can facilitate interactions and communications between coworkers, enhance the sense of belonging to a group, and foster a spirit of comradeship. The improvement of such social relationships makes it possible to establish a network structure based on strong ties. Within such groups, the flow of information and knowledge must be smoothly disseminated in order to ensure effective knowledge sharing from a resources mobilization standpoint (Coleman, 1988). Cooperation represents an important element of successful knowledge sharing as effective cooperation requires trust between individuals. Tertius iungens orientation facilitates trust between people through the improvement of social relationships through the introduction of individuals who are not familiar with one another. As a result, cooperative activities will also be activated, and the invigoration of knowledge-sharing activities can also be expected. In a study of an automobile manufacturer's employees, Obstfeld (2005) empirically proved that tertius iungens orientation improved innovation involvement by promoting knowledge-sharing activities. In a study of managers, Singh (2008) proved that tertius iungens orientation is facilitated by higher-quality relationships, ensuring that knowledge-sharing activities occur within business relationship networks. Additionally, Garriga (2009) argues that tertius iungens strategy positively influences cooperation among stakeholders. Based on these considerations, we suggest the following hypothesis:

H9. : *Tertius iungens orientation will positively influence knowledge-sharing activities in social media.*

3.4. The effect of knowledge-sharing activities on job performance

Knowledge sharing can be defined as the act of diffusing individually-obtained knowledge to other members of an organization (Ryu, Ho, & Han, 2003). By sharing knowledge, a member of an organization can learn from the experiences of his or her coworkers, which in turn serves to improve individual and organizational job performance (Kang, Kim, & Chang, 2008). Sharing knowledge with other people can also positively influence team performance (Srivastava, Bartol, & Locke, 2006) which helps to foster better decision making (Stasser & Titus, 1985) and increases transactive memory. This strengthens coordination and collaboration between members of an organization (Mathieu, Heffner, Goodwin, Salas, & Cannon-Bowers, 2000) and results in successful job performance. In an analysis of local government officials, Park and Im (2001) empirically proved that knowledge sharing improves the job performance of an organization's members. Therefore, we can conclude that job performance improves when knowledge-sharing activities are carried out through social media. Based on these considerations, we introduce the following hypothesis:

H10. : *Knowledge-sharing activities in social media contexts positively influence individual job performance*.

4. Research methodology

4.1. Development of measurement instrument

The measurement instrument used in this study was developed based on survey questions from previous studies whose validity has been tested. Some questions were modified or added by the researcher, in order to reflect the current research context. To increase the reliability of the measurement instrument, the

constructs involved were measured with multiple items. All questionnaire items were scored based on a seven-point Likert scale. Furthermore, a pilot test was implemented between two researchers in the management information systems research field and 21 students majoring in MIS in order to assess the validity of the questionnaire items and content validity. The results of the pilot test were then taken into account to create the final questionnaire items used for the survey.

Knowledge self-efficacy was defined as the extent to which a person is confident that he or she possesses the capability to provide useful knowledge to others. Five questionnaire items were used to measure this variable, based on studies by Chen and Hung (2010) and Lin (2007). Enjoyment of helping was defined in terms of the extent of enjoyment that a person receives from helping others. Five questionnaire items were employed in conjunction with this variable, and these were borrowed from a study by Wasko and Faraj (2005) and amended in accordance with the needs of this research. Social interaction ties were defined by the extent of interaction with others. Four questionnaire items, based on a study by Chiu et al. (2006), were used to measure this variable. Adherence to the norm of reciprocity was defined as the extent of belief that the provision of favors to others will be reciprocated in the future. The four questionnaire items employed in conjunction with this variable were borrowed from the studies of Chen and Hung (2010) and Wasko and Faraj (2005), and were amended to meet the needs of this study. Tertius iungens orientation was defined as the extent to which an individual establishes new ties by introducing dissimilar parties to each other or strengthens established ties between similar parties. Six questionnaire items based on the study of Obstfeld (2005) were used to measure this variable. Knowledge-sharing activity in social media contexts was defined as the extent to which an individual provides or shares knowledge with others in social media environments. For this variable, six questionnaire items were borrowed from the studies of Hsu, Ju, Yen, and Chang (2007) and Davenport and Prusak (1998), and were amended in accordance with the aims of this study. Job performance was defined as the extent to which one achieves goals related to work duties. Six questionnaire items for this variable were borrowed from a study conducted by Williams and Anderson (1991), and these were also amended to meet the goals of this study.

4.2. Data collection and sample characteristics

To verify the research model, a survey was conducted with individual employees working for various organizations. Questionnaires were distributed over a period of roughly one month. A total of 259 questionnaires were returned. Four of the returned questionnaires were eliminated because it was believed that the answers were not sincere. Another 21 questionnaires were eliminated because it was deemed that the respondents' work conditions did not mesh with the goals of this study. As such, 234 questionnaires were used for the final analysis. The demographic characteristics of the sample respondents are summarized in Table 5.

5. Analysis and results

The research model introduced in this study was verified through a two-step data analysis approach, using LISREL 8.70 and based on the structural equation model (Anderson & Gerbing, 1988). First, the convergent validity and discriminant validity of the measurement model were identified. Then, a structural model based on the cleansed measurement model, which was determined to be valid, was examined and used to verify the proposed hypotheses.

5.1. Measurement model

The verification of the convergent validity requires that the unidimensionality of each variable be tested. In accordance with the suggested methodological procedure (Anderson & Gerbing, 1988; Gefen, Straub, & Boudreau, 2000), the measurement model was modified, with a total of seven items eliminated (SEC1, ENH2, SIT3, TIU6, KSA1, KSA2, and JOP6) by removing items that shared a high degree of residual variance with other items. The ratio of χ^2 to degree of freedom (Normed χ^2) was calculated at 1.893, which was deemed to be a good fitness level, lower than the recommended level of 3.0 (Gefen et al., 2000). While RMR was estimated to be 0.044, which was lower than the recommended level of 0.05 (Hair, Anderson, Tatham, & Black, 1998), GFI was estimated to be 0.834, thus meeting the recommended level of 0.8 (Chau, 1996). The other fitness indices also exhibited satisfactory levels (CFI = 0.987, NFI = 0.978, NNFI = 0.985), which indicated that overall the measurement model exhibited a satisfactory level of fitness.

The following three criteria were used to evaluate the convergent validity: first, the standardized path coefficients should be greater than 0.7 and should be statistically significant (Gefen et al., 2000). Second, the composite reliability and Cronbach's alpha for each variable must be greater than 0.7 (Hair et al., 1998). Third, the average variance extracted (AVE) for each variable should exceed 0.5 (Fornell & Larcker, 1981). As can be seen in Table 6, all standardized path coefficients were found to be higher than 0.7 and to exhibit statistically significant values (t-value > 1.96). The composite reliability and Cronbach's alpha for all constructs were also higher than 0.7. The AVE for each factor exceeded 0.5. Thus, the convergent validity of the measurement items used in this study was confirmed.

Next, the discriminant validity was assessed by comparing the square root of the AVE for each construct with the correlations between that construct and other constructs (Fornell & Larcker, 1981). As seen in Table 7, the square root of the AVE for each construct exceeded the correlations between that construct and other constructs. Therefore, the discriminant validity of the measurement items employed in this study was confirmed.

5.2. Structural model and hypothesis testing

Hypothesis testing was conducted using a LISREL structural model. Although there are no unified standards for model fitness, existing studies have suggested standards, such as RMR <0.05, GFI >0.8, AGFI >0.8, NFI >0.9, NNFI >0.9, and CFI >0.9 (Hair et al., 1998; Taylor & Todd, 1995). The general fitness of the structural model used in this study was revealed to be as follows: χ^2 = 856.69, df = 361, Normed χ^2 = 2.381, P-value = 0.000, RMR = 0.060, GFI = 0.827, AGFI = 0.791, CFI = 0.984, NFI = 0.972, and NNFI = 0.981. While certain fitness indexes (RMR and AGFI) did not reach the conservative recommended level, these can nevertheless be considered to be generally satisfactory, because not only is it difficult to obtain all suitable fitness indexes in a structural equation model, but the model has no absolute standards when it comes to acceptability (Gefen et al., 2000; Jöreskog & Sörbom, 1993). Thus, these results suggest that the structural model fits the data adequately.

Fig. 2 shows the standardized LISREL path coefficients and the results of the hypothesis test. Knowledge self-efficacy, social interaction ties, and norm of reciprocity were found to be significantly related to tertius iungens orientation, while enjoyment of helping was insignificant to tertius iungens orientation, explaining 48.1 percent of the tertius iungens orientation variance. Therefore, H1, H3, and H4, but not H2, were supported. Knowledge self-efficacy, social interaction ties, the norm of reciprocity, and

Table 5
Demographic characteristics of the sample.

Respondent profiles		Frequency	Percentage (%)
Gender	Male	139	59.4
	Female	95	40.6
	Total	234	100.0
Occupation	Government workers	5	2.1
	Company workers	196	83.8
	Specialists	31	13.2
	Other	2	0.8
	Total	234	100.0
Industrial group	IT	94	40.2
	Construction	9	3.8
	Public agency	12	5.1
	Financial	10	4.3
	Nonprofit	11	4.7
	Services	66	28.2
	Distribution	12	5.1
	Medical	11	4.7
	Manufacturing	9	3.8
	Total	234	100.0
Department	Marketing/sales	29	12.4
	Production/quality assurance	5	2.1
	R&D	20	8.5
	General management/planning	80	34.2
	Accounting	13	5.6
	Information systems	79	33.8
	General affairs/personnel	8	3.4
	Total	234	100.0
Academic background	High school	7	3.0
	University	168	71.8
	College	26	11.1
	Graduate school or higher	33	14.1
	Total	234	100.0
Age	20–25	21	9.0
	26–30	116	49.6
	31–35	57	24.4
	36–40	30	12.8
	Over 40	10	4.3
	Total	234	100.0
Work experience	Less than 3 years	120	51.3
	3–6 years	56	23.9
	6–9 years	20	8.5
	Over 9 years	38	16.2
	Total	234	100.0

tertius iungens orientation were found to be significantly related to knowledge-sharing activities, while enjoyment of helping was insignificant to knowledge-sharing activities. These constructs accounted for 77.3 percent of the tertius iungens orientation variance. Therefore, H5, H7, H8, and H9, but not H6, were supported. Knowledge-sharing activities were significantly related to job performance, explaining 52.7 percent of the job performance variance, so that H10 was supported.

6. Discussion

This study analyzed the influence of tertius iungens orientation on knowledge-sharing activities in social media, which in turn has an impact on job performance. To this end, this research introduced individual factors (knowledge self-efficacy and enjoyment of helping) and social factors (social interaction ties and norm of reciprocity) as antecedents that influence tertius iungens orientation and knowledge-sharing activities in social media. An empirical analysis showed that all hypotheses were supported, except for H2 and H6 (the hypotheses related to the enjoyment of helping), which leads to the following discussions:

First, it was found that enjoyment of helping, which refers to the degree of enjoyment gained from helping others, did not significantly influence the tertius iungens orientation. Thus, although one may feel great enjoyment from helping others, such enjoyment does not induce the active introduction of unconnected people in order to form new relationships. Within online environments, such as social media, one can establish various social networks with people who exist beyond the regional and cultural barriers that dictate offline environments. However, as there are fewer interactions based on trust, the social networks established within an online environment have a strong likelihood of being based on loose connections. In addition, there is a high probability that such networks will not pursue common goals or collective actions because those who are involved with activities through social media are not likely to have established relationships that are based on common values through the prolonged sharing of emotions with others. Under such circumstances, people try to obtain short-term and direct benefits rather than long-term and indirect ones gained by accumulating knowledge and information through relationships with others. Moreover, as the benefits of tertius iungens activities are not reciprocated over the short term, individuals will not engage in the voluntary introduction of others in their capacity as intermediaries. From the perspective of the enterprise social media, we can have the following inferences to explain insignificant relationships. Introducing individuals within their networks is a kind of asset sharing, which has much more value than sharing their expertise, i.e., knowledge sharing. Individuals may be concerned

Table 6
Results of convergent validity testing.

Construct	Items	Factor loadings	Composite reliabilities	Average variance extracted	Cronbach's alpha
Knowledge self-efficacy	SEC2	0.748	0.855	0.597	0.854
	SEC3	0.751			
	SEC4	0.769			
	SEC5	0.822			
Enjoyment of helping	ENH1	0.845	0.929	0.767	0.926
	ENH3	0.926			
	ENH4	0.787			
	ENH5	0.937			
Social interaction ties	SIT1	0.929	0.934	0.826	0.932
	SIT2	0.935			
	SIT4	0.861			
Norm of reciprocity	NOR1	0.798	0.915	0.731	0.913
	NOR2	0.863			
	NOR3	0.925			
	NOR4	0.829			
Tertius iungens orientation	TIU1	0.851	0.931	0.732	0.930
	TIU2	0.839			
	TIU3	0.911			
	TIU4	0.883			
	TIU5	0.791			
Knowledge-sharing activities	KSA3	0.930	0.896	0.685	0.891
	KSA4	0.803			
	KSA5	0.857			
	KSA6	0.705			
Job performance	JOP1	0.918	0.963	0.841	0.963
	JOP2	0.899			
	JOP3	0.954			
	JOP4	0.926			
	JOP5	0.889			

Table 7
Results of discriminant validity testing and correlations.

Construct	Mean (SD)	SEC	ENH	SIT	NOR	TIU	KSA	JOP
SEC	4.448 (1.451)	0.772						
ENH	4.566 (1.454)	0.720	0.875					
SIT	3.625 (1.691)	0.606	0.593	0.908				
NOR	4.322 (1.399)	0.639	0.736	0.661	0.854			
TIU	4.116 (1.492)	0.618	0.499	0.594	0.582	0.855		
KSA	3.352 (1.615)	0.677	0.622	0.767	0.734	0.712	0.827	
JOP	4.090 (1.483)	0.606	0.594	0.610	0.679	0.586	0.692	0.917

Note: Leading diagonals represent the square root of the average variance extracted between the constructs and their measures, while off-diagonal entries are the correlations among constructs.

that new relationships that they mediate will weaken their current relationships with the individuals involved, who may also share negative information about them. In addition, individuals with altruistic dispositions may be concerned about being helpful to others, and so may refrain from making connections between people when they feel that improper mediation could bring about undesirable consequences. As a result, we can guess that enjoyment of helping does not influence the tertius iungens orientation in social media environments.

Second, it was found that enjoyment of helping did not significantly influence knowledge-sharing activities in social media. This finding runs contrary to the results of the studies conducted by Kankanhalli et al. (2005) and Lin (2007), which found that a person who felt a sense of enjoyment from helping others through such means as the provision of knowledge possessed a strong motivation to engage in knowledge-sharing activities. However, the results of the present study are consistent with those of Wasko and Faraj (2005), who failed to confirm the influence of enjoyment of helping on the volume and helpfulness of knowledge contribution. This relationship is not significant in our research domain as the burden of sharing professional knowledge related to job duties may be a factor that impedes knowledge-sharing activities. The behavior of providing knowledge eventually tends to lead the person who has originally possessed the knowledge to lose his or her special status (Thibaut & Kelley, 1959; Thorn & Connolly, 1987). Within a social media environment, many people are able to enjoy a proverbial free-ride, vis-à-vis the people who share knowledge. As such, although it may be enjoyable to help others, people may not be willing to share their specialized knowledge with others for the benefit of the group in an unlimited manner.

7. Conclusion

This study confirmed the influential process of knowledge-sharing activities within a social media environment on job performance. It also empirically verified the roles of tertius iungens in relation to knowledge-sharing activities in social media. To attain this, this research identified the factors influencing tertius iungens orientation and knowledge-sharing activities in social media, which were divided into individual and social factors, and empirically verified the relationship between these factors. To empirically analyze the research model, which was derived from the social cognitive theory and social capital theory, data was collected from workers who use social media. As a result of the analysis conducted herein, knowledge self-efficacy, social interaction ties, and the norm of reciprocity were found to positively influence the tertius iungens orientation and knowledge-sharing activities in social media. In addition, the tertius iungens orientation was found to have a positive relationship with knowledge-sharing activities in social media, which in turn significantly influenced job performance. These study results provide important theoretical implications for researchers desiring to conduct research on topics such as knowledge management in a social media context, and to introduce a helpful perspective for managers who intend to introduce social media within their organizations as a means to facilitate the conduct of job duties.

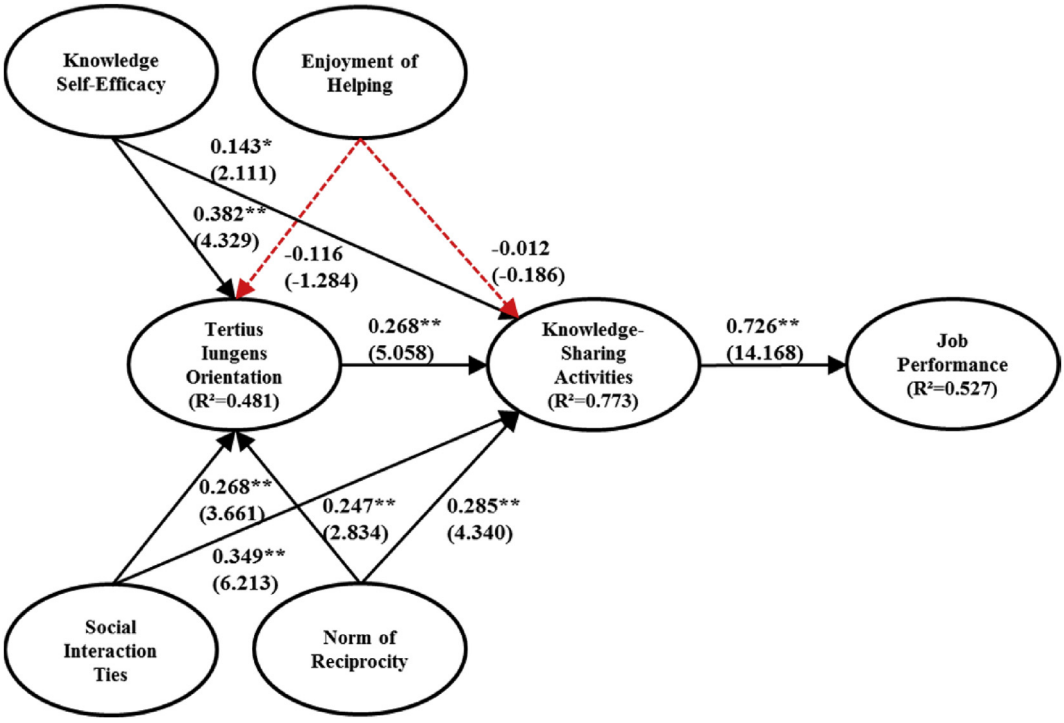

Fig. 2. Results of the analysis of the research model ($^{*}p < 0.05$, $^{**}p < 0.01$).

This study involved several implications from both theoretical and practical perspectives. First, from a theoretical standpoint, this study developed a new theoretical model to explain the influence of knowledge-sharing activities on job performance in a social media environment. Considering that there has been a lack of studies on the behavioral characteristics within social media and the relationship between social media and job performance in organizations, this research model is expected to provide a useful theoretical basis for future researchers who intend to conduct studies on the role of social media as a knowledge management tool.

Second, this study introduces the tertius iungens orientation as a new variable, and a factor that mediates the relationship between knowledge-sharing activities and job performance in social media contexts. An examination of previous empirical studies on the tertius iungens orientation, such as those of Garriga (2009), Obstfeld (2005), and Singh (2008) revealed the significance of individuals' network sharing activities, which are as important as knowledge sharing from the standpoint of knowledge management. The fact that the tertius iungens orientation constitutes an important factor in the cooperation required for knowledge sharing can be taken to mean that the effective use of the tertius iungens orientation may represent a helpful strategy with which to activate knowledge management within an organization. Therefore, the tertius iungens orientation is expected to provide new theoretical insight for researchers who intend to explore various factors related to the activation of knowledge-sharing activities in social media from a knowledge management perspective.

Third, this study presents a new integrated theoretical model that, based on social cognitive theory and social capital theory, simultaneously takes individual and social factors into consideration as antecedents that influence knowledge-sharing activities in social media. Since knowledge sharing requires active interaction with others who possess knowledge, the concept of social capital should be taken into consideration in explaining the behavioral properties of knowledge sharing. However, previous studies have largely failed to assess the roles of social factors or empirically prove their influence. With an awareness of these limitations, this study has introduced a model that takes into consideration not only individual and intrinsic factors as variables known to influence knowledge-sharing activities, but social and relational factors as well. This study also empirically proves the influence of these factors in an integrated manner, and finds that knowledge self-efficacy as an individual factor, as well as social interaction ties and the norm of reciprocity as social factors, significantly influences knowledge-sharing activities. These results present a new theoretical viewpoint – that the combination of individual and social factors can bring about significant results with regard to knowledge-sharing activities in social media contexts.

First, from a practical standpoint, by identifying the tertius iungens orientation as a factor that increases knowledge-sharing activities in social media, this study proposed a new way to facilitate knowledge-sharing activities within companies. In cases where connections have not yet been formed between members of an organization, the introduction and connection of individuals through tertius iungens activities can be expected to produce a more effective and efficient knowledge flow. In addition, useful information and knowledge can be obtained and shared through tertius iungens activities at a low cost. As knowledge capital is usually internalized by individuals, the most effective method of obtaining knowledge is to directly come into contact with those who possess the knowledge. Therefore, managers who intend to activate knowledge sharing need to analyze the fields of interest and knowledge demanded by members and create direct interaction ties between individuals who need knowledge and those who possess the knowledge through tertius iungens activities.

Second, this study has shown that knowledge self-efficacy positively influences knowledge-sharing activities in social media contexts and for individuals with the tertius iungens orientation. Given this, managers should help improve the knowledge self-efficacy of their organizations' members by paying more attention to the provision of useful feedback. Managers can improve the knowledge self-efficacy perceptions and confidence of knowledge

providers within their organizations by demonstrating that these individuals' knowledge-sharing activities play important roles in their organizations (Parker, 1998).

Third, this study reveals that enjoyment of helping does not significantly influence tertius iungens orientation and knowledge-sharing activities in social media contexts. This suggests that people do not share knowledge or connect others through social media because they gain a sense of enjoyment from helping others. In online environments, such as those of social media platforms, which are based on multiple relationships, one can create, maintain, and share relationships with many people at the same time. However, these relationships may be different from the face-to-face relationships formed in offline environments. Since social relationships in a social media environment are not likely to be long-lasting relationships, altruism-based compensation is not enough to activate knowledge-sharing. This may imply that managers who aim to facilitate knowledge-sharing activities through social media need to have both extrinsic compensation, such as improving the reputations of members who share knowledge, and intrinsic private compensation.

Fourth, this study empirically determines that social interaction ties positively influence knowledge-sharing activities in social media contexts, and thus companies must establish friendly and regular social media-based networks between coworkers. The relative ease of forming relationships with other people through social media makes it possible for coworkers to engage in frequent communication. Therefore, a manager who connects employees with similar interests through social media can improve job performance by facilitating active knowledge-sharing activities among members. In addition, providing face-to-face situations that bring together those connected through social media in order to improve social interaction ties, such as open seminars, will likely result in even more effective knowledge-sharing activities by heightening trust between coworkers.

Fifth, this study shows that the norm of reciprocity significantly influences knowledge-sharing activities in social media contexts. In order to foster active knowledge sharing, companies should focus on the establishment of institutional measures that promote adherence to the norm of reciprocity. For example, managers can create an atmosphere that is conducive to knowledge-sharing activity by establishing an information system that facilitates the exchange of helpful knowledge between members in an organization. Managers can also consider implementing measures that induce a reciprocal culture of knowledge exchange by publically recognizing knowledge providers and beneficiaries. Furthermore, as the norm of reciprocity is based on trust between people who share knowledge, measures should be applied that improve the levels of trust between the members of an organization. One possible measure might be to release appropriate levels of personal information on members who share knowledge on social media, such as their names, departments, and photos, in order to easily allow searches for such information. This kind of arrangement would spur members of an organization to share knowledge in an honest manner as their name is displayed for everyone to see, heighten their sense of responsibility in sharing knowledge, and decrease free-riding.

Although this study has introduced various implications for future research, it nevertheless has several limitations. First, because it adopted a cross-sectional study method, the present study measured the variables included in the research model using only survey replies that were provided at a single point in time. However, accumulated social capital, such as social interaction ties with coworkers, as well as individual beliefs, such as those related to knowledge self-efficacy, can change with time. In this regard, a longitudinal study should be implemented in the future that would make it possible to perceive changes in the factors that influence knowledge-sharing activities over a lapse of time, as well as the relationship between these factors.

Second, as this study measured individuals' perceptions based on a survey that employed the self-report method to measure social interaction ties, the possibility of subjective measurements cannot be ignored. Social network analysis represents a useful method of examining the exchange and interaction patterns of the actors in social units. In order to overcome the abovementioned limitation in future research, the relevant analysis must include analytical indicators of social networks, such as density and centrality.

Third, as it measured job performance based on the subjective opinions and judgments provided by the participants of the survey, this study can be regarded to some extent as suffering from a lack of objectivity. To this end, an empirical verification will be required in future studies based on the use of objective performance indicators to measure individual job performance.

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Appendix A. Survey items and related research.

Variable	Item	Questions	Related research
Knowledge self-efficacy	SEC1	I think that people who are actively involved with social media can provide valuable knowledge.	Chen & Hung, 2010; Lin, 2007
	SEC2	I think that I possess the necessary experience and specialized knowledge to provide valuable knowledge to those who are actively involved with social media.	
	SEC3	I think that I have the confidence needed to comment on or reply to messages uploaded by those who are actively involved with social media.	
	SEC4	I think that I can influence the usefulness of knowledge sharing by sharing my knowledge with others through social media.	
	SEC5	I think that I can provide more valuable knowledge than others through social media.	
Enjoyment of helping	ENH1	I enjoy sharing knowledge with other people through social media.	Wasko & Faraj, 2005
	ENH2	I enjoy helping other people by sharing knowledge through social media.	
	ENH3	I feel good when I help others by sharing my knowledge through social media.	
	ENH4	I want other people to ask my opinion about certain themes or work projects through social media.	
	ENH5	I enjoy helping others through social media.	
Social interaction ties	SIT1	I maintain close social relationships with people through social media.	Chiu et al., 2006
	SIT2	I think that I spend a lot of time interacting with other people through social media.	
	SIT3	I personally know some of the people who actively use social media.	

(continued on next page)

(*continued*)

Variable	Item	Questions	Related research
	SIT4	I think that I frequently communicate with people through social media.	
Norm of reciprocity	NOR1	I believe that it is fair and obligatory to help others when I engage in social media activities because I know that other people will help me some day.	Chen & Hung, 2010; Wasko & Faraj, 2005
	NOR2	I believe that other people will help me when I need help if I share knowledge with others through social media.	
	NOR3	I believe that other people will answer my questions regarding specific information and knowledge in the future if I share knowledge with others through social media.	
	NOR4	I think that people who are involved with social media develop reciprocal beliefs on give and take based on other people's intentions and behavior.	
Tertius iungens orientation	TIU1	I introduce people who are likely to have similar interests to each other.	Obstfeld, 2005
	TIU2	I like to explain issues in a manner that makes it possible for various people to develop an interest in them.	
	TIU3	I like to create opportunities for different people to work together in a cooperative manner.	
	TIU4	I like to search for common points on an issue that people with different viewpoints may share.	
	TIU5	I like to introduce two different people who I believe would be helpful to one another once they get to know each other.	
	TIU6	I like to introduce dissimilar people who have interests in similar issues and themes but have not yet been connected to one another.	
Knowledge-sharing activities in social media	KSA1	I think that I frequently participate in knowledge-sharing activities in social media.	Hsu et al., 2007; Davenport & Prusak, 1998
	KSA2	I think that I spend a lot of time engaged in knowledge-sharing activities in social media.	
	KSA3	I think that I actively share my knowledge with others when I participate in social media.	
	KSA4	I interact with more people when I discuss a difficult or complicated theme through social media than is usually the case.	
	KSA5	I think that I voluntarily participate in various themed discussions through social media.	
	KSA6	How often do you share knowledge through social media every month? (①: less than once–⑦: more than 30 times)	
Job performance	JOP1	I think that my ability to perform my job duties has improved as a result of knowledge-sharing activities.	Williams & Anderson, 1991
	JOP2	I think that my job-related communications have improved as a result of knowledge-sharing activities.	
	JOP3	I think that my job-related knowledge has improved as a result of knowledge-sharing activities.	
	JOP4	I think that the reliability of my job performance has improved as a result of knowledge-sharing activities.	
	JOP5	I think that knowledge-sharing activities have allowed me to properly play the roles given to me.	
	JOP6	I think that knowledge-sharing activities have helped me to achieve the job duties that are required of me.	

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