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KNOWLEDGE SHARING IN VIRTUAL COMMUNITIES: THE ROLE OF GROUP IDENTITY

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Abstract

The rapid growth of network access and the development of Web 2.0 have resulted in the popularity of virtual communities (VCs), such as Wikipedia, Facebook, professional forums and social network communities. The impact of VCs increasingly spreads over a broad range of fields, from social and educational to business. The content (i.e., knowledge) that VC members provide is the factor that determines the growth and survival of VCs. Previous studies have investigated the factors that influence knowledge-sharing behavior in the VC environment. Despite the fact that these studies have examined the same factors, their findings have been inconsistent. In this paper, we argue that group identity mediates the relationships between knowledge sharing and these factors. This study adopts social identity theory as a theoretical foundation and collects data from a popular virtual community in Taiwan. The results show that group identity indeed mediates the relationships between VC member knowledge sharing and both organizational commitment and organizational support.

Keywords: Knowledge Sharing, Virtual Community, Social Identity Theory, Group Identity

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1 INTRODUCTION

Knowledge has been recognized as an organization's most important resource (Nonaka and Takeuchi, 1995; Nahapiet and Ghoshal, 1998). In this era of the knowledge-based economy, knowledge management has become increasingly important to organizations. Firms seek knowledge management strategies to more effectively build a foundation for a competitive advantage (McEvily et al., 2000; Ipe, 2003). To help organizations manage knowledge, knowledge-based literature has already developed various approaches, such as knowledge creation, sharing, access, integration and application. Knowledge sharing can be defined as the culture of social interaction that involves transferring knowledge, experience, and skills among members of an organization. The idea of knowledge sharing has enjoyed widespread popularity in academic and business spheres in recent years (Pastor et al., 2010). For an organization, knowledge sharing is part of the process of capturing, organizing, reusing, and transferring experiences based on knowledge held within the organization, making the knowledge accessible for everyone who needs it (Lin, 2007a).

Unsurprisingly, knowledge sharing is even more important for virtual communities (VCs). The prevalence of the Internet and the rapid development of Web 2.0 have prompted continual growth among virtual communities (VCs). The knowledge sharing VC provides a convenient platform for content and community knowledge, and facilitates member participation (Marathe, 1999) while enhancing the interaction between members (Chiu et al., 2006). VCs rely on their members to contribute valuable knowledge within the community. Members' willingness to share has become the key to VC success.

The key to collecting knowledge is to develop a knowledge sharing culture inside the VC (Teo et al., 2011). However, developing such a culture is more easily said than done. Members often consider their personal knowledge to be their key competitive asset, and may be reluctant to share it for fear of losing their competitive edge (Huber, 2001). Recently, researchers have explored various motivators that may influence VC members' behavior regarding content contribution (Chiu et al., 2006; Cho et al., 2010; Fan et al., 2009; Hsu and Lin, 2008; Oh, 2012; Wasko and Faraj, 2005). Previous studies, however, have reported inconsistent findings, even though the studies used the same influencing factors to explore knowledge sharing in the VC environment.

VC member knowledge sharing may be influenced by the social context. Past studies (Tajfel, 1970; Tajfel et al., 1971) have found that social categorization plays an important role in intergroup behavior. According to Ashforth and Mael (1989), individuals who identify with the organization see themselves as part of a group of constituents, and they associate their fate with that of the other members of the group. When an increasing number of the population identifies with the organization, personal identification with the organization becomes seen as a favorable behavior within the group. Therefore, this study posits that VC members first recognize the formation of the community, and then become willing to share knowledge.

This study adds to our understanding of the impact of personal identification with the VC on the willingness to share knowledge. Social identity theory was adopted as the theoretical basis. An empirical survey was conducted to collect data from the largest BBS-type (Bulletin Board Service) VC in Taiwan. The results showed that members' group identity is the conduit through which organizational commitment and organizational support affect VC members' willingness to share.

This paper is organized into five sections, of which this introduction is the first. The second section is a literature review that explains the influencing factors of knowledge sharing, including group identity which is shown as a mediating factor in the model. The research framework and hypotheses are proposed in this section as well. Research methods and procedures are described in the third section. The data analysis results are described in the fourth section. Finally, we discuss the results and provide a conclusion.

2 MODEL DEVELOPMENT AND HYPOTHESES

Knowledge sharing describes the behavior of an individual who disseminates his acquired knowledge to other members within an organization (Ryu et al., 2003). In a VC context, knowledge sharing refers to the activities of VC members transferring or disseminating ideas, information, and suggestions amongst themselves. Knowledge sharing in VCs has received increasing attention in the literature (Sharratt and Usoro, 2003; Koh and Kim, 2004; Wasko and Faraj, 2005; Chiu et al., 2006; Ma and Agarwal, 2007; Hsu and Lin 2008; Fan et al., 2009; Cho et al., 2010; Chai et al., 2012; Oh, 2012). Past studies have explored the antecedents of knowledge sharing in the VC context from different perspectives. From the perspective of social interaction, the VC has been considered as a platform to help people connect with other individuals and build social networks. Based on this perspective, several theories (e.g., social cognitive theory, social capital theory, and social exchange theory) were adopted to explain VC members' knowledge sharing behavior. Some studies adopted social cognitive theory (Bandura, 1986) and stated that knowledge sharing in VCs is the result of the interaction between a person's cognition and the environment. Because of the interaction among VC members, some researchers claimed that interpersonal relationships are also a valuable resource for knowledge sharing. Nahapiet and Ghoshal (1998) labelled this resource embedded within networks of human relationships as "social capital." Past studies have examined the effects of social capital factors (i.e., social interaction ties, reciprocity, shared vision and shared language) on knowledge sharing in VCs (Chiu et al., 2006; Wasko and Faraj, 2005). According to social exchange theory (Blau, 1964), individuals engage in social interaction based on the expectation that it will, in some way, lead to social rewards. Social rewards (i.e., reputation, and the enjoyment of helping others) have also been adopted to investigate the effectiveness of knowledge contribution (Wasko and Faraj, 2005; Taylor and Murthy, 2009).

Social identification is an important component of group formation (Ashforth and Mael, 1989). Ellis and Fisher (1994) posited that roles are common standards for group members' behavior. When people participate in a social group, they identify with and assume a role in it. Through group action, they develop a perception of membership in the group (Hsu and Lin, 2008). VCs are essentially new communities, whose identity may become increasingly clear when people in the group identify themselves as members and treat others as partners.

Social identity theory (Tajfel, 1982) is concerned with when and why individuals identify with social groups and behave as part of them, adopting shared attitudes towards outsiders. According to social identity theory, once individuals identify with a group, they are likely to support it in a variety of ways because the group's welfare is psychologically incorporated into their self-concept (Law and Chang, 2008). Also, they are likely to focus on tasks that benefit the whole community rather than on tasks which are purely for self-interest (Tajfel and Turner, 1986; Hogg, 2003). Past studies have found that social factors, i.e., organizational commitment (Riketta, 2005), organizational support (Gibney et al., 2011), expected rewards (Willem and Buelens, 2007), and trust (van den Hooff et al., 2003) influence the formation of social identity. These social identity factors have also been found to play an important role in how knowledge is shared in VCs (Taylor and Murthy, 2009; Ardichvili et al., 2003; Hsu et al., 2007; Chiu et al., 2006). The relationships between knowledge sharing and these factors are described below.

2.1 Organizational Commitment

Organizational commitment is defined by O'Reilly and Chatman (1986) as the level and type of psychological attachment a person has to an organization. It refers to a positive attitude toward the organization, and to the quality of the relationship between the individual and the organization (Meyer and Allen, 1997; Mowday et al., 1982). Recent meta-analytic evidence has reported that commitment can be used to predict a wide range of job attitudes, turnover intention, and citizenship behaviors (Cooper-Hakim and Viswesvaran, 2005; Meyer et al., 2002). Wasko and Faraj (2005) referred to commitment to a collective as a sense of responsibility to help others within that collective. People

who make an effort out of a sense of commitment have a sense of moral obligation and care more for the organization (Meyer et al., 1993; O'Reilly and Chatman, 1986). This may play an important role in encouraging an individual to share knowledge.

Muthusamy (2009) found that employees with a high level of emotional commitment are more willing to work with their colleagues to share their tacit knowledge. Han et al. (2010) examined the relationship between the two variables and found it to be positive and significant. Organ and Ryan (1995) conducted meta-analysis research and found that affective commitment was significantly related to the kind of altruism that would promote members' knowledge sharing intentions. Without enough commitment to organizational goals—and attention to the needs of others, if necessary—members are less apt to expend extra effort and personal resources to promote the greater good, and knowledge sharing is likely to suffer. Because of the collective nature of team work, emotional attachment to and identification with the team can contribute to the achievement of knowledge-sharing behavior. Organizational commitment has also been found to have an effect on knowledge sharing in a VC context (Wasko and Faraj, 2005). Thus, VC members with high levels of commitment to the community will have a higher level of intention to share knowledge.

Hypothesis 1: Organizational commitment is positively related to knowledge sharing intention.

2.2 Organizational Support

Organizational support theory argues that members pay attention to treatment offered by the organization in an effort to determine the degree to which their contributions to the organization are valued and their organizations care about their welfare (Eisenberger et al., 1986). An important component of this argument is the notion that members believe that treatment provided to them by agents of the organization is representative of the organization's general favorable or unfavorable orientation towards them, as opposed to representing the independent motives of the individual agents (Eisenberger et al., 1986). Top management support is considered one of the important potential influences on organizational knowledge in the workplace (Connelly and Kelloway, 2003). Lin and Lee (2004) suggested that the perception that top management encourages knowledge sharing is necessary for creating and maintaining a positive knowledge sharing culture in an organization. Organizational support may increase the commitment of the organization's members to promote increased member interaction (Eisenberger et al., 1986). Therefore, members who receive support from the organization are likely to assuage their feelings of indebtedness by displaying positive work behaviors. This is likely to support the work environment by establishing an atmosphere of cooperation and openness which enhances teamwork and communication. Research has recognized the influence of environmental factors such as organizational support on employees' psychological variables. Similarly, organizational support may have positive impact on members' willingness to share knowledge with other members.

Hypothesis 2: Organizational support is positively related to knowledge sharing intention.

2.3 Expected Reward

Social exchange theory posits that social exchange engenders social rewards such as feelings of approval, status and respect. By showing their knowledge to others, members gain recognition and respect, resulting in an improved self-concept. Rewarding members in a tangible way (money, gifts, etc.) for their knowledge sharing efforts is considered *extrinsic* motivation, while *intrinsic* motivation is intangible in nature (increased reputation, special rights, etc.) The belief that sharing knowledge will increase one's reputation and position in the VC is likely to be an important motivator for sharing valuable knowledge. Leonard-Barton (1998) found that reward systems can decide how knowledge is shared within the organization. Research has found that expected rewards are the major determinants of individuals' attitudes toward knowledge sharing (Kwok and Gao, 2004; Watson and Hewett, 2006). Thus, a fair and objective performance-based reward system will probably help to increase members'

motivation to contribute new knowledge and increase the desire to share knowledge among members (Argote et al., 1990; O'Dell and Grayson, 1998).

Hypothesis 3: Expected reward is positively related to knowledge sharing intention.

2.4 Trust

Trust refers to a psychological state which includes the intention to accept vulnerability based on positive expectations of the intentions or the behavior of another (Golden and Raghuram, 2010). Trust is not only fundamental to collaboration (Child, 2001), it also facilitates close interpersonal interactions (Bijlsma-Frankema and Costa, 2005). Evidence suggests that trust and good relationships will lead to positive attitudes and behavior among workers (Gambetta, 1988; Sparrow and Cooper, 2003). Interpersonal trust is also important for creating an atmosphere conducive to knowledge sharing (Nonaka, 1994). Thus, trust is not only an enabler that can increase knowledge transfer (Inkpen, 1998; Mat Isa and Ameer, 2007), interpersonal trust is also important for creating an atmosphere for knowledge sharing (Nonaka, 1994). Past studies found that trust has a highly positive correlation with knowledge sharing in a VC context (Chiu et al., 2006; Noor et al., 2005). Hence, trust is very important to facilitate the development of social networking, and is indispensable for knowledge sharing (Sharkie, 2005). As a result, VC members with higher levels of interpersonal trust will have a greater propensity for knowledge sharing.

Hypothesis 4: Trust is positively related to knowledge sharing intention.

2.5 The Role of Group Identity

Over the past decade, organizational researchers have increasingly applied social identity theory to the workplace. As a specific form of social identification, organizational identification reflects the specific ways in which individuals define themselves in terms of their membership in a particular organization (Mael and Ashforth, 1995). The focus on identification within organizational contexts has continued to intensify because such identification is purported to benefit individuals, work groups, and the organization as a whole (Ashforth and Mael, 1989; Riketta, 2005; van Dick, 2004). Haslam et al. (2003) claimed that without organizational identification, there can be no effective organizational communication, no heedful interrelating, no meaningful planning, no leadership.

Mael and Ashforth (1995) defined organizational identification as "a specific form of social identification where the individual defines him or herself in terms of his or her membership in a particular organization." Social identity, implying an emotional involvement with VCs, fosters loyalty and citizenship behaviors (Ellemers et al., 1999; Bergami and Bagozzi, 2000; Bagozzi and Dholakia, 2002). Nahapiet and Ghoshal (1998) argued that social identity nurtures one's motivation to share knowledge. Kane et al. (2005) found that knowledge was more likely to be shared when team members had a common social identity. Such identification induces individuals to maintain a positive self-defining relationship with other members, and increase their knowledge contribution activities (Hogg and Abrams, 1988).

Hypothesis 5: Group identity is positively related to knowledge sharing intention.

As a significant dimension of work attitudes, organizational commitment is the psychological identification that an individual feels with his or her employing organization (Mowday et al., 1982). Though organizational commitment and identification involve similar concepts, they are different constructs (Riketta, 2005). Organizational commitment reflects the relationship between members and organization and affect the decision regarding membership. (Meyer and Allen, 1997). Commitment is compliance, which occurs when the behavior is primarily a result of incentives, rewards or punishments, but the actor does not necessarily appreciate or understand the value of the desired

behavior. Identification occurs when members adopt behaviors to achieve a satisfying and self-defining relationship with another person or group (Hwang, 2008). Commitment reflects a relationship between separate psychological entities, whereas identification reflects psychological oneness (van Knippenberg and Sleebos, 2006). Thus, although organizational commitment and organizational identification are highly correlated, a difference does appear to exist regarding the sources and outcomes of the two variables (James, 2011).

The correlations between commitment and identification are reportedly strong, ranging from the 0.50s to as high as the 0.70s (Riketta, 2005; van Dick, 2004). Postmes et al. (2001) argued that social identification is closely related to affective commitment, which is another argument why CMC use can be expected to positively influence affective commitment. The results of Meeus et al. (2002) showed that commitment is a related process in the development of identity. Past research has found that commitment produces a collective sense of identity among individuals in the organization, and results in pro-social behaviors (Dewitte and de Cremer, 2001) such as voluntarily sharing knowledge. Organizational identification is considered to be the result of an individual's assessment and evaluation of a plethora of social identities. Thus, organizational commitment is an important factor contributing to VC members' identification with the VC and, in turn, their willingness to contribute knowledge. The following hypothesis is posited.

Hypothesis 6: Organizational commitment is positively related to group identity.

Organizational support may have positive effect on identification. According to Eisenberger et al. (1986), a key manifestation of a social exchange relationship in the workplace occurs when members judge that the organization is supportive: when members perceive organizational support, they form a link with the organization responsible for that support. Gibney et al. (2011) demonstrated a positive relationship between perceived organizational support and organizational identification in a correlational study. Such an argument therefore provides the reasoning behind why perceptions of organizational support might lead to organizational identity.

Hypothesis 7: Organization support is positively related to group identity.

O'Reilly and Chatman (1986) viewed compliance, identification and internalization as the bases for commitment. According to Kelman (1958), compliance occurs when people adopt attitudes and behaviors in order to obtain specific rewards or to avoid specific punishments. Compliance refers to a kind of investment, focused on specific extrinsic rewards. When members are compliant, any personal attachment they feel regarding the organization is based on shared *interest*, rather than a shared *belief*. However, when an organization provides incentives, members do identify more with the organization, and when members receive the rewards, their sense of attachment to the organization grows, further endorsing the organization. This study aims to determine whether or not the benefits will, in turn, affect members' identification with the group.

Hypothesis 8: Expected reward is positively related to group identity.

Trustful relationships among VC members may contribute to organizational identification (John et al., 2011). According to Van Dick et al. (2004), individuals try hard to achieve positive self-esteem, which is derived from group membership. Faced with the uncertainty of a new community, members may access and use the responses from other members as heuristic cues to help them identify members who are suitable for intense exchange relationships characterized by high affect-based trust. For these reasons, an individual's trust in the other members may help that individual identify his or her role and connect psychologically to the VC. Thus, the following hypothesis is posited.

Hypothesis 9: Trust is positively related to group identity.

The research model is shown in Figure 1.

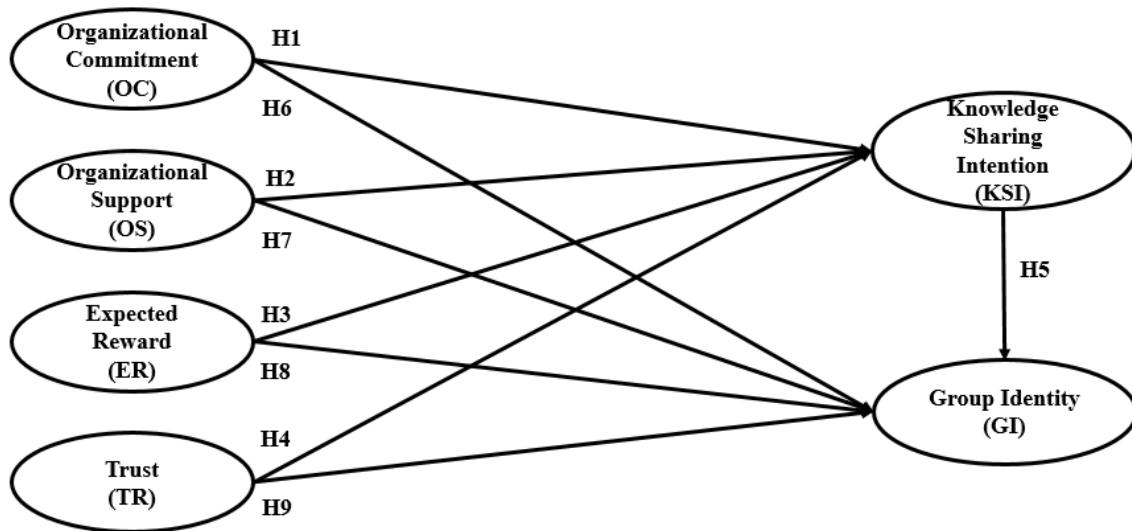


Figure 1: The Research Model

3 METHODOLOGY

To test the proposed research model, we adopted the survey method to collect data from one of the largest VCs in Taiwan, and we examined the hypotheses using the partial least squares (PLS) method of data analysis. The unit of analysis was the members of VCs.

3.1 Measure Development

We developed measurement items by adopting measures that had been validated in prior studies, modifying them to fit our context of knowledge sharing in virtual communities. The questionnaire consisted of 30 items to measure six constructs in the research model. Knowledge-sharing intention was assessed with items adapted from Bock and Kim (2002). The measure focused on the willingness and intentions of respondents to share knowledge with other members in the VC. The measurements for organizational commitment were developed from Lin (2007a). These items measured the individual's psychological attachment to the community. Organizational support measured the level of support that community members perceived from community managers, and the amount of care shown for members' efforts in the community. A total of five items obtained from Gakovic and Tetrick (2003) were used to measure organizational support. Expected rewards were assessed with two items adapted from Lin (2007b), and three newly developed items regarding received benefits from external means, such as monetary rewards, virtual points, or promotion of position in the VC. In the context of our study, trust refers to the belief in the good intentions and reliability of members with respect to contributing knowledge in the VC. The construct was measured using a scale developed by Costigan et al. (1998). Group identity refers to the degree to which one sees oneself as similar to other members of the online community, attributes community-defining characteristics to oneself, and takes the community's interest to heart (Turner et al., 1987). The items measuring social identity were adapted from Dholakia et al. (2004). According to Dawes (2008), five-point and seven-point Likert Scale was comparable. To reduce respondents' effort, all measurement items used a five-point Likert scale with values ranging from strongly disagree (1) to strongly agree (5). Some items were slightly modified to accommodate the context of VCs.

A pretest was performed with help from three specialists in the VC sector and two professors in the IS domain to assess the questionnaire's content validity, its understandability, the sequence of items, and contextual relevance. The questionnaire was modified slightly after comments from these experts were received. To ensure the reliability of the question items and the feasibility of the survey process, a pilot test involving 18 VC members was performed. The wording of the questions was also changed slightly based on comments from the participants in the pilot test. The source and the number of items for each variable of this instrument are listed in Table 1.

Variable (Abbreviation)	# of Items	Origin
Knowledge Sharing Intention (KSI)	5	Bock and Kim (2002)
Trust (TR)	5	Costigan et al. (1998)
Expected Reward (ER)	5	Lin (2007b)
Organizational Commitment (OC)	5	Lin (2007a)
Organizational Support (OS)	5	Gakovic and Tetrick (2003)
Group Identity (GI)	5	Dholakia et al. (2004)

Table 1. Sources and Item Numbers of Instrument

3.2 Survey Administration

The two-month-long survey was conducted from January to February, 2013. Data was collected from members of the PTT Bulletin Board System, a terminal-based bulletin board system located in Taiwan. Founded in 1995, this website is the largest Chinese language BBS in the world, with more than 1.5 million registered users, over 150,000 of whom are online simultaneously during peak hours. Approximately 40,000 articles and 1 million comments are posted in its 200 discussion boards and online forums every day.

A letter of invitation describing the research purpose and the survey process was sent to randomly selected members asking them to join the study. Those who responded that they were willing to participate in the survey were then sent a hyperlink directing them to the online questionnaire. To increase the response rate, the cover letter assured all respondents that their responses would be kept confidential and used for research purposes only.

3.3 Demographics of Respondents

Out of 455 responses received, 317 valid surveys were completed, for a response rate of 69.6%. The data shows that slightly more males (52.6%) than females (47.4%) responded. Most respondents were between the ages of 25 and 30. Most of them had an IT related bachelor's degree and 2-5 years' work experience, indicating that these were experienced IS knowledge workers.

4 DATA ANALYSIS AND RESULTS

Based on the analysis process using PLS software, the t-value can be known, and the direction of the correlation among variables can be determined. We first assessed the measurement model for reliability and validity, followed by tests of the structural model in order to test the hypotheses.

4.1 Assessment of Reliability and Validity

Construct reliability was measured using Cronbach's alpha, Fornell's composite reliability, and average variance extracted (AVE). Furthermore, Cronbach's alpha was used to measure the reliability of the dimensions in this study. According to George and Mallery (1999) there is no set interpretation of acceptable alpha values. According to the rule of thumb, however, acceptable alpha values range from 0.50 to 0.90, while alpha values of less than 0.50 are not acceptable. Nunnally and Bernstein (1994) also argued that a reliability value between 0.50 and 0.60 is sufficient, but a higher Cronbach's alpha is desirable. As shown in Table 2, for all constructs, Cronbach's alpha values ranged from 0.597 to 0.746, higher than the recommended minimum cutoff of 0.50. The diagonal cells are the square-root of AVE, and the off-diagonal cells are the correlations between the constructs. Table 2 shows that the values in the diagonal cells are higher than all the others in the same row, indicating high discriminant validity for the constructs. Thus we conclude that this survey has a high degree of discriminant validity and reliability.

	Mean	Cronbachs Alpha	ER	GI	KSI	OC	OS	TR
ER	2.095	0.620	0.754					
GI	2.068	0.603	0.400	0.746				
KSI	2.116	0.620	0.478	0.648	0.754			
OC	2.059	0.712	0.473	0.595	0.568	0.682		
OS	2.061	0.746	0.387	0.660	0.613	0.601	0.754	
TR	2.089	0.597	0.391	0.472	0.453	0.461	0.495	0.742

Note: The shaded numbers in the diagonal row are square roots of the average variance extracted (AVE).

Table 2. Construct Correlations and Discriminant Validity

4.2 Hypothesis Testing

After obtaining satisfactory results from the reliability and validity tests, hypothesis testing was conducted using partial least squares regression analyses.

4.2.1 Analysis of the Main Effects of Social Factors

The base model was estimated using 200 iterations of the bootstrapping technique in SmartPLS 2.0. To examine the specific hypotheses, we assessed the t-statistics for the path coefficients and calculated p-values based on a two-tail test with a significance level of .05. The path coefficients, t-statistics and p-values of the relationships among the constructs are shown in Table 3. Table 6 shows that organizational support ($\beta=0.361$, $t=2.886$, $p < 0.01$) and expected reward ($\beta=0.197$, $t=2.031$, $p < 0.01$) have a significant impact on knowledge sharing. Thus, H2 and H3 were supported.

Organizational commitment ($\beta=0.212$, $t=1.825$, $p = n.s.$) and trust ($\beta=0.102$, $t=0.957$, $p = n.s.$) had no significant impact. Thus, H1 and H4 were not supported.

Hypothesis	Path coefficient	T - statistic	Result
H1: Organizational Commitment (OC) → Knowledge Sharing Intention (KSI)	0.212	1.825	Not Supported
H2: Organizational Support (OS) → Knowledge Sharing Intention (KSI)	0.361	2.886**	Supported
H3: Expected Reward (ER) → Knowledge Sharing Intention (KSI)	0.197	2.031*	Supported
H4: Trust (TR) → Knowledge Sharing Intention (KSI)	0.102	0.957	Not Supported

+ $p < 0.1$, * $p < 0.05$, ** $p < 0.01$

Table 3. *The Results of Main Effects*

4.2.2 Analysis of the Mediating Effects of Group Identity

Table 4 shows that organizational commitment ($\beta=0.249$, $t=2.244$, $p < 0.01$) and organizational support ($\beta=0.423$, $t=3.891$, $p < 0.01$) have a significant impact on group identity; however, expected reward ($\beta=0.071$, $t=0.836$, $p = n.s.$) and trust ($\beta=0.121$, $t=1.150$, $p = n.s.$) did not. Thus, H6 and H7 were supported, but H8 and H9 were not supported. These results show that for people in a VC, group identity is influenced mainly by the perception of organizational commitment and support, with organizational support having the greatest impact. In contrast, neither the expectation of a reward nor the level of trust had any significant impact. Finally, group identity ($\beta=0.324$, $t=3.034$, $p < 0.01$) was shown to have a significant impact on knowledge sharing. Therefore, H5 was supported, showing that the formation of a group identity among the members results in an increase in knowledge sharing intentions within the VC. The results of this mediating effect are shown in Table 4.

Hypothesis	Path coefficient	T - statistic	Result
H5: Group Identity (GI) → Knowledge Sharing Intention (KSI)	0.324	3.034**	Supported
H6: Organizational Commitment(OC)→Group Identity (GI)	0.249	2.244*	Supported
H7: Organizational Support (OS) → Group Identity (GI)	0.423	3.891**	Supported
H8: Expected Reward (ER) → Group Identity (GI)	0.071	0.836	Not Supported
H9: Trust (TR) → Group Identity (GI)	0.121	1.150	Not Supported

+ $p < 0.1$, * $p < 0.05$, ** $p < 0.01$

Table 4. *Results of the Mediating Effects of Group Identity*

5 DISCUSSION AND CONCLUSION

In this study, we used social identity theory to examine how group identity might mediate the influence of other factors on knowledge sharing in VCs. Based on the empirical results of this study, the findings are summarized as follows.

Hypothesis 1 predicted that organizational commitment would be positively related to knowledge sharing intention. Table 3 shows that there is no direct relationship between organizational commitment and VC member intentions to share knowledge. Data analysis indicates that even higher commitment would not necessarily enhance the group identity of VC members, inducing them to further share their knowledge. This result may be because of the essential nature of the virtual community world in which people who have high levels of commitment expect not only to contribute but also to access knowledge from VCs.

Hypothesis 2 posited that organizational support is positively related to knowledge sharing intention. The coefficient correlation ($r=.613$) indicates a positive correlation between these two variables. The result shows that support from VC managers plays an important role in encouraging knowledge sharing. MacNeil (2004) mentioned that support from top management can build an atmosphere conducive to knowledge sharing within an organization. Our finding is consistent with Lin and Lee (2004) who noted that organizational support positively influences members' willingness to share knowledge with others.

Hypothesis 3 examined the relationship between expected rewards and knowledge sharing intention. Cabrera and Bonache (1999) reported that organizational rewards can shape people's habits. The data analysis statistically supported this idea that rewards have a positive influence on the knowledge sharing activities of VC members. The result is consistent with Chiu et al. (2006) who found that external rewards encourage VC members to conduct knowledge sharing behaviors. When VC members believe they will be rewarded for sharing knowledge, they are more willing to contribute their knowledge.

Hypothesis 4 stated that trust was positively related to knowledge sharing. The findings of this study suggest that trust does not impact knowledge sharing in the VC context. The competence promised by VC managers does not affect community members' willingness to share knowledge. Since community members and managers do not actually know each other, trust may be difficult to generate. Furthermore, trust relationships among community members do not necessarily enhance the willingness of VC members to share.

Hypotheses 6 and 7 predicted that organizational commitment and support would be individually related to group identity. According to the results, both of them have a positive relationship with group identity. Based on the analysis of the main model, organizational support did not directly affect knowledge sharing. However, this study found that commitment *does* effectively enhance members' group identity, and *then* influence members' intentions to share knowledge. The findings show that organizational support also indirectly affects knowledge sharing via group identity. Though commitment may not have a strong influence on members' intentions to share, knowledge, the formation of a group identity must be formed before contributions can be expected.

Hypotheses 8 and 9 posited that expected rewards and trust would be positively related to group identity. Based on the results, however, expected rewards and trust have no relationship with group identity. It is more likely that available incentives and an atmosphere of mutual trust may not effectively enhance members' sense of identification with the VC. One possible reason is that members are voluntarily participating in VC activities. Rewards (i.e., an extrinsic motivation) would detract from the intrinsic motivation which is one of the most important factors affecting voluntary behaviors.

Hypothesis 5 indicated that group identity would be positively related to the intention to share knowledge. The result shows that group identity does effectively enhance members' knowledge sharing intentions. The findings are consistent with Nahapiet and Ghoshal (1998) in that social identity nurtures one's motivation to share knowledge. VC members have a higher sense of group identity if they feel strongly that they belong to and are a part of the community. Therefore, having membership in a VC facilitates a higher sense of identity with that community, and the willingness to share knowledge increases, accordingly.

5.1 Implications for Research

Most past studies explored knowledge sharing in the VC context based on theories such as social exchange theory, social cognitive theory and social capital theory. This study adopted social identity theory, which has been used by only a few studies, as its research foundation in order to investigate the impact of several factors on knowledge sharing. This study provides another point of view from which academia can examine and better understand the mechanisms driving knowledge sharing behavior.

In this study, we argued that group identity plays a mediating role between knowledge sharing and the other factors. Through group identity, commitment and perceived organization support effectively enhance VC members' willingness to share knowledge. Future studies can explore other social factors, such as reputation and reciprocity, to have better understand of knowledge sharing in VCs.

Organizational support and rewards were found to effectively enhance members' willingness to share knowledge. The results are consistent with previous studies, and the findings confirm that these two factors have direct effects on knowledge sharing.

5.2 Implications for Practice

The results of this study's empirical analysis provide several important insights for VC managers interested in promoting knowledge sharing. First, rewards do not improve members' sense of group identity, even though they lead to a greater willingness of VC members to share knowledge. The effect is immediate, but not necessarily long lasting. VC managers should be careful how they use the incentive mechanism when promoting sharing. Second, members who have a higher level of commitment to the community have a greater willingness to share knowledge. Therefore, we recommend that VC managers who expect their members to share more knowledge develop an environment which promotes member commitment. Third, assistance or support from the VC has a dual effect. Members may not only increase their willingness to share knowledge, but also establish a stronger sense of group identity and community solidarity because of the VC's support. We recommend that, in order to increase members' willingness to share knowledge, VC managers give more support or assistance when members encounter problems.

5.3 Limitation and suggestions for future research

This study is subject to the following limitations. First, the study employed a self-assessment for knowledge sharing, which may not objectively reflect the real behavior of VC members. Future research should simultaneously employ subjective and objective assessment methods (e.g., by members collecting actual posting numbers in the community) to measure the actual sharing behavior. Second, our data was drawn exclusively from VC members. Future researchers may consider using data from enterprise members to gain more insight into the influence of group identity on the process of knowledge sharing. Finally, this study used social identity theory to explore the impact of group identity on the factors involved in knowledge sharing. Future research can incorporate other theories, or detect and use other factors.

References

- Ardichvili, A., Page, V. and Wentling, T. (2003). Motivation and barriers to participation in virtual knowledge-sharing communities of practice. *Journal of Knowledge Management*, 7 (1), 64-77.
- Argote, L., Beckman, S.L. and Epple, D. (1990). The persistence and transfer of learning in industrial settings. *Management Science*, 36 (2), 140-154.
- Ashforth, B.E. and Mael, F. (1989). Social identity theory and the organization. *The Academy of Management Review*, 14 (1), 20-39.
- Bagozzi, R.P. and Dholakia, U.M. (2002). Intentional social action in virtual communities. *Journal of Interactive Marketing*, 16 (2), 2-21.
- Bandura, A. (1986). *Social foundations of thought and action: A social cognitive theory*. Englewood Cliffs, NJ: Prentice Hall.
- Bergami, M. and Bagozzi, R.P. (2000). Self-categorization, affective commitment and group self-esteem as distinct aspects of social identity in the organization. *British Journal of Social Psychology*, 39 (4), 555-577.
- Bijlsma-Frankema, K. and Costa, A.C. (2005). Understanding the trust-control nexus. *International Sociology*, 20 (3), 259-282.
- Blau, P.M. (1964). *Exchange and power in social life*: Prentice Hall PTR.
- Bock, G.W. and Kim, Y.G. (2002). Breaking the myths of rewards: An exploratory study of attitudes about knowledge sharing. *Information Resources Management Journal*, 15 (2), 14-21.
- Cabrera, E.F. and Bonache, J. (1999). An expert HR system for aligning organizational culture and strategy. *Human Resource Planning*, 22 (1), 51-60.
- Chai, S., Das, S. and Rao, H. (2012). Factors affecting bloggers' knowledge sharing: An investigation across gender. *Journal of Management Information Systems*, 28 (3), 309-342.
- Child, J. (2001). Trust-the fundamental bond in global collaboration. *Organizational Dynamics*, 29 (4), 274-288.
- Chiu, C.M., Hsu, M.H. and Wang, E.T.G. (2006). Understanding knowledge sharing in virtual communities: An integration of social capital and social cognitive theories. *Decision Support Systems*, 42 (3), 1872-1888.
- Cho, Y.I., Martin, M.J., Conger, R.D. and Widaman, K.F. (2010). Differential item functioning on antisocial behavior scale items for adolescents and young adults from single-parent and two-parent families. *Journal of Psychopathology and Behavioral Assessment*, 32 (2), 157-168.
- Connelly, C.E. and Kelloway, E.K. (2003). Predictors of employees' perceptions of knowledge sharing cultures. *Leadership & Organization Development Journal*, 24 (5/6), 294-301.
- Cooper-Hakim, A. and Viswesvaran, C. (2005). The construct of work commitment: Testing an integrative framework. *Psychological Bulletin*, 131 (2), 241-259.
- Costigan, R.D., Ilter, S.S. and Berman, J.J. (1998). A multi-dimensional study of trust in organizations. *Journal of Managerial Issues*, 10 (3), 303-317.
- de Meeûs, T., Béati, L., Delaye, C., Aeschlimann, A., Renaud, F. and Ross, K. (2002). Sex-biased genetic structure in the vector of Lyme Disease, *Ixodes Ricinus*. *Evolution*, 56 (9), 1802-1807.
- Dewitte, S. and Cremer, D.D.E. (2001). Self-control and cooperation: Different concepts, similar decisions? A question of the right perspective. *The Journal of Psychology*, 135 (2), 133-153.
- Dholakia, U.M., Bagozzi, R.P. and Klein. (2004). A social influence model of consumer participation in network- and small-group-based virtual communities. *International Journal of Research in Marketing*, 21, 241-263.
- Eisenberger, R., Huntington, R., Hutchison, S. and Sowa, D. (1986). Perceived organizational support. *Journal of Applied Psychology*, 71 (3), 500-507.
- Ellemers, N., Kortekaas, P. and Ouwerkerk, J.W. (1999). Self-categorisation, commitment to the group and group self-esteem as related but distinct aspects of social identity. *European Journal of Social Psychology*, 29 (2-3), 371-389.
- Ellis, D.G. and Fisher, B.A. (1994). *Small group decision making: Communication and the group process* (4th ed.). New York: McGraw-Hill.
- Fan, Y.W., Wu, C.C. and Chiang, L.C. (2009). Knowledge sharing in virtual community: The comparison between contributors and lurkers. Paper presented at the 9th International Conference on Electronic Business, Macau.

- Gakovic, A. and Tetrick, L.E. (2003). Perceived organizational support and work status: A comparison of the employment relationships of part-time and full-time employees attending university classes. *Journal of Organizational Behavior*, 24 (5), 649-666.
- Gambetta, D. (1988). Can we trust trust? In D. Gambetta (Ed.), *Trust: Making and breaking cooperative relations* (pp. 213-238). New York: Basil Blackwell.
- George, D. and Mallery, P. (1999). *SPSS for windows step by step: A simple guide and reference*. Boston: Allyn and Bacon.
- Gibney, R.A.Y., Zagenczyk, T.J., Fuller, J.B., Hester, K.I.M. and Caner, T. (2011). Exploring organizational obstruction and the expanded model of organizational identification. *Journal of Applied Social Psychology*, 41 (5), 1083-1109.
- Golden, T.D. and Raghuram, S. (2010). Teleworker knowledge sharing and the role of altered relational and technological interactions. *Journal of Organizational Behavior*, 31 (8), 1061-1085.
- Han, T.-S., Chiang, H.-H. and Chang, A. (2010). Employee participation in decision making, psychological ownership and knowledge sharing: Mediating role of organizational commitment in taiwanese high-tech organizations. *The International Journal of Human Resource Management*, 21 (12), 2218-2233.
- Haslam, S.A., Postmes, T. and Ellemers, N. (2003). More than a metaphor: Organizational identity makes organizational life possible. *British Journal of Management*, 14 (4), 357-369.
- Hogg, M.A. (2003). Social identity. In M. R. Leary & J. P. Tangney (Eds.), *Handbook of self and identity* (pp. 462-479). New York: Guilford.
- Hogg, M.A. and Abrams, D. (1988). *Social identifications: A social psychology of intergroup relations and group processes*. London: Routledge.
- Hsu, C.L. and Lin, J.C.C. (2008). Acceptance of blog usage: The roles of technology acceptance, social influence and knowledge sharing motivation. *Information & Management*, 45 (1), 65-74.
- Hsu, M.H., Ju, T.L., Yen, C.H. and Chang, C.M. (2007). Knowledge sharing behavior in virtual communities: The relationship between trust, self-efficacy, and outcome expectations. *International Journal of Human-Computer Studies*, 65 (2), 153-169.
- Huber, G.P. (2001). Transfer of knowledge in knowledge management systems: Unexplored issues and suggested studies. *European Journal of Information Systems*, 10 (2), 72-79.
- Inkpen, A.C. (1998). Learning and knowledge acquisition through international strategic alliances. *The Academy of Management Executive*, 12 (4), 69.
- Ipe, M. (2003). Knowledge sharing in organizations: A conceptual framework. *Human Resource Development Review*, 2 (4), 337-359.
- Isa, R.M. and Ameer, R. (2007). Hedge fund performance and managerial social capital. *Journal of Risk Finance*, 8 (3), 246-259.
- Kane, A.A., Argote, L. and Levine, J.M. (2005). Knowledge transfer between groups via personnel rotation: Effects of social identity and knowledge quality. *Organizational Behavior and Human Decision Processes*, 96 (1), 56-71.
- Kelman, H.C. (1958). Compliance, identification, and internalization three processes of attitude change. *Journal of Conflict Resolution*, 2 (1), 51-60.
- Koh, J. and Kim, Y.G. (2004). Knowledge sharing in virtual communities: An e-business perspective. *Expert Systems with Applications*, 26 (2), 155-166.
- Kwok, J.S.H. and Gao, S. (2004). Knowledge sharing community in p2p network: A study of motivational perspective. *Journal of Knowledge Management*, 8 (1), 94-102.
- Law, S.P.-M. and Chang, M.K. (2008, December 14-17, 2008). Fostering knowledge exchange in online communities: A social capital building approach. Paper presented at the International Conference on Information Systems, Paris, France.
- Leonard-Barton, D. (1998). *Wellsprings of knowledge: Building and sustaining the sources of innovation*: Harvard Business School Press.
- Lin, C.P. (2007a). To share or not to share: Modeling tacit knowledge sharing, its mediators and antecedents. *Journal of Business Ethics*, 70 (4), 411-428.
- Lin, H.F. (2007b). Effects of extrinsic and intrinsic motivation on employee knowledge sharing intentions. *Journal of Information Science*, 33 (2), 135-149.
- Lin, H.-F. and Lee, G.-G. (2004). Perceptions of senior managers toward knowledge-sharing behaviour. *Management Decision*, 42 (1), 108-125.

- Ma, M. and Agarwal, R. (2007). Through a glass darkly: Information technology design, identity verification, and knowledge contribution in online communities. *Information Systems Research*, 18 (1), 42-67.
- MacNeil, C.M. (2004). Exploring the supervisor role as a facilitator of knowledge sharing in teams. *Journal of European Industrial Training*, 28 (1), 93-102.
- Mael, F.A. and Ashforth, B.E. (1995). Loyal from day one: Biodata, organizational identification, and turnover among newcomers. *Personnel Psychology*, 48 (2), 309-333.
- Marathe, J. (1999). Creating community online. available at <http://unpan1.un.org/intradoc/groups/public/documents/apcity/unpan003006.pdf>
- McEvily, S.K., Das, S. and McCabe, K. (2000). Avoiding competence substitution through knowledge sharing. *The Academy of Management Review*, 25 (2), 294-311.
- Meeus, W., Iedema, J. and Maassen, G.H. (2002). Commitment and exploration as mechanisms of identity formation. *Psychological Reports*, 90 (3), 771-785.
- Meyer, J.P. and Allen, N.J. (1997). *Commitment in the workplace: Theory, research, and application*. Thousand Oaks, CA: Sage Publications.
- Meyer, J.P., Allen, N.J. and Smith, C.A. (1993). Commitment to organizations and occupations: Extension and test of a three-component conceptualization. *Journal of Applied Psychology*, 78 (4), 538-551.
- Meyer, J.P., Stanley, D.J., Herscovitch, L. and Topolnytsky, L. (2002). Affective, continuance, and normative commitment to the organization: A meta-analysis of antecedents, correlates, and consequences. *Journal of Vocational Behavior*, 61 (1), 20-52.
- Mowday, R.T., Porter, L.W. and Steers, R.M. (1982). *Employee-organization linkages: The psychology of commitment, absenteeism, and turnover*. San Diego, CA: Academic Press.
- Muthusamy, V. (2009). Affective commitment, person-organization fit and turnover intention : Examining the effect of knowledge sharing.
- Nahapiet, J. and Ghoshal, S. (1998). Social capital, intellectual capital, and the organizational advantage. *Academy of Management Review*, 23 (2), 242-266.
- Nonaka, I. (1994). A dynamic theory of organizational knowledge creation. *Organization Science*, 5 (1), 14-37.
- Nonaka, I. and Takeuchi, H. (1995). *The knowledge-creating company: How Japanese companies create the dynamics of innovation*. New York: Oxford University Press.
- Noor, N.L.M., Hashim, M., Haron, H. and Aiffin, S. (2005). Community acceptance of knowledge sharing system in the travel and tourism websites: An application of an extension of TAM. In the Proceedings of the 13th European Conference on Information Systems (ECIS 2005), Regensburg, Germany.
- Nunnally, J.C. and Bernstein, I.H. (1994). *Psychometric theory*. New York: McGraw-Hill.
- O'Dell, C. and Grayson, C.J. (1998). If only we knew what we know: Identification and transfer of internal best practices. *California Management Review*, 40 (3), 154-174.
- Oh, S. (2012). The characteristics and motivations of health answerers for sharing information, knowledge, and experiences in online environments. *Journal of the American Society for Information Science and Technology*, 63 (3), 543-557.
- O'Reilly, C. and Chatman, J. (1986). Organizational commitment and psychological attachment: The effects of compliance, identification, and internalization on prosocial behavior. *Journal of Applied Psychology*, 71 (3), 492-499.
- Organ, D.W. and Ryan, K. (1995). A meta-analytic review of attitudinal and dispositional predictors of organizational citizenship behavior. *Personnel Psychology*, 48 (4), 775-802.
- Pastor, I.M.P., Santana, P.P. and Sierra, C.M. (2010). Managing knowledge through human resource practices: Empirical examination on the Spanish automotive industry. *The International Journal of Human Resource Management*, 21 (13), 2452-2467.
- Postmes, T., Tanis, M. and de Wit, B. (2001). Communication and commitment in organizations: A social identity approach. *Group Processes & Intergroup Relations*, 4 (3), 227-246.
- Riketta, M. (2005). Organizational identification: A meta-analysis. *Journal of Vocational Behavior*, 66 (2), 358-384.
- Ryu, S., Ho, S.H. and Han, I. (2003). Knowledge sharing behavior of physicians in hospitals. *Expert Systems with Applications*, 25 (1), 113-122.

- Sharkie, R. (2005). Precariousness under the new psychological contract: The effect on trust and the willingness to converse and share knowledge. *Knowledge Management Research & Practice*, 3 (1), 37-44.
- Sharratt, M. and Usoro, A. (2003). Understanding knowledge-sharing in online communities of practice. *Electronic Journal on Knowledge Management*, 1 (2), 187-196.
- Sparrow, P. and Cooper, C.L. (2003). *The employment relationship; key challenges for hr*: Butterworth-Heinemann.
- Tajfel, H. (1970). Experiments in intergroup discrimination. *Scientific American*, 223, 96-102.
- Tajfel, H. (1982). *Social identity and intergroup relations*. Cambridge: Cambridge University Press.
- Tajfel, H., Billig, M.G., Bundy, R.P. and Flament, C. (1971). Social categorization and intergroup behaviour. *European Journal of Social Psychology*, 1 (2), 149-178.
- Tajfel, H. and Turner, J.C. (1986). The social identity theory of intergroup behavior. In S. Worchel & L. W. Austin (Eds.), *Psychology of Intergroup Relations*. Chicago: Nelson-Hall.
- Taylor, E.Z. and Murthy, U.S. (2009). Knowledge sharing among accounting academics in an electronic network of practice. *Accounting Horizons*, 23 (2), 151-179.
- Teo, T.S.H., Nishant, R., Goh, M. and Aggarwal, S. (2011). Leveraging collaborative technologies to build a knowledge sharing culture at HP analytics. *MIS quarterly executive*, 10 (1), 1-18.
- Turner, J.C., Hogg, M.A., Oakes, P.J., Reicher, S.D. and Wetherell, M.S. (1987). *Rediscovering the social group: A self-categorization theory*. Oxford: Blackwell.
- van den Hooff, B. and de Ridder, J.A. (2004). Knowledge sharing in context: The influence of organizational commitment, communication climate and CMC use on knowledge sharing. *Journal of Knowledge Management*, 8 (6), 117-130.
- van den Hooff, B., Elving, W., Meeuwssen, J.M. and Dumoulin, C. (2003). Knowledge sharing in knowledge communities *Communities and technologies* (pp. 119-141): Kluwer, B.V.
- van Dick, R. (2004). My job is my castle: Identification in organizational contexts *International review of industrial and organizational psychology 2004* (pp. 171-203): John Wiley & Sons, Ltd.
- van Knippenberg, D. and Sleebos, E. (2006). Organizational identification versus organizational commitment: Self-definition, social exchange, and job attitudes. *Journal of Organizational Behavior*, 27 (5), 571-584.
- Wasko, M.M. and Faraj, S. (2005). Why should I share? Examining social capital and knowledge contribution in electronic networks of practice. *MIS Quarterly*, 29 (1), 35-57.
- Watson, S. and Hewett, K. (2006). A multi-theoretical model of knowledge transfer in organizations: Determinants of knowledge contribution and knowledge reuse. *Journal of Management Studies*, 43 (2), 141-173.
- Willem, A. and Buelens, M. (2007). Knowledge sharing in public sector organizations: The effect of organizational characteristics on interdepartmental knowledge sharing. *Journal of Public Administration Research & Theory*, 17 (4), 581-606.