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ABSTRACT

Advances in information and communication technologies have produced enormous changes in the manners, approaches, and methods that people use to collaborate. Knowledge sharing is one of the essential functions of social networking sites (SNSs) as a new e-Collaboration environment. We study knowledge sharing behavior in SNSs from the perspective of knowledge contributors and their characteristics by using the lens of identity and bond theory. Identity and bond theory asserts that individuals have behavioral patterns in SNSs. Therefore, this study identified the factors that influence knowledge sharing in SNSs based on identity and bond theory. The data were collected using an online survey of the members of Cyworld, Facebook, and Twitter in South Korea. The results indicate that network externality, social interaction, enjoyment of helping, and self-image expression significantly affect the two types of attachment (common identity formation and bonding). In doing so, the two types of attachment significantly affect knowledge sharing. As the result of the findings, this study suggests that SNSs enable members of organizations to enhance knowledge sharing.

KEYWORDS

Knowledge Sharing, Social Networking Sites, e-Collaboration, Social Capital, Identity and Bond Theory

INTRODUCTION

Social network sites (SNSs), the use of which is rapidly increasing, are a communication tool that appears in various forms (Chang and Zhu, 2012). For example, Facebook, a leading SNS tool, can broadcast messages to large audiences through chats, status updates, and wallposts. Such communication methods of SNSs lead their users to develop various usage motivations (Smock et al., 2011). The reasons for people using SNSs can generally be classified into relaxing entertainment, knowledge (information) sharing, escapism, social interaction, and habitually passing time. Among such usage motivations for SNSs, the inclusion of 'knowledge sharing' is noteworthy.

Due to the importance of knowledge sharing, many organizations have been recently introducing Knowledge Management (KM) for the creation of high-quality knowledge, the utilization of this knowledge for a competitive edge, and the improvement of organizational learning and innovation. However, it hardly accomplished these original purposes and remained an information-technology centered repository, or a system-oriented approach. At this point, if SNSs can be used in a more explorative way, this will help achieve the ultimate purposes of knowledge sharing via KM (Cai, 2005; Hall and Graham, 2004; Kim, Zheng, and Gupta, 2011a). In particular, SNSs play a critical role in facilitating collaboration among organizational members because they operate as a platform that enables collaborations within an organization (Turel and Zhang, 2011).

Meanwhile, existing SNS studies include those regarding the usage motivations of SNSs (Smock et al., 2011), the network externality that influences the use of SNSs, the influence factors on product purchases (Pookulangara and Koesler, 2011), and risk-taking, trust, and privacy concerns in social network communities (Fogel and Nehmad, 2009). However, there has been very little focus on 'knowledge sharing' as the role of SNSs. The aim of the current study is to examine knowledge sharing in SNSs as a reflection of social capital and two types of attachment (common identity creation and bonding). Specifically, this paper seeks answers to the following research questions:

(1) How are the SNS members' motivations related to their knowledge sharing?

(2) How do the motivation and attachments interact with each other in affecting knowledge sharing?

The major contribution of this study is to build the influence factors on knowledge sharing in the SNS environment into a framework based on the identity and bond theory and then empirically test it. Furthermore, this study intends to provide

practical implications in order to help organizations promote knowledge sharing via SNSs to succeed in their e-Collaborations.

THEORETICAL BACKGROUND

Identity and bond theory

Ren et al. (2007) explained that SNS attachment types are divided into the common identity and common bond concepts. This classification is related to the reason that individuals engage in SNS groups. They suggested that the members of a group either feel attached to the group as a whole or feel attached to individual members in a group. Prentice et al. (1994) conducted research involving clubs within universities, which was segmented in terms of the clubs: one segment was topic-based groups (common identity groups), such as art groups and sport teams, and another was relation-based groups (common bond groups), such as residential units, fraternities, and eating clubs.

According to Prentice et al. (1994), members of a common identity group feel more attached to the group as a whole than to their fellow group members, whereas members of common bond groups reported feeling attached to group members as well as to the group as a whole (Ren, et al., 2007; Sassenberg, 2002). Their studies have been applied to various domains, including the online community environment (Fiedler and Sarstedt, 2010; Ren et al., 2012). Individuals engaging in SNSs share opinions and information with a certain scope of members within their groups, according to their interests, and this is done because they have individually different purposes. Topic-based groups tend to have a specific purpose in their activities, whereas relation-based groups place value on social and emotional attachments to other people. According to this classification, groups present different characteristics. Of course, it is difficult to make such a clear differentiation for the purposes of joining SNSs. However, the extent of knowledge sharing within a group is believed to differ according to how an individual is attached to the group in terms of a common identity and common bonds.

Social capital

The concept of social capital is variously defined in various fields (Adler and Kwon, 2002). It can be defined as the resources accumulated through the relationships among people (Bourdieu, 1986; Coleman, 1988; Okoli and Oh, 2007). In addition, Fukuyama (2001) explained social capital as the concept of promoting collaborations among individuals, which defined social capital as the sum of capital that is latent or real in the daily relationships of individuals with their friends and acquaintances. Thus far, social capital has been used to explain the diversity of pro-social behaviors, such as group actions taken for other people or community involvement. Coleman (1988) insisted that social capital is helpful when promoting activities between people or companies. Social capital is constituted by many attributes, but it is generally understood via three factors: structural, relational, and cognitive perspectives (Granovtetter, 1992; Wang and Chaing, 2009; Wasko and Faraj, 2005). The structural dimension is explained as density, connectivity network configuration, stability, and ties (Coleman, 1988; Tichy, Tushman, and Fombrun, 1979). The relational dimension is described as the kinds of personal relationships that are developed through a history of interactions (Granovtetter, 1992). This concept focuses on factors that influence behavior, like respect and friendship, which will affect sociability, acceptance, and prestige. Finally, the cognitive dimension refers to the resources that emanate shared visions, interpretations, systems of meaning (mainly codes and narratives), values, and other cultural elements (Macke and Dilly, 2010).

Putnam (2000) divided social capital into bridging and bonding social capital. Bridging social capital exists in the relationships of merely exchanging information or new perspectives without emotional bonds. It is linked to what network researchers refer to as "weak tie' (Granovetter, 1982). By contrast, bonding social capital is observed in strongly tied relationships such those as with families and friends (Ellison et al., 2007). Adler and Kwon (2002) separated social capital based on the internal and external relations, which explained internal relations as bonding social capital and external relations as bridging social capital. The common identity group and the common bonding group presented above can be understood in light of the nature of social capital by linking with the study of Putnam (2000). Here, the common identity group and the common bonding group can represent bridging social capital and bonding social capital, respectively.

With the increasing use of SNSs, studies on the relationships between social capital and SNS are underway (Ellison et al., 2007; Steinfield et al., 2008; Valenzuela et al., 2009; Ji et al., 2010). Ellison et al. (2007) explained that the relationships between the usage level of Facebook users personally can be perceived in terms of bridging social capital, bonding social capital, and maintained social capital. According to the study, individuals on Facebook utilized bridging social capital more than bonding social capital, thereby maintaining social capital. Steinfield et al. (2008) examined the fact that there are impact relationships between the use of Facebook and bridging social capital, including those between psychological happiness (self-

esteem, life satisfaction) and bridging social capital, through a longitudinal analysis. The longitudinal analysis revealed that the level of Facebook usage increased and that Facebook produced bridging social capital.

In addition, Valenzuela et al. (2009) identified the relationships between the usage level of each individual and group on Facebook and their respective life satisfaction levels, social confidence, civil society participation, and political participation. Ji et al. (2010) found that the usage motivations of Korean, Chinese, and American SNS users existed the cultural difference and social capital formation (identity, professional knowledge search, connection, communication, content sharing).

As shown above, quite a few studies have been conducted on the social capital-related nature of SNSs, but the studies relating SNSs to knowledge sharing are not sufficient. Particularly, this study established the nature of relational factors ('network externality' and 'social interaction') and individual factors ('enjoy helping' and 'self-image expression') as the antecedents influencing the common identity and common bonds of social capital. Such factors can also be regarded as the enablers that explain why SNS users are motivated to use such systems.

RESEARCH MODEL AND HYPOTHESES

Based on the theoretical background, the proposed research model for the current study is shown in Figure 1.

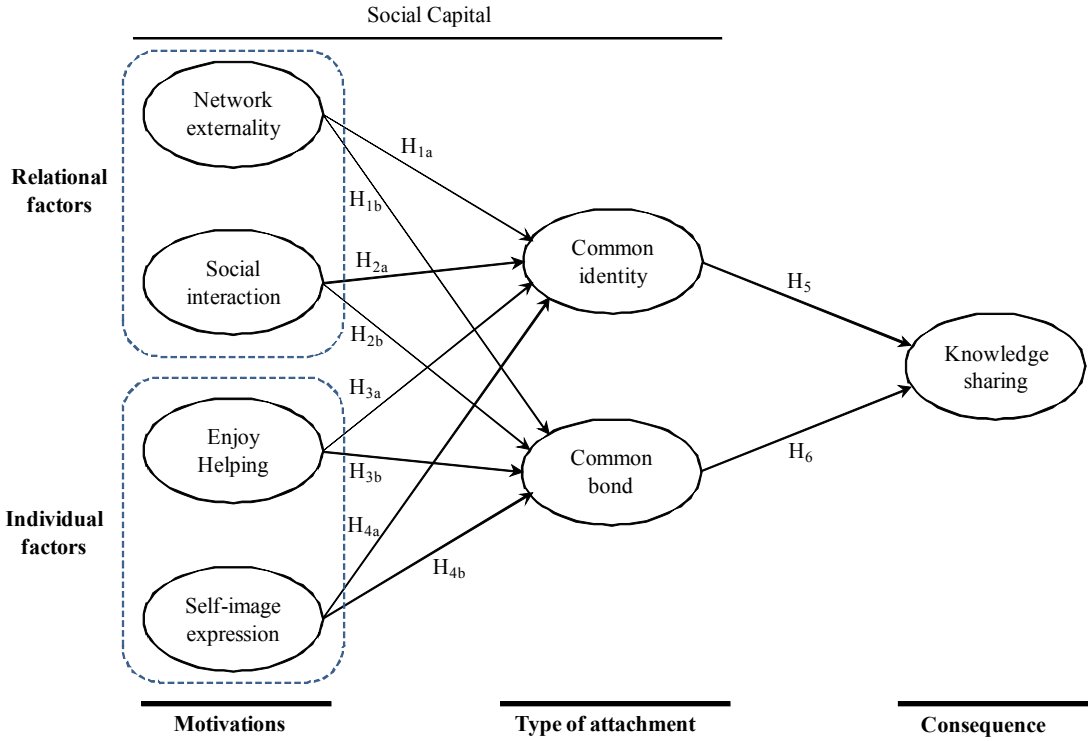

Figure 1. Research Model

In this study, network externality was operationally defined as the number of SNS members (Lin and Lu, 2011). Network externality is a value or effect derived from goods or services, and when brought to customers, this value or effect grows by bringing the increment of users, ancillary products and services (Katz and Shapiro, 1985). Therefore, once the scope of users reaches a critical level, externally expected benefits are revealed, thereby attracting more users (Lin and Bhattacherjee, 2008; Lin and Lu, 2011). Network externality is also called the 'network effect,' which means that the value or usefulness of connecting to a network is determined by the number of participants already plugged into the network and that increasing the number of users of a given network enhances its usefulness (Farrell and Saloner, 1985; Fiedler and Sarstedt, 2010). In fact, network externality is deemed to be one of the most important influence factors in the adoption of innovative technologies (Katz and Shapiro, 1985). Also, network externality is known to boost the price of the network services and the willingness to pay a fair price for them (Kauffman and Wang, 2001). When users recognize that their network is large, they expect more

benefits from it, which consequently creates more demand. Lin and Bhattacherjee (2008; 2009) observed that the benefits for users also stem from social effects. For instant messengers, such as MSN messenger, as the number of network participants rises, a larger number of users maintain and newly form their individual and social relational networks, thereby further enlarging user benefits. Thus, when applying the characteristics of network externality to SNSs, the larger the scale of an SNS, the more benefits its users will feel or experience, and as the result, they will grow more attached to the SNS community they belong to. Hence, this work proposes the following hypothesis:

H_{1a}: Network externality has a positive effect on common identity creation.

H_{1b}: Network externality has a positive effect on common bonding.

Social interaction is a process through which individuals can find and provide emotional support, companionship, and encouragement (Kim et al., 2011b; Fiedler and Sarstedt, 2010). In large social networks, such as SNSs, how well one is getting along and exchanging with others is very important, and this can be defined as interaction. If members of an SNS proactively interact with one another, they further rely on one another while extending a helping hand, thus leading to enhanced ties among members (Kim et al., 2011b). In particular, people with strong interactions tend to conveniently discuss matters with others and share their problems to facilitate social exchange within SNSs and thus increase attachment to the SNS (Park and Chung, 2011). Therefore, people who actively engage in social interactions with other people within SNSs can be inferred to be more attached to SNSs. Hence, the hypothesis is proposed as follow:

H_{2a}: Social interaction has a positive effect on common identity creation.

H_{2b}: Social interaction has a positive effect on common bonding.

Enjoying helping is explained because it feels good to help others on SNSs (Lee and Lee, 2010; Kim et al., 2011a; Wasko and Faraj, 2005). Generally, helping others is nothing new, but people would not show pro-social behaviors if they were not praised or rewarded otherwise. People who are willing to help others are engaging in altruism (Ma and Agarwal, 2007), and if some have been helped by others previously, they are likely to be more willing to help others as well. According to Sassenberg (2009), the members who feel an identity-based attachment in their own group tend to more strongly think that they should comply with the group's norms as compared to members who feel bond-based attachment. Their findings explained that the members with identity-based attachment are expected to exhibit generalized reciprocity (helping any members), whereas the members with bond-based attachment show direct reciprocity (helping only those who have helped them). In fact, although there may be a small difference between identify- and bond-based attachment, depending on direct or generalized reciprocity (Ren et al., 2012), members with either identity- and bond-based attachment enjoy helping other members. Thus, enjoying helping makes people more attached to their own groups. Hence, the hypothesis is proposed as follows:

H_{3a}: Enjoying helping has a positive effect on common identity creation.

H_{3b}: Enjoying helping has a positive effect on common bonding.

Self-image expression means that people play a part in disclosing themselves (Trammell and Keshelashvili, 2005), which is a constant process of controlling and managing information to continuously deliver one's specific image to others (Leary and Kowalski, 1990). In other words, self-image expression is expressing the image of oneself and, if possible, effectively expressing the image of oneself within an organization so that users of the media try to build up their own identities (Fiedler and Sarstedt, 2010). If SNS users' self-image expression is positively formulated, users would further enhance a sense of sharing, standards, tradition, and a sense of responsibility, and it is considered that attached for pertinent SNS occurs. For example, online communities, such as MMORPGs (Massive Multiplayer Online Role-Playing Games), induce their members to proactively take part by offering chatting services or messengers. The behavior of chatting through a messenger could satisfy members' desire for self-image expression (Park and Chung, 2011). Hence, the hypothesis is proposed as follows:

H_{4a}: Self-image expression has a positive effect on common identity creation.

H_{4b}: Self-image expression has a positive effect on common bonding.

Common identity creation and common bonding are considered to be the attachment types through which individuals experience online communities, such like SNSs (Ren et al., 2012). In particular, Hogg (1992) indicated that the people who are more attached to their own group tend to evaluate the group more positively, stay longer, participate more in the group, and endeavor to help other group members more than those who are less attached to their group. In addition, the existing literature on SNSs that pertains to social capital (Wasko and Faraj, 2005) suggests that the relationships in SNSs are 'weak ties,' but that their members are generous in sharing their own knowledge. In other words, individuals present a high likelihood of sharing their knowledge with other members in their SNS communities if the other members ask for help (Kim et al., 2011a). In particular, people with identity-based attachment will like their group and participate in it. Thus, they will become willing to help others (Ren et al., 2007). Meanwhile, people with bond-based attachment will focus on the relationships with other people and help others along with relationship building. Therefore, although the reasons for helping others may differ, people with both attachment types are believed to actively engage in helping others through knowledge sharing. Hence, the hypothesis is proposed as follow:

H_5: Common identity creation has a positive effect on knowledge sharing.

H_6: Common bonding has a positive effect on knowledge sharing.

RESEARCH METHODOLOGY

Instrument development

In this study, measurements were derived from previous literature pertaining to the seven constructs of network externality, social interaction, enjoying helping, self-image expression, common identity creation, common bonding, and knowledge sharing (see Table 2). Three network externality items were adopted from the previous study (Lin and Lu, 2011). Four enjoying helping items were adopted from previous research (Kim et al., 2011a). Four social interaction items and social self-image expression items related to SNSs were drawn from previous research (Kim et al., 2011b). Also, six common identity items and three common bond items were drawn from the work of Marina and Marko (2010). Finally, four knowledge sharing items were adapted from the previous research (Kim et al., 2011a). This study adopted multi-measurement items for each construct in order to overcome the limitations of a single item because a single item is usually too specific to capture all the attributes of a construct and is likely to have a high rate of measurement error. All these items were measured on a 7-point Likert scale ranging from strongly disagree (1) to strongly agree (7).

Data collection

This study employed a top-ranking Korean Internet survey firm to collect data. The Internet survey firm has a nationwide panel of 650,000 online respondents, from which representative samples are selected. Their standard procedures use Korean resident registration numbers matched against personal passwords to verify the identity of the panelists included in each sample. They are selected as best-fit participants by their responses to a sampling questionnaire and rejected during the survey if they complete their questionnaires too fast. The Internet survey was collected during November 2011. The Internet survey firm distributed questionnaires to 646 potential customers, who were chosen randomly. By using a screening question, we selected those who were experienced with SNS. Via this procedure, 502 questionnaires were collected (with response rate of 77.7%), and after checking for outliers, all 502 questionnaires were coded for analysis. The characteristics of the respondents are as follows in Table 1. The respondent gender ratio was male 269 (53.6%) and female 233 (46.4%). More were single 252 (50.2%) than married 250 (49.8%). The 30-39 year age group had the largest proportion at 45.2% (227), followed by those under 30 years (143, 28.5%) and those 40-49 years (106, 21.1%). 89.4% (449) of respondents had two-year college degrees or higher. The typical respondent's monthly income level was less than 1 million won at 144 (28.7%), followed by 1 million to 1.9 million Korean won (73, 14.5%), where 1,100 Korean won equals US$1.

Characteristics		Frequency	%
Gender	Male	269	53.6
	Female	233	46.4
Age	Under 30	143	28.5
	30~39	227	45.2
	40~49	106	21.1
	Over 50	26	5.2
Education	Middle and high school	53	10.6
	2 year college	147	29.3
	University	225	44.8
	Graduate school	77	15.3
Marital status	Single	252	50.2
	Married	250	49.8
Occupation	Student	144	28.7
	Office worker	257	51.2
	Professional	40	8.0
	Businessperson	47	9.4
	Others	14	2.8
Monthly income	Less than 1 million won*	144	28.7
	1 – 1.9 million won	73	14.5
	2 – 2.9 million won	110	21.9
	3 – 3.9 million won	75	14.9
	4 – 4.9 million won	52	10.4
	More than 5 million won	48	9.6
Total		502	100

* 1$ (USD) =1,100 Won

Table 1. Demographic Characteristics of Respondents

DATA ANALYSIS AND RESULTS

This study employed a structural equation modeling (SEM) approach in order to test the hypotheses proposed in Figure 1. SEM is designed to evaluate how well a proposed model or hypothetical construct explains the collected data (Hair, Black, Babin, Anderson, and Tatham, 2006). The SEM used a two-step hybrid method by specifying a measurement model in the confirmatory factor analysis (CFA) and testing a latent structural model developed from the measurement model (Kline, 2005).

Confirmatory Factor Analysis

We assessed the constructs for convergent validity and discriminant validity via CFA using AMOS 18. In CFA, the measurement model is revised by dropping items that share a high degree of residual variance with other items. We dropped total five items that shared a high degree of residual variance. The χ^2 fit statistic was 565.275 with 209 degrees of freedom (χ^2/d.f = 2.705) ($p < 0.001$). The goodness-of-fit index (GFI) is 0.905, the adjusted goodness-of-fit index (AGFI) is 0.875, the normed fit index (NFI) is 0.952, the comparative fit index (CFI) is 0.969, and the root mean square error of approximation (RMSEA) is 0.058. All statistics supported the overall measurement quality given the number of indicators (Anderson and Gerbing, 1992).

Convergent validity was checked using three other criteria. First, the standardized path loading of each item must be statistically significant and greater than 0.7 (Gefen, Straub, and Boudreau, 2000). Second, the composite reliability (CR) and the Cronbach's α for each construct must be larger than 0.7. Third, the average variance extracted (AVE) for each construct must exceed 0.5 (Fornell and Larcker, 1981). As shown in Table 2, the standardized path loadings were all significant and greater than 0.7. Also, the CR and the Cronbach's α for all constructs exceeded 0.7. The AVE for each construct was greater than 0.5. Therefore, the convergent validity for the constructs was supported (Bhattacherjee and Sanford, 2006, p. 815).

Constructs and Variables		Loadings	CR[b]	AVE[c]	α
Network externalities	I think a good number of people use SNSs.	0.922	0.934	0.875	0.933
	I think most people are using SNSs.	0.949			
	I think there will still be many people joining SNSs.[d]	-			
Social interaction	SNSs better enable me to create interpersonal bonds with others.	0.902	0.914	0.781	0.913
	SNSs help me maintain social relationships with others.	0.898			
	SNSs help me make new friends.[d]	-			
	SNSs enhance my social relationships with others.	0.850			
Enjoy helping	I am a person who is concerned about others in SNSs.	0.874	0.920	0.793	0.918
	I am a person who helps others to achieve their goals.	0.907			
	I am a person who pays attention to the needs of others.	0.890			
	I am a person who helps others feel happy. [d]	-			
self-image expression	Using SNSs enhances my self-image for others.	0.833	0.936	0.784	0.935
	Using SNSs improves my self-image expression to others.	0.893			
	Using SNSs makes a good impression on other people.	0.913			
	Using SNSs improves the way I am perceived.	0.901			
Common identity	Belonging to this SNS is very important for me.[d]	-	0.952	0.797	0.951
	It would feel very good to be described as a typical member of this SNS.	0.863			
	I often mention this SNS when I first meet someone.	0.867			
	I feel strong attachment to this SNS.	0.917			
	I often acknowledge the fact that I am a member of this SNS.	0.918			
	I am a typical member of this SNS.	0.898			
Common bond	I feel very close to the other members of this SNS.	0.883	0.880	0.786	0.880
	Many members of this community have influenced my thoughts and behaviors.	0.890			
	Many of my friends come from this SNS.[d]	-			
Knowledge share	I share my knowledge often to others in this SNS.	0.817	0.929	0.768	0.927
	I post my knowledge often in this SNS.	0.884			
	I share my knowledge often in this SNS.	0.939			
	I usually share valuable knowledge with others.	0.860			

[a] $\chi^2 = 565.275$, d.f = 209 (χ^2/d.f = 2.705), p = 0.000, GFI = 0.905, AGFI = 0.875, NFI=0.952, CFI=0.969, RMSEA = 0.058
[b] Composite Reliability
[c] Average Variance Extracted
[d] The item was deleted after confirmatory factor analysis.

Table 2. Results of Convergent Validity Testing[a]

The discriminant validity of the measurement model is checked by comparing the square root of the AVE for each construct with the correlations between that construct and other constructs. If the square root of the AVE is greater than the correlations between that construct and other constructs, then this indicates discriminant validity (Fornell and Larcker, 1981). As shown in Table 3, the square root of the AVE for each construct exceeded the correlations between that construct and the other constructs. Therefore, discriminant validity was established.

Construct	Correlation of constructs							Mean	S.D.
	1	2	3	4	5	6	7		
1. Network externality	**0.936**							5.436	1.199
2. Social interaction	0.489**	**0.884**						4.963	1.027
3. Enjoying helping	0.176**	0.473**	**0.890**					4.246	1.159
4. Self-image expression	0.274**	0.641**	0.597**	**0.886**				4.388	1.117
5. Social identity	0.171**	0.518**	0.687**	0.651**	**0.893**			4.067	1.246
6. Social bond	0.167**	0.563**	0.617**	0.628**	0.815**	**0.887**		4.279	1.224
7. Knowledge sharing	0.072	0.410**	0.661**	0.564**	0.728**	0.641**	**0.876**	4.018	1.252

Note. The diagonal elements in boldface in the "correlation of constructs" matrix are the square root of the average variance extracted (AVE). For adequate discriminant validity, the diagonal elements should be greater than the corresponding off-diagonal elements.
** $p < 0.01$

Table 3. Correlation and Descriptive Statistics

Hypothesis Testing

Table 4 presents the maximum-likelihood estimates for the various overall fit parameters. The χ^2 statistic fit was 540.276 with 211 degrees of freedom ($p < 0.000$). The GFI is 0.909, the AGFI is 0.881, the NFI is 0.955, the CFI is 0.972, and the RMSEA is 0.056. These multiple indicators suggest that the model has a good fit, justifying further interpretation.

Hypothesis	Path	Estimates (t-value)	Results
H_{1a}	Network externality → Common identity	-0.080 (-2.127)	Not supported
H_{1b}	Network externality → Common bond	-0.137 (-3.220)	Not supported
H_{2a}	Social interaction → Common identity	0.110 (2.123)	Supported
H_{2b}	Social interaction → Common bond	0.315 (5.338)	Supported
H_{3a}	Enjoy helping → Common identity	0.505 (11.075)	Supported
H_{3b}	Enjoy helping → Common bond	0.379 (7.724)	Supported
H_{4a}	Self-image expression → Common identity	0.316 (6.130)	Supported
H_{4b}	Self-image expression → Common bond	0.272 (4.726)	Supported
H_5	Common identity → Knowledge sharing	0.705 (14.026)	Supported
H_6	Common bond → Knowledge sharing	0.115 (2.713)	Supported

$\chi^2 = 540.276$, d.f = 211 (χ^2/d.f =2.561), p = 0.000, GFI = 0.909, AGFI = 0.881, NFI=0.955, CFI=0.972, RMSEA = 0.056

Table 4. Standardized Structural Estimates and Tests of the Main Hypotheses

The squared multiple correlations (SMCs; R^2) for the structural equations for common identity creation, common bonding, and knowledge sharing are high, as shown in Table 4 and Figure 2. For common identity creation, SMC = 0.643; for common bonding, SMC = 0.619. Also, more than half of the variance (SMC = 0.611) in knowledge sharing is explained by the direct effects of common identity creation and common bonding. Table 4 presents the standardized parameter estimates.

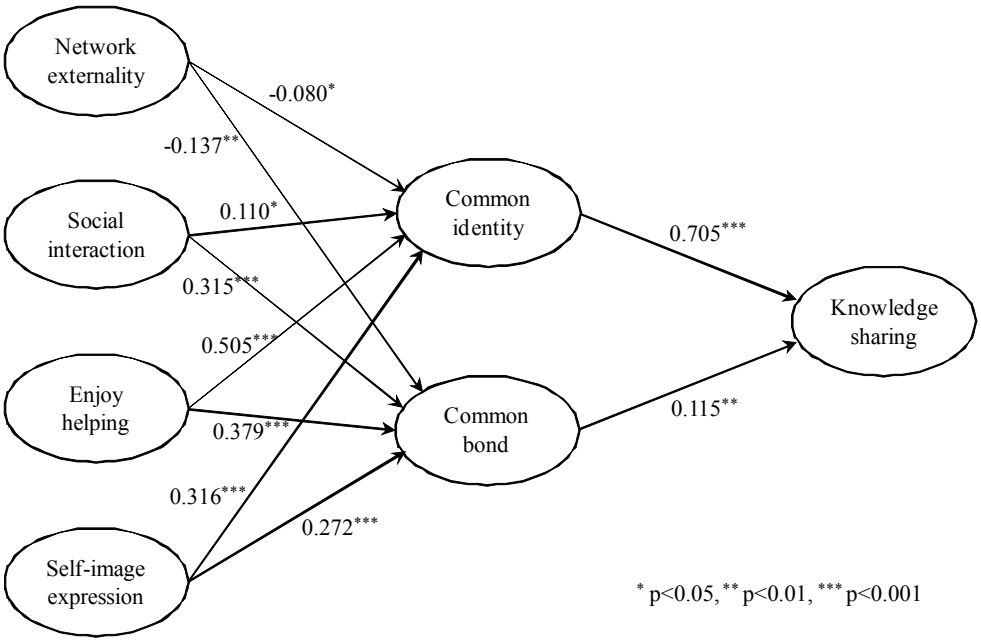

Figure 2. Results of SEM Analysis

Hypotheses H_{1a}, H_{2a}, H_{3a}, and H_{4a} address the structural relationships among network externality, social interaction, enjoying helping, self-image expression, and common identity. Network externality has a negative effect on common identity (γ_{11} = -0.080, t-value = -2.127). Even though the coefficient is statistically significant at the $p < 0.05$ level, due to the negative effect, this does not support H_{1a}. H_{2a} is supported by the significant, positive impact of social interaction on common identity (γ_{21} = 0.110, t-value = 2.123, $p < 0.05$). H_{3a} is supported by the significant, positive impact of enjoying helping on common identity (γ_{31} = 0.505, t-value = 11.075, $p < 0.001$). Also, H_{4a} is supported by the significant, positive impact of self-image expression on common identity (γ_{41} = 0.316, t-value = 6.130, $p < 0.001$).

Hypotheses H_{1b}, H_{2b}, H_{3b}, and H_{4b} address the structural relationships among network externality, social interaction, enjoying helping, self-image expression, and common bonding. Network externality has a negative effect on common bonding (γ_{12} = -0.137, t-value = -3.220). Even though the coefficient is statistically significant at the $p < 0.01$ level, due to the negative effect, this does not support H_{1b}. H_{2b} is supported by the significant positive impact of social interaction on common bonding (γ_{22} = 0.315, t-value = 5.338, $p < 0.001$). H_{3b} is supported by the significant positive impact of enjoying helping on common bonding (γ_{32} = 0.379, t-value = 7.724, $p < 0.001$). Also, H_{4b} is supported by the significant positive impact of self-image expression on common bonding (γ_{42} = 0.272, t-value = 4.726, $p < 0.001$).

Finally, H_5-H_6 address the relationships among common identity, common bond, and knowledge sharing. Common identity has a positive effect on knowledge sharing (β_{31} = 0.705, t-value = 14.026) and is statistically significant at the $p < 0.001$ level, supporting H_5. Also, H_6 is supported by the significant positive impact of common bonding on knowledge sharing (β_{32} = 0.115, t-value = 2.713, $p < 0.01$).

DISCUSSIONS AND CONCLUSION

In this study, the researcher built a model based on the concept of social capital and the identity and bond theory in order to identify the factors influencing knowledge sharing in the SNS environment and then substantiated and analyzed the framework. The study established network externality (the number of members), social interaction, enjoying helping, and self-image expression of SNSs as major factors affecting knowledge sharing. It also identified that the two types of attachment in SNSs, common identity creation and common bonding, mediate between and influence the extent of knowledge sharing.

According to the results of substantiating and analyzing the hypotheses of this study involving 502 respondents, all ten hypotheses constructed for this study turned out to be significant. First, network externality had a significant causal relationship with common identity- and common bond-based attachments. However, it was a negative causal relationship, not a positive one, unlike the result of Lin and Lu (2011).

Specifically, the coefficient in relation to common bond-based attachment was lower in comparison to common identity, which led to the conclusion that people could be more attached to groups with smaller numbers of members. However, this necessitates additional examination in the future. Social interaction also significantly affected both common identity- and common bond-based attachments, but the degree of influence on common bond-based attachment was around three times larger. This indicates that social interaction holds a greater influence on common bond-based attachment in the SNS environment. Enjoying helping also had a significant influence on both common identity- and common bond-based attachments, but exerted a more significant influence on common identity-based attachment. As mentioned in the studies of Ren et al. (2012), this appears to be because members with common bond-based attachment have a stronger desire to help others unconditionally than those with common bond-based attachment. Meanwhile, self-image expression also significantly affected both common identity- and common bond-based attachments, whereas the influence on common identity-based attachment turned out to be slightly larger.

Finally, the two types of attachment both influenced knowledge sharing significantly. One intriguing fact was that the path-coefficient regarding common identity-based attachment was revealed to be much higher than common bond. This illustrates that in terms of knowledge sharing on SNSs, a sufficient level of knowledge sharing is enabled even if the SNS members maintain weak ties among them, without emotional bonds. This is in accordance with the outcomes of existing studies on the relationships between SNSs and social capital: the members of SNSs, such as Facebook, utilize bridging social capital more than bonding social capital (Ellison, 2007; Steinfield et al., 2008; Valenzuela et al., 2009; Ji et al., 2010).

In light of this, this study has theoretical and practical contributions. First, in theoretical terms, the study is meaningful in terms of building a research model that explains knowledge sharing in the SNS setting by using identity and bond theory from the viewpoint of social capital and verifying the model empirically. Particularly, at such a time as today, when e-Collaboration is being highlighted, this study may have made a new contribution to the study of e-Collaboration via SNSs in theoretical terms. In other words, this study suggested ways in which organizations can share knowledge actively in practical terms. In order to facilitate knowledge sharing using an SNS within an organization, it is important to first foster the attachment of individuals to the SNS itself. This study is significant in suggesting the antecedents influence such a development of attachment. In particular, as existing research projects have suggested, this study advocates that if an organization aims at knowledge sharing via SNSs, the facilitation of common identity-based attachment among organizational members is more desirable than the facilitation of common bond-based attachment.

This study indicates a future need to examine how differentiated the influences of the research model suggested in the current work are between the common identity group and the common bond group by dividing the respondents of this study into the two groups. This will help to more explicitly identify which factors are more influential on common identity-based attachment and which factors are more influential on common bond-based attachment.

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