

12-31-2007

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## Recommended Citation

Zheng, Jun and Kim, Hee-Woong, "Investigating Knowledge Contribution from the Online Identity Perspective" (2007). *ICIS 2007 Proceedings*. Paper 143.

<http://aisel.aisnet.org/icis2007/143>

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# INVESTIGATING KNOWLEDGE CONTRIBUTION FROM THE ONLINE IDENTITY PERSPECTIVE

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## Abstract

*Knowledge contribution is one of the essential factors for the success of virtual communities (VCs). Although there has been a great deal of research on knowledge management in organizational settings, there is a lack of understanding about the knowledge contributions of individual members in non-organizational settings, especially in VCs. This study examines the knowledge contribution of individuals in VCs from the online identity perspective based on social identity theory. Previous research on identity explains that human behavior is an activity for communicating the identity. This study tests the effect of personal and social aspects of online identity on knowledge contribution. The results indicate both personal and social aspects of online identity significantly affect knowledge contribution. This research contributes toward the understanding of online identity and its effect on knowledge contribution. This study also offers suggestions to VC organizers and Internet vendors for managing the online knowledge contributions of their members.*

**Keywords:** Knowledge contribution, online identity, virtual community, social identity theory

## Introduction

A lot of knowledge and information is exchanged through virtual communities (VCs). Blogs (i.e., web logs) also have been used as channels for knowledge sharing. Many Internet sites (e.g., yahoo.com, mspace.com, us.cyworld.com) provide blog functions to their members to facilitate knowledge sharing in VCs. According to Kubal (2006), the blogosphere doubles in size roughly every six months and is over 60 times larger today than it was only three years ago. Currently more than 75,000 new blogs are created every day (Kubal 2006).

One of the key activities of users in VCs and blogs is knowledge contribution. Knowledge contribution means “transferring and sharing of knowledge from one party to another” (Kumar and Thondikulam 2006). There are many knowledge contribution examples in VCs, such as posting recipes, providing new technology information, sharing investment information, and writing reviews on books and movies. The knowledge contribution activities of members in VCs and blogs have important implications for VC organizers and blog vendors as well as for other users who benefit from the contributed knowledge.

Dell Inc., the computer manufacturer, uses VCs to refine its products. Through an online customer forum, Dell accumulates knowledge from customers and identifies new trends as well as customer requirements. Dell improves their research and development activities and marketing activities based on the ideas contributed by their customers. Online travel agencies also capitalize on their users’ knowledge contributions to increase revenue. For example, TripAdvisor.com features reviews written by travelers and has a very active traveler forum. It is currently the largest global travel information and advice destination on the web. There are more than 5 million reviews and opinions

posted by TripAdvisor.com users. Other users' opinions and reviews become very important for customer decision making in this kind of web site. As more Internet vendors tap users' knowledge to enhance and strengthen their web sites and businesses, the online knowledge contribution of users becomes more important for vendors and for other users who benefit from the contributed knowledge. Therefore, one of the biggest challenges in fostering a virtual community is the supply of knowledge, that is, the knowledge contribution by the VC members (Chiu et al. 2006).

Much research has been done to study knowledge contribution behavior in organizational settings. It has been found that increased knowledge sharing can lead to improved organizational efficiency, innovation, flexibility, and learning (e.g., Alavi and Leidner 2001; Grover and Davenport 2001). However, online knowledge contribution behavior in VCs is different from that in organizational settings. In addition, Chiu et al. (2006) examined quantity and quality of knowledge sharing in a VC in terms of structural, relational, and cognitive dimensions together with outcome expectations. Because knowledge sharing includes knowledge gaining and knowledge contribution, knowledge sharing cannot explain the motivation of individual members in knowledge contribution specifically. Despite its central function, online knowledge contribution remains an under-addressed element in non-organizational settings like VCs (von Krogh 2003).

This study aims to examine the knowledge contribution of users in VCs. For this purpose, this study adopts an identity perspective based on social identity theory. Donath (1998) posits that it would be difficult to explain how one person is different and behaves differently from others without using identity. People's behavior further can be considered a means of communicating their identities (Leary 1995). However, people's online behavior (i.e., online knowledge contribution) is quite different from their behavior offline in daily life. Online space is a separate arena for people to explore and communicate their identities (Turkle 1997). This study proposes a construct, online identity, representing the identity established online. Specifically, this study seeks answers to two research questions: (1) What is online identity? and (2) How does online identity lead to people's knowledge contribution online?

This study contributes to IS literature, especially VC and knowledge contribution literature, in a number of ways. First, this study proposes a new construct, online identity, for explaining the identity established online in comparison with the offline identity. Second, it develops a conceptual framework of online identity to explain people's knowledge contribution in VCs based on social identity theory. Third, this study enhances our understanding about online knowledge contribution behavior based on empirical testing. Fourth, it offers practical insights for VC organizers by explaining what factors affect VC members' online knowledge contribution behavior.

## **Conceptual Background**

### ***Identity***

According to the Longman Dictionary of Contemporary English (2003), identity is defined as "qualities and attitudes you have that make you feel you have your own character and are different from other people." The Collins Cobuild English Dictionary for Advanced Learners (2003) defines identity as "who you are; the identity of a person or place is the characteristics they have that distinguish them from others." Ruyter and Conroy (2002) propose that identity is the dynamic configuration of the *defining* characteristics of a person. The term "defining" is used to indicate that identity does not comprise every aspect of the person, but only those aspects that people themselves, or others, regard as the characteristics that best represent them (Flanagan 1991).

Identity has been conceived as a unitary construct developed across a person's life-span (Erikson 1968). On the other hand, Mead (1925) and Harter (1998) argue that multiple identities are role-played, depending upon the situation. Different identities become prominent, dominant, and shown in different situations. In addition, Harter (1998) posits that identity is socially constructed and is communicated through linguistic exchanges and social interaction with others. Social interaction provides a social mirror through which individuals can see themselves through the eyes of others. In social interactions, role-playing allows people to understand and to adopt the attitude of other people in relation to their own identity (Mead 1925).

There are three phases in identity development (Fournier 1998): identity exploration, identity construction, and identity communication. Adams and Montemayor (1983) posit that the development of an identity would be initiated by a kind of feeling of crisis, a necessary turning point, a crucial moment, when development must move one way or

another, marshalling resources of growth, recovery, and further differentiation. From this moment onwards, people start exploring and comparing several alternatives until commitments can be made: identity exploration. After identity exploration, people engage in some kind of commitment to establish the identity: identity construction. Established identity consists of personal identity and social identity (Ashforth and Mael 1989). Personal identity is the continuous awareness of oneself (Baumeister 1998). Social identity is a person's knowledge that he or she belongs to a social category or group and an individual-based perception of what defines the "us" associated with any internalized group membership (Hogg and Abrams 1988). For the social identity formation, people adopt self-categorization and social comparison (Huddy 2001; Tajfel 1981). In self-categorization, people categorize objects, including people and themselves, in order to understand them. In social comparisons, individuals learn and assess themselves by comparing themselves to other people.

After establishing identity, people communicate and reinforce the current identity by behaving in ways that convey the identity (Leary 1995): identity communication. Communication of personal identity is achieved through linguistic markers including vocabulary, grammar, tone, and accent (Ekman and Keltner 1997); how we behave; the clothes we wear; what we buy; our body language; and our hobbies. Communication of social identity is achieved primarily through associations with people, club memberships, sports team affiliations, and the professional (work) groups people belong to. In VCs, people communicate their identities in multiple ways: joining some online groups, decorating their blogs with avatars, posting their knowledge on blogs and online forums, and managing relationships with others.

### ***Previous Research on Identity in Online Context***

Brooke et al. (2004) classified the concepts of identity into two types: (1) the individual characteristics by which a person or thing is recognized and (2) the state of having unique identifying characteristics held by no other person or thing. The first type of definition highlights recognition while the second type highlights the characterization of self. Similar to the two types of definition, previous research on online identity (including digital identity, virtual identity, and Internet identity) can be classified into two groups (see Table 1). The first group of research has discussed identity theft and developed ideas for identity management systems (Brooke et al. 2004; Josang et al. 2007; Madsen et al. 2005; Roussos et al. 2003; Satchell et al. 2006). Because identity management systems are developed to support multilateral security (Claub and Kohntopp 2001), our research is less relevant to the first branch of research.

The second branch of research has discussed unique identity and the relevant behaviors in the online context (Boyd et al. 2004; Millen and Patterson 2003; Turkle 1997; Vasalou et al. 2007; Walker 2000). Turkle (1997) notes the difference of identity in the Internet environment (i.e., digital identity) compared to identity in the offline context. That is, digital identity breaks from constraints of everyday life, allowing users to transcend the limits of the real world. Walker (2000) explores digital identity and interaction with reference to Internet home pages. He also discusses how people present their Internet identity on their Internet home pages through design and content. Millen and Patterson (2003) describe the online identity policy decisions (e.g., use of real-world identity) for a community network and its impact on creating social capital. Boyd et al. (2004) note that the performance of identity occurs primarily within the constraints of digital representations constructed by interactive systems in computer-mediated communication. That is, software-enabled visual or textual representations are used as substitutes in this context. Vasalou et al. (2007) explain that individuals tend to customize their avatars to portray their online identities in the Internet context. The reason is avatars emit individuating properties back to their owners and outwards to the community in the anonymous online context.

The literature review shows that previous research has used several similar terms, such as Internet identity (Walker 2000), digital identity (Boyd et al. 2004; Josang et al. 2007; Roussos et al. 2003; Satchell et al. 2006; Turkle 1997), virtual identity (Brooke et al. 2004), and online identity (Madsen et al. 2005; Millen and Patterson 2003; Vasalou et al. 2007). Among the several researchers, Roussos et al. (2003) conceptualize digital identity as the electronic representation of personal information of an individual or organization. Satchell et al. (2006) note that digital identity is the key by which we are able to communicate, interact, transact, share reputations, and create trusted relationships with people, businesses, and devices electronically. However, there is no clear discussion about the characteristics of online identity (including other terms). In addition, there is lack of understanding about the role of online identity in online behavior, especially online knowledge contribution. As people behave based on their identity or to represent their identity in the offline context, online identity would play a key role in leading to online behavior in the online context. Understanding the characteristics of online identity and its role in leading to online behavior would therefore add value to the literature.

**Table 1. Previous Research on Identity in Online Context**

Research	Use of Term	Context	Research Output
Boyd et al. (2004)	Digital identity	Internet environment	Discussed representations of digital identity.
Brooke et al. (2004)	Virtual identity	Multiplayer gaming	Virtual identity theft is a variant of impersonation whereby a player in the real world acquires control of avatars by hacking and other means.
Josang et al. (2007)	Digital identity	Identity mgt. systems	Proposed identity management architecture.
Madsen et al. (2005)	Online identity	Identity mgt. systems	Discussed the issue of identity theft in federated identity management.
Millen and Patterson (2003)	Online identity	Online community	Discussed online identity policy and its impact on creating social capital.
Roussos et al. (2003)	Digital identity	Mobile identity mgt. systems	Discussed mobile identity management and systems.
Satchell et al. (2006)	Digital identity	Identity mgt. systems	Federated identity management systems satisfy user needs by allowing the construction of multiple digital data sets.
Turkle (1997)	Digital identity	Internet environment	Digital identity breaks from constraints of everyday life, allowing users to transcend the limits of the real world.
Vasalou et al. (2007)	Online identity	Internet environment	Found that users tend to customize their avatars to portray their own characteristics.
Walker (2000)	Internet identity	Homepage	Discussed the presentation of self on Internet home pages.

## Theoretical Development

### *Social Identity Theory*

Social identity theory provides a theoretical lens to explain the influence of identity on behavior. Social identity theory is formed by Tajfel and Turner (1986) based on Tajfel's (1981) work. There are three elements in this theory: (1) categorization, which is the process by which we often put ourselves and others into categories (e.g., students, professionals, housewives) to show identity, (2) identification, which is the process by which we associate with certain groups to bolster our self-esteem, and (3) comparison, which is the process by which we compare our groups with other groups, seeing a favorable bias toward the group to which we belong.

In the social identity theory, Tajfel (1981) first proposes that personal identity and social identity coexist. Personal identity is derived from individual personality traits and interpersonal relationships. It is the categorization of the self as a unique entity, distinct from other individuals (Baumeister 1998). It involves attributes, skills, beliefs, and so on specific to the individual. Personal identity thus derives from self-knowledge of an individual's personality traits and a belief in the uniqueness of the self. On the contrary, social identity is derived from belonging to a particular group. Social identity is an individual-based perception of what defines the "us" associated with any internalized group membership; it is a person's knowledge that he or she belongs to a social category or group (Hogg and Abrams 1988). Social identity thus serves to distinguish the self and members of the same group from members of another group.

Social identity theory holds that personal identity influences people's behaviors via the process of being a unique entity, and social identity influences people's behavior via the process of categorization and comparison. When personal identity is salient, an individual's needs, standards, beliefs, and motives primarily determine behaviors (Stets and Burke 2000). When people's social identity is activated, people come to see themselves more as exemplars of a social category through self-categorization and comparison (Turner et al. 1987). Under these conditions, collective needs, goals, and standards primarily determine behavior (Verkuyten and Hagendoorn 1998).

However, both personal identity and social identity can be salient at the same time with no one identity dominating the other, and yet the individual is still able to function in a coherent manner.

### **Online Identity**

In the physical world, there is an inherent unity to the self as one body corresponds to one particular identity (Donath 1998); without identity, we have no way of explaining how we differ from other human beings (MacLeod 1999). According to Bailenson and Beall (2005) and Huffaker and Calvert (2005), formation of an offline identity is tedious and requires much time and effort. Possessions and proximal objects are tools for identity communication, and their use requires physical presence. In addition, the self-definition and self-presentation of offline identities are affected by factors beyond our control (e.g., race, class, age, and gender). It is not easy to hide certain aspects of offline identity. Schau and Gilly (2003) and Bargh et al. (2002) posit that images people portray as offline identities are constrained by the physical situation and practical condition.

However, the Internet has provided a new context for identity exploration and development. The virtual world offers a flexible and potentially anonymous venue in which to explore a complex set of relationships (Turkle 1997). For example, an individual who is shy offline can form different characteristics and show aggressive behaviors in the online context. Also, an individual who does not join groups offline for several reasons could readily join groups online. Forming an online identity is relatively easier and requires less time and effort compared to forming an offline identity. More digital means, such as digital association, can be used to express online identity, and people can easily select the image they want to portray. An identity established online is not necessarily tied to the identity of the person offline (Calvert 1999). We believe identity established online accounts for people's behavior online. Therefore, this study proposes a new construct – online identity – to represent the identity established online. Following Ruyter and Conroy's (2002) definition of identity, we define online identity as *a configuration of the defining characteristics of a person in online space*.

As explained by social identity theory (Tajfel and Turner 1986) and other identity studies (Ashforth and Mael 1989; Hogg and Abrams 1988), identity includes both personal identity and social identity. Therefore, online identity also includes both social and personal aspects -- online social identity and online personal identity. Tajfel (1978) maintains that social identity is the part of individuals' identity which derives from their knowledge of their membership in a social group (or groups) together with the value and emotional significance attached to that membership. In online spaces, such as VCs, members also form groups, make friends and subsequently develop identities in line with the characteristics of the focal online group (Koh and Kim 2003). Therefore, following the definition of social identity proposed by Tajfel (1978), online social identity is defined as *the part of the individual's identity derived from his or her knowledge of his or her membership in an online social group (or groups) together with the value and emotional significance attached to that membership*.

Hitlin (2003) holds that personal identity is a sense of self built up over time as the person embarks on and pursues projects or goals that are not thought of as those of a community, but as the property of the person. Personal identity thus emphasizes a sense of individual autonomy rather than communal involvement. In the online context, it is exactly the same. Very often we see a few active members contributing most of the postings in VCs, even though other members value their memberships as much as those active members do. Therefore, online personal identity is an important aspect of a person's online identity. In this study, we term a personal identity established online as an online personal identity. Following Hogg and Abram's (1988) definition of personal identity, an online personal identity is defined as *a set of idiosyncratic traits and personality characteristics that the person has in online space*.

### **Conceptual Framework**

Based on the previous discussion, we place the three identity development steps into the conceptual framework for online identity development. In this study, we focus mainly on identity construction (i.e., online identity) and identity communication (i.e., online identity behavior) because identity exploration also can be understood as a trial of the "temporary identity" via identity construction and identity communication to see whether the "temporary identity" is desirable or suitable to the particular person.

According to the social identity theory (Tajfel and Turner 1986), when individuals perceive themselves to be members of the social category, they share an emotional involvement in this common definition of themselves, and achieve some degree of social consensus about the evaluation of their group and their membership. In addition, Ellemers et al. (1999) posit that social identity consists of a cognitive, an evaluative, and an emotional component. It

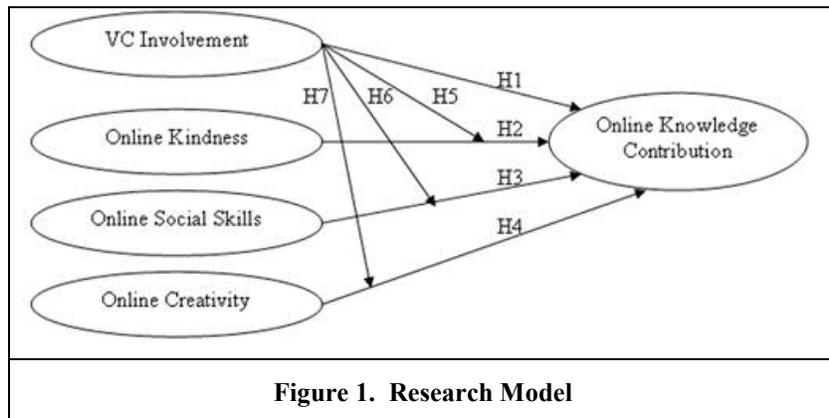
is found that the emotional component (i.e., involvement in the group) is the most important factor determining social identity (Bagozzi and Lee 2002). At the same time, in the literature of people’s behavior in offline groups, group involvement is defined as a state of motivation, arousal, or interest toward the focal group. It is also shown to be an indicator of an individual’s attachment and sense of belonging to the particular offline group (Havitz and Dimanche 1997) to measure their social identity. This study identifies *VC involvement* to measure the online social identity.

Hitlin (2003) argues that values form the core of personal identity. Values are “desirable trans-situational goals, varying in importance, that serve as guiding principles in the life of a person or other social entity” (Hitlin 2003, p. 119). Therefore, values could be used to represent the personal identity. As a result, in the online context, we propose to measure online personal identity from the values which people have online. Scott’s (1965) work on values gives us insight in this study. Scott (1965) proposes 12 main personal values that best describe a person’s personality. Based on the literature (Andreoni 1995; MacDonald et al. 1998; Hirschman 1980), out of the 12 personal values, five values (kindness, social skills, intellectualism, status leadership, and creativity) might be related to the knowledge contribution behavior. Of the five values, three values (creativity, leadership, and intellectualism) are loaded together on one construct, the self-actualizing factor (Chamberlain 1985). This implies they share the same underlying meaning. Our study measures creativity on behalf of the self-actualizing factor. Based on the discussion above, in view of the prominent online knowledge contribution behavior, this study selects *online kindness*, *online social skills* and *online creativity* as the defining values in online personal identity. We will discuss how these online social identity and online personal identity factors affect online knowledge contribution by developing the research model and hypotheses in the next section.

## Research Model and Hypotheses

Based on the theoretical background and conceptual discussion above, we propose the research model shown in Figure 1. Following the concept of group involvement (Havitz and Dimanche 1997), this study defines VC involvement as *a state of motivation, arousal, or interest toward the focal VC*. VC involvement indicates the level of members’ attachment and sense of belonging to the particular VC (Havitz and Dimanche 1997). The higher the involvement in a VC, the stronger the member’s attachment to it. When members are highly attached to the group, they will perceive that the participation and other online activities are essential to them, and thus they will develop a greater intent to patronize the VC (Kyle et al. 2003). Being part of the VC will motivate members to spend more effort in the VC and to actively contribute knowledge to the focal VC to benefit the VC and other VC members. In addition, when members’ involvement level is high and they feel they are part of the VC, they tend to value social interactions with other group members more. Thus, they will be less hesitant to share knowledge to help other group members when their involvement level is high. Hence, we hypothesize,

**H1:** VC involvement has a positive effect on knowledge contribution.



Following the definition of kindness (Scott 1965), this study defines online kindness as *the degree to which one is concerned about the happiness of other people in the VC*. Kindness is regarded as a traditional virtue in many

cultures, and it is also central to many religious traditions. Thus, Andreoni (1995) finds it is not uncommon that some people help others for their own benefit. However, in many cases, the reason people carry out helping behaviors and other pro-social behaviors is not for tangible benefits. Rather, it is out of kindness. In addition, kindness corresponds to a large body of evidence from privately provided public goods, like charitable giving. Therefore, kind members in VCs are more concerned about others' happiness. They are willing to sacrifice some personal benefit for others' interest. When other VC members need some help, they will usually post replies (i.e., knowledge or ideas) in the community. Kind members will actively contribute their knowledge to others by replying to the posts. Other research argues that kind people in a community contribute a great deal more to the community than those people who are not kind (Kurzban and Houser 2001). Hence, we hypothesize,

**H2:** Online kindness has a positive effect on knowledge contribution.

Following the definition of social skills (Scott 1965), this study defines online social skills as *the degree to which a person is able to get along with all kinds of people in the VC*. MacDonald et al. (1998) propose that social skills influence, to a large extent, the interaction and communication in the community. MacDonald et al. (1998) find that enhancing social skills increases people's ability to establish and maintain social relationships. A member's large social network implies that he or she has many friends in the community. As a result, when help is needed, a member will be more willing to contribute his or her knowledge to help gain some goodwill in the community. MacDonald et al. (1998) also find social skills increase the ease of getting a message across to the other parties in an offline community. Thus, members with high social skills will have less trouble sharing knowledge with other people. Consequently, they will feel contributing knowledge is easy and comfortable. Therefore, they will be more willing to contribute knowledge when they have a high level of social skills. Hence, we hypothesize,

**H3:** Online social skills have a positive effect on knowledge contribution.

Following the definition of creativity (Scott 1965; Midgely and Dowling 1978), this study defines online creativity as *the degree to which an individual is receptive to new ideas and makes innovative decisions independently of the communicated experience of others in the VC*. Hirschman (1980) posits that a person's creativity is immediately relevant to people's behavior. According to marketing literature, creativity can cause more positive intentions toward the use of an innovation in that domain (Agarwal and Prasad 1998). When members need help, it is more likely that creative members will offer solutions. With solutions on hand, it is also more likely for them to contribute knowledge to others in a VC. Agarwal and Prasad (1998) also mention that creative people require fewer positive perceptions to support the same level of usage intentions of innovations than an individual who is less creative. This shows their adaptability to new things and a new environment is high. As a result, creative people will feel more comfortable dealing with other members in a VC even when they are not yet acquainted. Consequently, creative people might contribute more knowledge in VCs compared to less creative people because less creative people might feel uncomfortable sharing knowledge with others. Hence, we hypothesize,

**H4:** Online creativity has a positive effect on online knowledge contribution.

According to social identity theory, an online personal identity can lead to various online behaviors regardless of the online social identity. That is, when the level of VC involvement is low, online behaviors could be influenced separately by the online personal identity in the VC. On the other hand, VC involvement initiates and manages the self-categorization process and helps to establish a person's social identity, as explained before. Categorizing oneself as a group member shifts the self-concept to bring it in line with the characteristics of the focal group. People become assimilated to the social identity of a specific group as their level of involvement in the group increases (Hogg and Terry 2000). Previous research also has found interaction between personality traits and social identity (Frissbie et al. 2000). As the level of involvement changes, the effect of personal identity on online behaviors changes.

When a member's VC involvement is high, he or she tends to have more interactions with other members. In this way, the member's relationship deepens. As a result of closer relationships, kind members become more willing to contribute knowledge and help others, even when they need to sacrifice more in terms of time, effort and so on. Therefore, the effect of online kindness on online knowledge contribution would become stronger for those who have a higher level of VC involvement than for those who have a lower level of VC involvement. Hence, we hypothesize,

**H5:** VC involvement moderates the effect of online kindness on online knowledge contribution.

Similarly, when people have high social skills, they tend to get along with all kinds of people easily and they communicate well with others. MacDonald et al. (1998) argue that social skills increase the number of people in a member's social network. Consequently, members will have a bigger network. Thus, when their involvement is high in a particular VC, it might mean they already know a lot of people in the focal VC. It implies that their commitment to the focal VC and to their friends becomes stronger (Kyle et al. 2004). In this way, when the commitment is stronger, members would have more motivation to contribute knowledge to the focal VC. Therefore, the effect of online social skills on online knowledge contribution would become stronger for those who have a higher level of VC involvement than those who have a lower level of VC involvement. Hence, we hypothesize,

**H6:** VC involvement moderates the effect of online social skills on online knowledge contribution.

When a member's VC involvement is high, he or she tends to have more interactions with other members. In this way, the member's relationship deepens. As the level of VC involvement increases, creative members will have more commitment to the VC and display more pro-social behaviors (Kyle et al. 2004). In this way, when commitment becomes stronger, members with online creativity would have more motivation to contribute knowledge in the focal VC. Therefore, the effect of online creativity on online knowledge contribution would become stronger for those who have a higher level of VC involvement than for those who have a lower level of VC involvement. Hence, we hypothesize,

**H7:** VC involvement moderates the effect of online creativity on online knowledge contribution.

## **Research Methodology**

We used the survey methodology to collect data for testing the hypotheses. For the survey, we chose a VC, cyworld.com (us.cyworld.com). Similar to myspace.com, this VC is a community of relationships, interest, and transactions. In this VC, members create blogs, interact with others, and join online groups. Furthermore, they can decorate their blogs by purchasing digital items (e.g., avatars) in this VC. Members can post their ideas and knowledge to their blogs. They can also contribute to their online groups by posting their knowledge to the forums in the VC. Cyworld.com has more than 20 million members around the world and thus provides a good context for this study. In addition to the survey data, we also conducted interviews using online chatting and emails with more than fifty users of the VC to gain more in-depth information and assist in the interpretation of survey results. Because of space limitations, we do not report the interview results in this paper.

For the measurement instrument, we adopted existing validated scales and empirical procedures wherever possible. Scales for VC involvement were modified from Kyle et al. (2004) to the context of the VC. To measure online kindness, online social skills, and online creativity, we adapted scales from Scott (1965) by considering the VC context. To measure online knowledge contribution, we adapted scales from Igbaria et al. (1996).

Given that the items for measuring the constructs were adapted from various sources for the study, all of the measurement items were subjected to a two-stage conceptual validation exercise. After a successful sorting exercise, two IS professors were engaged to look into the items again; they further fine-tuned the items and the sequence of the questions for the survey questionnaire. Feedback on the questionnaire was gathered from 10 members of the focal VC with regard to any ambiguity in the wording of the questions, the length of the instrument, the format of the scales, and the information to be sought from respondents. The measurement items were anchored on the 7-point Likert scale (1 = strongly disagree, 7 = strongly agree). The final measurement items are presented in the Appendix.

We collected empirical data for this study via an Internet survey conducted over four weeks. We randomly selected about 2,000 members of cyworld.com by using the member search function of the VC. We then sent survey invitation emails to them together with the URL of the survey web site. To improve the response rate, US\$5 was offered to every respondent as an incentive. We also assured the respondents about the confidentiality of their responses. Further, we informed them that there were no right or wrong answers and requested that they answer each question as honestly as possible.

A total of 215 respondents participated in the survey. Out of the 215 responses, there were 185 valid responses for our data analysis (male: 82, female: 103). The descriptive statistics of the sample indicate that the majority of respondents were between 15 and 29 years of age (65.2%): mean = 22.9, s.d. = 7.1 (< 19: 37.8%, 20-29: 44.9%, >30: 17.8%). Most of them were undergraduate students (25.9%), professionals (20.5%), or high school students (20.0%). They had experienced the focal VC for 3.07 years on average (s.d. = 1.67). They had experienced the Internet for 7.75 years on average (s.d. = 2.39).

## Data Analysis and Results

To validate the survey instrument, we first performed exploratory factor analysis (EFA). For EFA, we examined the data using principal component analysis with varimax rotation using SPSS. All the items loaded on distinct factors with eigenvalues greater than 1.0 and explained 79.59% of the total variance. The results of factor analysis indicate that the conditions of convergent and discriminant validity are satisfactorily met. The scales also show good reliability with Cronbach’s alphas greater than the recommended 0.70 level (Nunnally 1978). Table 2 provides the correlations between all the constructs. The square root of average variance extracted (AVE) for each construct (diagonal term) exceeded the correlations between the construct and other constructs (off-diagonal terms). Hence, discriminant validity of the instrument was established.

Construct	Mean (Std. Dev.)	INV	KIN	SOC	CRE	KNO
INV	4.51 (1.58)	<b>0.82</b>				
KIN	4.43 (1.25)	0.59	<b>0.74</b>			
SOC	4.56 (1.43)	0.52	0.55	<b>0.80</b>		
CRE	4.32 (1.52)	0.58	0.62	0.58	<b>0.80</b>	
KNO	4.37 (1.56)	0.53	0.50	0.58	0.53	<b>0.80</b>

Note: Leading diagonal shows the squared root of average variance extracted (AVE) of each construct

To test the individual moderator hypotheses, hierarchical moderated multiple regression (HMMR) is used because this method appears to be the preferred statistical method for examining moderator effects when either the predictor or the moderator variable is measured on a continuous scale. The results are shown in Table 3. The first step is to test the effects of control variables on online knowledge contribution. The second step is to test the effects of main factors on online knowledge contribution. This study found that three factors (online involvement, online social skills, and online creativity) have significant effects on online knowledge contribution, explaining 40.7% of the variance. It found online kindness has an insignificant effect on online knowledge contribution. Therefore, H1 (VC involvement), H3 (online social skills), and H4 (online creativity) are supported while H2 (online kindness) is not supported.

Variable	Control	Main	Full
Age	-.10	.03	.02
e-Shopping Experience	.06	-.01	-.01
Gender	.02	.08	.08
Profession	-.09	.03	.05
Internet Experience	-.14	-.02	-.03
Cyworld Experience	.10	.02	.02
INV		.20**	.22**
KIN		.10	.09
SOC		.34***	.33***
CRE		.16*	.16*
INV * KIN			.13†
INV * SOC			-.03
INV * CRE			-.15†
R <sup>2</sup>	.046	.453	.467
ΔR <sup>2</sup>		.407	.014
F Value		32.37***	1.50*

†: p < 0.1, \*: p < 0.05, \*\*: p < 0.01, \*\*\*: p < 0.001

The third step of HMMR analysis is to test the full model by adding interaction terms to the main model. Before fitting the data into a regression model, we standardized the interaction terms. This procedure is intended to reduce problems associated with multicollinearity among variables in the regression equation, which are common in models including both main effects and interaction terms. This study found the significant increase of  $R^2$  in the full model compared to the main model ( $\Delta R^2 = 0.14$ ,  $F=1.5$ ,  $p < 0.05$ ). The results reveal that the VC involvement moderates the effect of online kindness on online knowledge contribution ( $\beta = 0.139$ ) and of online creativity on online knowledge contribution ( $\beta = -0.152$ ). However, the significance level is marginal ( $p < 0.1$ ). Therefore, H5 (the moderating effect of VC involvement on the relationship between online social skills on online knowledge contribution) and H7 (the moderating effect of VC involvement on the relationship between online creativity on online knowledge contribution) are supported while H6 (the moderating effect of VC involvement on the relationship between online social skills on online knowledge contribution) is not supported.

## **Discussion**

### ***Discussion of Findings***

There are several salient findings of this study. The first finding is that VC involvement corresponding to online social identity has a significant effect on online knowledge contribution. From the social identity theory perspective (Verkuyten and Hagendoorn 1998), it shows that online social identity influences the online behavior (i.e., online knowledge contribution) significantly. Prior research also shows that involvement is very likely to translate into commitment to the community and its members (Kyle et al. 2004). When the involvement goes up, commitment to the focal VC and to the members in the VC will be stronger. As a result, members will participate in the focal VC more actively and have pro-social behavior toward the VC. With pro-social behavior toward the online group, individuals contribute knowledge more to the community.

The second finding is that two factors (online social skills and online creativity) corresponding to online personal identity have significant effects on online knowledge contribution. This finding is also consistent with the argument of social identity theory (Stets and Burke 2000): personal identity leading to behavior. As the first factor, online social skills are significantly related to online knowledge contribution. This finding is consistent with the findings of Han et al. (2007). Members with high social skills will find it is easy to communicate with others online. Consequently, members will find contributing knowledge to others and helping others is natural to them. As the second factor, online creativity is significantly related to online knowledge contribution. Chamberlain (1985) categorizes creativity as a self-actualizing factor that encourages members to come out with new ideas and get them disseminated. When people have high creativity, they are more likely to generate new ideas and have more resources to share with others. Consistent with the findings of Chamberlain (1985), VC members with high creativity in the VC are self-motivated to generate new ideas and contribute them to the VC.

The third finding is that VC involvement has a moderating effect on the relationship between online kindness and online knowledge contribution, although online kindness as a corresponding factor of online personal identity does not have a significant effect on online knowledge contribution. One possible explanation for the insignificant effect is that kindness itself is not enough to warrant knowledge contribution behavior because it is not uncommon that people might feel shy and uncomfortable talking to strangers. People need to have motivations other than kindness to carry out a helping behavior like knowledge contribution. For example, people in an unfamiliar environment might tend to have reservations about putting in effort. This explanation is supported by the result of the moderating effect of VC involvement on the relationship between online kindness and online knowledge contribution behavior. This study found individuals with higher online kindness contributed more knowledge online in the VC as they had a higher level of VC involvement. This is consistent with prior research (Frissbie et al. 2000), which found the interaction effect between personality traits and social identity.

Our next finding is that VC involvement has a moderating effect on the relationship between online creativity and online knowledge contribution. However, VC involvement has a negative moderating effect on the relationship: individuals with higher online creativity contribute less knowledge in the VC as their level of VC involvement increases. One possible reason is that creative people are constantly looking out for new ideas (Hirschman 1980). Creative people are more interested in new and challenging environments that might give them the chance to try out new things. Thus, when their VC involvement level is high in a particular VC, those creative members might already be very familiar with and accustomed to the environment. As a result, they may start looking for new environments.

Consequently, their motivation to contribute knowledge to the current community might drop. Therefore, when VC involvement is high, members with creativity might not want to contribute as much knowledge as they did before.

This study found no significant moderating effect of VC involvement on the relationship between online social skills and online knowledge contribution. One possible explanation is that the effect of online social skills on online knowledge contribution is so strong that the moderating effect of VC involvement appears to be insignificant. MacDonald et al. (1998) propose that social skills are important in social interaction, which might influence the knowledge contribution behavior. However, the strength of social skills is seldom discussed. From our research, we found that people with social skills can easily communicate and get along with all kinds of people. Therefore, it does not matter whether they have a higher level or a lower level of VC involvement. They could easily carry out the helping behavior regardless of their involvement level. VC involvement thus does not have a significant moderating effect on the relationship between social skills and knowledge contribution behavior.

### **Limitations**

The results of this study must be interpreted in the context of its limitations. First, the data for this study were collected from members of a single general VC. It would be useful to replicate this study across a variety of VCs and online groups. Future study can also select a specific type of VC (e.g., travel knowledge sharing VC) for the testing. Second, this study identified VC involvement and three other values as corresponding factors of online social identity and online personal identity. While this study selected only three types of values regarding online personal identity, there are other types of general values. Future study could identify and test the other factors. Third, there could be other factors (e.g., VC characteristics) motivating online knowledge contribution in addition to online identity. Future study needs to identify the other factors and test their effects. Next, we used a 7-point Likert scale for independent variables and moderators. A possible improvement is to ask respondents to give a number from 1 to 100 to indicate their options. This would improve the power of the test. Finally, although anticipated and prepared for, common method variance might still affect the validity of the findings. However, Harman's single-factor test indicated that our data do not suffer from common method variance.

### **Implications and Conclusions**

This research offers several implications for theory and practice. From the theoretical perspective, this study has examined online knowledge contribution from the online identity perspective based on social identity theory. People behave so as to communicate their identities (Leary 1995). Thus, identity leads to human behavior. It is one of the first studies systematically looking into identity exploration, identity formation, and identity communication in the context of VCs. Online identity has provided more insight into understanding online behavior, especially online knowledge contribution.

This study highlights another key theoretical implication in terms of social identity theory. This theory was developed for explaining the development of identity and the sub-types of identity (Tajfel 1981; Tajfel and Turner 1986) and the subsequent behaviors (Stets and Burke 2000; Verkuyten and Hagendoorn 1998). As an extension of previous research, this study has demonstrated how social identity theory can be applied in IS research to explain online knowledge contribution in the context of VCs. It has helped develop a new construct of online identity, classifying online identity into online social identity and online personal identity, and identified corresponding factors in the context of VCs. It has also helped explain how the identified factors affect online knowledge contribution.

The findings of this study highlight the salient role of VC involvement in determining members' online knowledge contribution from the social identity perspective. This study also highlights the salient roles of online creativity and online social skills as the antecedents of online knowledge contribution from the personal identity perspective. Further, this study finds the positive moderating effect of VC involvement on the relationship between online kindness and online knowledge contribution, and the negative moderating effect of VC involvement on the relationship between online creativity and online knowledge contribution. The study thus contributes towards a richer understanding of online knowledge contribution from the online identity perspective.

From the practical perspective, this study shows a member's VC involvement is of vital importance to his or her online knowledge contribution. Therefore, VC organizers need to further increase the stickiness of VCs so that members will have a higher involvement level, which leads to more knowledge contribution. To enhance the level of VC involvement, VC providers need to improve the usefulness of the VC and provide a pleasurable usage

experience to users (Gupta and Kim 2007). VC organizers also could actively organize and initiate interesting discussions among the members so that members will stick to the VC and be more easily integrated into the community, which might potentially improve members' involvement levels.

This study also shows that a member's social skills are very important characteristics that encourage online knowledge contribution in VCs. VC organizers should pay special attention to members who are less socially skillful. Because online social skills are not necessarily the same as offline social skills, VC organizers could better formulate strategies to improve members' online social skills so that even less socially skillful people could find a way to communicate well with others in the online space. For example, VC organizers could provide more guidelines or online tutorials to educate members on how to use the tools provided to decorate blogs, or on how to showcase their interests and hobbies to attract others to interact with them. In addition, VC providers can organize more online and offline meetings to encourage and facilitate interaction among members. In this way, VC providers could help members improve social skills and build self-esteem.

This study also shows how creative members can become doubled-edged swords for VCs. If VC organizers manage creative members well, such members will contribute a lot of new ideas to the community and, in turn, attract others and enlarge the knowledge pool. If VC organizers cannot manage them well, however, the more creative members might migrate to competing VCs. Therefore, VC organizers could consider providing new experiences and organizing more competitions like "best blog design" competitions or "best Valentine's Day greetings" together with rewards to keep members' – especially creative members' – attention. For example, cyworld.com publicizes the ratings of each blog and, from time to time, it also organizes competitions like best blog design and best design of community photos. In this way, creative members in VCs will be kept interested in the focal VC and will continue to participate actively. Their innovative ideas will definitely attract many more others.

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## Appendix: Measurement Instrument

Construct	Item	Wording	Reference
VC Involvement	INV1	I really like participating in this VC.	Kyle et al. (2004)
	INV2	Participating in this VC is one of the most enjoyable things I do.	
	INV3	Participating in this VC is pleasurable to me.	
	INV4	Participating in this VC is important to me.	
Online Kindness	KIN1	I am a person who is concerned about others in this VC.	Scott (1965)
	KIN2	I am a person who helps others to achieve their goals in this VC.	

	KIN3	I am a person who pays attention to the needs of other people in this VC.	
	KIN4	I am a person who helps others feel happy in this VC.	
Online Social Skills	SOC1	I am a person who is sociable in this VC.	Scott (1965)
	SOC2	I am a person who is able to get along with all kinds of people in this VC.	
	SOC3	I am a person who is skillful in developing social relationships in this VC	
Online Creativity	CRE1	I like to experiment with new ways of doing things in this VC.	Scott (1965)
	CRE2	I often try new things in this VC.	
	CRE3	I like to try different things in this VC.	
	CRE4	I am original in my thought and ways of looking at things in this VC.	
Online Knowledge Contribution	KNO1	I contribute my knowledge often to others in this VC.	Igbaria et al. (1996)
	KNO2	I post my knowledge often in this VC.	
	KNO3	I share my knowledge often in this VC.	