Interpersonal Relationship needs in virtual communities and virtual worlds: When Virtual Participation Explained as Self-Expression

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Abstract

This paper aims at exploring motivations driving virtual community and virtual world members' participation—virtual participation. The expression theory and interpersonal relationship perspective is introduced as a framework through which to explore the participation of virtual world members, using a interpersonal relationship model—the Fundamental Interpersonal Relationship Orientation (FIRO) model (Schutz, 1966, Schutz, 1958). Specifically, the paper attempts to explain that members desiring to expression them and fulfill their interpersonal relationship needs in both virtual communities and virtual worlds. Specifically, two main types of virtual involvement behavior, Behavior to Obtain Information (BOI) and Behavior to Give Information (BGI) are investigated. The data were collected from two virtual communities—Microsoft Chinese Community and the Xilu Communityand a virtual world—Cyworld and analyzed with ANOVA for the FIRO model. The results show that the interpersonal relationship model can explain virtual participation. At the same time, members are more expressive in virtual worlds than in virtual communities.

Keywords: *virtual communities, virtual worlds, self-expression, interpersonal relationship, FIRO*

Introduction

One of the most exciting aspects of the Internet development is the wide spread and diffusion of various social computing related technologies into the society level. Technologies such as BBS, forums, virtual communities in the very earlier days, a series of social networking technologies including virtual worlds, Facebook, Linked-In, and the more recently emergently web intelligence and mobile computing technologies are transforming the whole society into a digitalized world. Technology and people intertwine to such a degree that the boundary between these two are blurred. That's why many business could easily utilize these social computing technologies for the purpose of marketing expansion (Kozinets, 1999), customer services provision (E. Y. Kim & Kim, 2004), customer loyalty retention (E. Y. Kim & Kim, 2004), brand building (McWilliam, 2000), and business transaction support (Hagel & Armstrong, 1997; F. T. Rothaermel & S. Sugiyama, 2001) in virtual communities and branding and marketing (Hemp, 2006; Papagiannidis, Bourlakis, & Li, 2008; Stuart & Jan, 2008), business training and education (Briggs, Dennis, Beck, & Nunamaker Jr, 1993), virtual collaboration (Surinder, Elizabeth, & Rebecca, 2007), game industry (Jin & Chee, 2008), and the potential business model called virtual commerce (Arakji & Lang, 2008; Papagiannidis, et al., 2008) in virtual worlds. Within the organization, these social network based technologies provide opportunities for employees to share knowledge, promote innovation, and increase the adoption rate of the information technologies (Sykes, Venkatesh, & Gosain, 2009). Many large companies even decided to setup the social network-based platforms to facilitate either employees' interaction or customers' communication (such as Cisco's purchase of Five Cross and IBM's setup of innovative social computing software).

Among all these social network-based technologies, the participation behavior, defined as users' various level of involvement in these virtual environments has been investigated by a bundle of researchers (Ardichvili, Page, & Wentling, 2003; Bishop, 2007; Anita L. Blanchard & Markus, 2004; Chen, 2007; Dholakia, Bagozzi, & Pearo, 2004; Ewing, 2008; Gensollen, 2006; Hall &

Graham, 2004; Koh, Kim, Butler, & Bock, 2007; Preece, Nonnecke, & Andrews, 2004; Wasko & Faraj, 2000, 2005; Wiertz & de Ruyter, 2007). Various participation behaviors together with the importance of all these participation behaviors have been identified out in various virtual environments, for instance, virtual community participation behavior was regarded as the key to sustain the operation of virtual communities (Hagel & Armstrong, 1997; Wasko & Faraj, 2005), and virtual world functions creating values such as chatting, collaboration, building islands and cooperation rely heavily on virtual world members' regular involvement and participation (Fetscherin & Lattemann, 2008; Hua & Haughton, 2009), the participation in virtual commerce websites can greatly benefit the transaction process and increase margins (Claus von & Hauke, 2002; Füller, Bartl, Ernst, & Mühlbacher, 2006). Recently, the concept of co-creation through virtual community participation is brought out by several researchers (Nambisan & Baron, 2009) to emphasize the importance of customers' participation in the new product development process. In general, all these participation behavior are so essential to the organizers of virtual environments that the participation level directly influenced the viability or sustainability of the operations of these technologies. Besides, the participation can produce the user-generated contents crucial for virtual community organizers, which sometimes even bring innovations (Ebner, Leimeister, & Krcmar, 2009), facilitate product consummation (W. G. Kim, Lee, & Hiemstra, 2004), or provide new virtual business opportunities such as digital products (H. W. Kim & Chan, 2007).

Among current existing research on reasons for virtual participation, various lines of theories have been explored, such as sense of belonging (A. L. Blanchard, 2007), sense of community (A. L. Blanchard, 2008), social capitals (A. Blanchard & Horan, 1998), status seeking (Lampel & Bhalla, 2007), gift economy (Kollock, 1999), social identity (Dholakia, et al., 2004), self-presentation theory (Papacharissi, 2002; Schlenker, 1985) etc. Principally, all previously explored participation motivations could be traced back to their psychological and social psychological origins, but none of these theories could answer the virtual participation

motivation in a general and comprehensive method. Most of these theories are related with the cognitive perspective of human behavior, touching only the surface level of human behavior and could only explain single aspect of the virtual participation behavior. A very nature research question would be, is there any root cause for all virtual participation behavior from deeper level? Specifically, does there exist any theory to explain all types of virtual participation behavior, such as virtual community participation, virtual world participation, and virtual shopping behavior, etc from one general framework or perspective? Furthermore, is there any participation difference between different types of social network technologies?

Philosophically, the virtual participation motivation should be traced back to the basic questions of why people exist, when the meaningfulness of life is brought up. We borrowed the philosophical concept of body, mind, soul, and spirit to illustrate that the need for self-expression is the fundamental and key reasons for people to participate in various virtual environments. Using virtual community participation and virtual world participation, we demonstrated that virtual participation is the expression of the internal spirit of people. Specifically, we proposed that human's behavior is directed by their internal needs emanating from their spirit. Those needs could be illustrated through a theoretical framework called Fundamental Interpersonal Relationship Orientation (FIRO) (Schutz, 1966). To demonstrate that levels of self-expression vary in different virtual environment, virtual community and virtual world behaviors are compared.

Virtual Participation Behavior, Self-Expression, and Interpersonal Relationship

Generally speaking, virtual participation behavior refers to any online behavior involving browsing information, post information, or post photos, including contribution to the Wikis (Yates, Wagner, & Majchrzak, 2010), virtual community participation (C. M. Ridings, D. Gefen, & B. Arinze, 2002), virtual world participation (Hendaoui & Limayem, 2008), participation in

open source software (Xu & Jones, 2010), and virtual shopping behavior (Holzwarth, Janiszewski, & Neumann, 2006). However, the most discussed virtual participation behavior should be virtual community participation behavior because of virtual community's wide spread in kinds of internet applications. Recently, virtual world behavior gained popularity in the IS research for the emergent of the virtual world technologies such as CyWorld and Second Life. We thus focus on the virtual community participation behavior together with the virtual world behavior in this paper and employ these two behaviors as the agents of virtual participation of virtual participation behavior. Here we basically reviewed the motivations for both virtual community participation and virtual world participation.

The virtual community participation

The antecedents of VC behavior vary with participation activities. In general, there are three types of participation behavior—general participation, lurking, and active contribution. Each of these three behaviors is contributive to the overall development of VCs. The general participation behavior, defined either as the time and frequency spent in VCs (Wang & Fesenmaier, 2003, 2004a, 2004b) or the intention to participate in VCs (Bagozzi & Dholakia, 2002; Teo, Chan, Wei, & Zhang, 2003), has been investigated in several studies. Wang and Fesenmaier (2003, 2004a, 2004b) studied the participation in an online travel community and concluded that social needs, psychological needs, hedonic needs, and membership duration have significant correlations to VC participation. When VC participation is treated as intentions, Bagozzi & Dholakia (2002) found that regular VC participants' intentions can be constructed as group intention to participate in VCs, and is jointly determined by individual determinants and social identities. Teo et al. (2003) attempted to explain the general members' intention to participate in VCs at the individual level with the classical adoption model TAM, but found that only an additive construct—sense of belongings—played a key role in affecting the members' intention to participate in VCs.

Lurking is the behavior of viewing messages in a VC, but not posting any. People who lurk are called lurkers. Lurking behavior has been reported in a series of studies. Preece et al. (2004) reported that "even in busy online communities, usually only a small fraction of members post messages". McKee (2002) reported similar results from his study of the extent of students' participation in an intercollegiate project named IEDP (Intercollegiate E-Democracy Project), which was developed to encourage students' exchange of ideas across institutions via online forums. Further evidence was also reported in Christie and Azzam's (2004) study on a professional listserv, EVELTALK, an online evaluation discussion forum and official listserv of the American Evaluation Association. Brazelton and Gorry (2003) also demonstrated that the largest group of VC's members are lurkers, who do not leave any trace except for logging into the community and viewing messages.

The lurkers are sometimes considered to be free-riders of the community. Indeed, the lurkers may not contribute to VCs by posting messages (Wasko & Faraj, 2005), but they do contribute to the community by viewing messages. Each click they make on a message is counted as an indication of participation, which could contribute to the community indirectly. These indirect contributions are in fact incentives for members to contribute by posting messages in VCs (Ardichvili, et al., 2003). Though lurking behavior has been widely reported, it has not been extensively investigated. Among the few empirical findings reported so far, Preece et al. (2004) stated that the rationales for lurking include: not needing to post, needing to find out more about the group before participating, thinking that they were being helpful by not posting, not being able to make the software work (i.e., poor usability), and not liking the group dynamics or feeling that the community was a poor fit for them. Ridings et al. (2002), on the other hand, found that 26% of lurking behavior could be explained by trust of other members' ability and benevolence/integrity. Lurking behavior is very important for the community's development because lurkers are potential contributors who may post messages in the future (Brazelton &

Gorry, 2003; Wang & Fesenmaier, 2004b). Nevertheless, limited studies have given attention to this behavior. It is worth investigation, and theories are needed to explain this behavior.

In fact, the behavior of posting messages in VCs generates more interest from VC researchers than lurking behavior and general participation behavior. The reason is that active VC participations are contributive to the VC's continued success, despite the fact that this behavior is spontaneous, unrewarding and time-consuming. In general, three perspectives have been proposed to explore and explain this behavior. The first perspective is from the gift economy viewpoint, and has been studied by several researchers (Kollock, 1999; Rheingold, 2000; Wang & Fesenmaier, 2003; Wasko & Faraj, 2000). For example, Rheingold (1993) and Kollock (1999) stated that online interactions are like a series of exchanges among members and their contribution to the community is like giving gifts to the community and its members. When members contribute to VCs, they are actually expecting a future reciprocal return from other members. This factor has been tested by several studies, but no consistent results were reported. In 2000, Wasko and Faraj conducted a survey to examine why people participate and share knowledge in electronic communities of practice. Their findings can be summarized to include community interest, generalized reciprocity and pro-social behavior. Along the same line of research, Wang and Fesenmaier (2003, 2004b) also reported that expectancy of returns from other members is a major motivation for active VC participation. However, in a recent study conducted by Wasko and Faraj (2005), expectations of reciprocity were not found to have any impact on active contribution. Hence, expectancy of reciprocity as a motivation should be further investigated. The second perspective on active VC contribution can be attributed to and explained by social identity theory (Dholakia, et al., 2004; Tajfel & Turner, 1986), self-efficacy theory (Bandura, 1982, 1986; Wang & Fesenmaier, 2004b), and self-presentation theory (Papacharissi, 2002; Schlenker, 1985), which are all sub-theories of self-concept theory. Social identity theory states that an individual can develop his or her identity in context groups. If he or she has membership of more than one group, he or she may develop distinct social identities in

different groups (Tajfel & Turner, 1986). Self-efficacy is an individual's belief in his or her ability to change his or her behavior (Bandura, 1982, 1986). Self-presentation theory states that people are in fact continuously managing their image while they communicate with others or act in a social context (Schlenker, 1985). Based on the self-concept theory, an individual can gain satisfaction and build their ideal self through managing his or her social identity (Dholakia, et al., 2004; Tajfel & Turner, 1986), self impressions (Papacharissi, 2002; Schlenker, 1985), and self-efficacy (Bandura, 1982, 1986; Wang & Fesenmaier, 2004b) in social groups. VCs, as examples of social groups, can enable members to build their social identity, manage their self-impression, and increase their self-efficacy. Such activities in VCs as answering messages, tackling difficult questions, and sharing experiences, may facilitate members in achieving their ideal selves. This line of constructs has recently emerged, and few studies have been published to date. Rheingold (1993), in his discussion of the Well—a computer conferencing system that enables people around the world to carry on public conversations and exchange private electronic mail (e-mail)—identified the desire for status and prestige as some of the key motivations of individuals' contributions to the group. In addition, Wasko and Faraj (2000) found that people post messages because they could attain self-actualization, gain confidence, earn reputations, and enhance their self-efficacy. The reputation-earning's effect on active participation were empirically validated in 2005 by Wasko and Faraj, who confirmed that earning reputation in the community was significant in influencing online active contribution. Additionally, Wang and Fesenmaier (2004b) found in an empirical study that members' self-efficacy is a critical motivation for active online contribution. The third perspective of active VC participation arises from social-related constructs such as culture (McKee, 2002), trust (Catherine M. Ridings, et al., 2002), and centrality in the network and self-related expertise (Wasko & Faraj, 2005). These constructs are based on social capital theories, which state that trust, social networks and other social factors people acquire in VCs are valuable resources and are beneficial for their social recognition.

In summary, antecedents of virtual community participation behavior could be illustrated in figure 1. It should be observed that the virtual community participation behavior is either caused by personal emotional expression or pursuit of certain longing inside or the acceptance or identification with the social groups despite there is no framework or theories linked to these dispersed variables.

--------Insert Figure 1 here----------

Virtual world participation

Although the notion of virtual world has been proposed since 1980 the academic literature on it only emerges in the last decades especially recent several years. The study on virtual worlds is just in its infancy as well as the virtual world technology itself. According to Festcherin (2008) the virtual world research can be classified into four categories based on two lines, the individual / company level and the game / social interaction oriented. The game and social interaction oriented virtual worlds differ in many ways from the individual/company level such as there is no "levels", "scores", nor "end" or "game over" in social interaction oriented virtual worlds. We thus focus on the virtual world literature on social interaction oriented virtual worlds at the individual level.

Because virtual worlds just emerged recent years and are still in development, there are not many studies on virtual world members' participation behavior, especially the motivations for people to participate. Broadly speaking behavior in social interaction oriented virtual world can be classified into two types—the active participation behavior such as behavior to post messages, write blogs, comment on pictures and articles and the passive participation behavior such as behavior to view photos, blogs, messages (Jung et al., 2007) although there are several other peripheral types of behavior such as playing games included in the virtual world and searching friends. The former active behavior is similar to the active participation in virtual communities while the later passive behavior is similar to the lurking behavior in virtual communities.

Corresponding to the virtual community behavior, we can also define these two types of behavior as behavior to get information and behavior to post information. In the limited papers investigating virtual world members' participation motivation, the community factors, relationship factors, and social psychological are found to be significant. Fetscherin et al. (2008) conducted an empirical study in Second Life to investigate members' intention to participate in virtual world and found that community factors such as communication, collaboration, and cooperation play a pivotal role in means of influencing user intention and acceptance of Virtual Worlds. In another paper, Jung et al. (2007) investigated members in Korean-based Cyworld and found that entertainment and personal income factors are the main motives people maintain their homepage in Cyworld. In another paper discussing members' participation behavior in Cyworld Kim and Yun (2007) found that the emotional and relationship side of virtual world members are the main reason for them to participate. An article on virtual game worlds also pointed out that online gaming enjoyment together with attitude and subject norms are key factors for virtual game world play intention (Wu et al., 2008)

Based on the explorative studies on both the virtual world literature and virtual community literature, we can find that virtual world studies have some similarity to virtual community study and are still in the early stage. The literature from both sides suggests that the relational, social psychological and emotional factors are the main reasons for members to participate. The current needs for virtual world research thus are 1) to set up a theoretical framework to investigate motivations of virtual world members' involvement; 2) empirically testify the proposed framework; 3) differentiate the two main types of virtual world behavior and identify the factors influencing these two behaviors.

Self-Expression and the Interpersonal Relationship

The discussion of self-expression arises from the basic philosophical question of the meaningfulness of life. It could be traced far back to around two thousand years ago when Socrates and Plato quest the meaningfulness of life. In his corpus, Plato described the dialogue

with Socrates and proposed that there is transcendence beyond the daily discourse and an image of soul could be manifested through narrative speeches and conversations (Angus, 2011), i.e., human exist to manifest the soul through daily life. Despite it is not empirically proved, the concept of soul has thus being discussed as a controversial concept since then. It has not been in the main stream of psychological research until 1960's, when Golfman's theory of self-presentation was popular in explaining people's motivation and daily life. According to Golfman's (1959) the presentation of self in everyday life, people's face-to-face interactions produce meaningfulness guiding the one's impression management strategy. People's daily life centered on the impression they want to present to others. They will either perform or not perform some actions to manage their impressions on others. The self-presentation theory was further empirically tested by Jones and his students through laboratory experiments (Jones, 1964; Jones & Wortman, 1973). Despite welcomed by some psychologists and other scientists, the self-presentation theories has been resisted by a group of social psychologists for a number of reasons (Leary, 1995). The reasons why self-presentation theory has been resisted could be categorized into four, many social psychologists view self-presentation as inherently manipulative and deceptive, social psychologists have been dominated by cognitive side of the research, self-presentation has been used to over-explain too much phenomenon, and the discussion of self-presentation was viewed too much as a manipulative pop psychology rather than a formal theory.

Despite its controversy in the social psychological field, the self-presentation theory has been widely adopted to explain people's internet behavior (Boyer, Brunner, Charles, & Coleman, 2006; Calvert, Mahler, Zehnder, Jenkins, & Lee, 2003; Marcus, Machilek, & Schutz, 2006; Stritzke, Nguyen, & Durkin, 2004; Vazire & Gosling, 2004; Whitty, 2008), especially those related with web 2.0 technologies such as BBS, MSN instant messenger (Nastri, Pena, & Hancock, 2006), Blog (Mazur & Kozarian, 2010; Sanderson, 2008; Vasalou & Joinson, 2009), Facebook (Gonzales & Hancock, 2011; Mehdizadeh, 2010), MySpace (J. Davis, 2010; Manago,

Graham, Greenfield, & Salimkhan, 2008), and many other social networking websites (Chu & Choi, 2010; Vasalou & Joinson, 2009), etc. In the early discussion of the self-presentation theory, most researchers argued that people express or present themselves because they carry certain personality to manifest in the internet. For example, Vazire & Gosing (2004) examined the accuracy of the personality impressions based on personal webpages and found that the personal webpage could accurately reflect the owner's personality. Stritzke et al. investigated the shy people's behavior online and reported that the shyness could be reduced in the online environment, a better environment for self-presentation, than in the offline environment. Research on the web 2.0 technology mainly argued that people participate in the social networking websites to manage their impressions, a main purpose for the self-presentation. The motivation for self-presentation comes from a desire within. For instance, Vasalou and Joinson (2009) conducted an experiment asking users to interact through avatars in several different social networking websites and found that the design of the avatar basically reflected the image of the person himself or herself. At the same time, it's widely reported that the impression management is part of the reason for people to participate actively in the social networking website such as Facebook (Gonzales & Hancock, 2011; Mehdizadeh, 2010) and MySpace (J. Davis, 2010; Manago, et al., 2008).

Although the self-presentation theory answered why people conduct certain interpersonal behavior in certain way, it does not really answer the root cause of the meaningfulness of life. It just provided an answer for the motivation of certain interpersonal behavior but not really addresses whether the self-presentation is meaningful and where does this desire to impress others come from. It's not until Mitchell presented his research on self-expression that the meaningfulness of life is academically answered. According to Mitchell (Green, 2007), human are dynamic beings that need to express themselves, i.e., signaling the state of their minds. Every perspective of our behavior comes within ourselves and shows the meaningfulness of our being. From this perspective, our daily life and daily practice is a way to show the meaning of our inner

self, or signaling the mental state of our minds. Even though Mitchell's self-expression theory has been challenged by several scholars (W. A. Davis, 2008; Moore, 2010) for its boldness, the concept of self-expression has been widely used in many previous literature especially in artistic papers (Price et al., 2007). It has also been used in the marking research area to explain consumers' expression of themselves by choosing different brands (Aaker, 1999).

In all these literature, the assumption of self-expression is that there is a self within or soul within human. Our behavior is actually expressing this self within, or singling the state of mental state from Mitchell's perspective. This self is different for different person, or we might state that different person have different personality so that the expression of this personality is different. However, the higher level of this self-expression calls us think whether the personality are born by nature or developed in the environment. This is a very controversial educational and psychological debate and we won't want to discussion much here. If the self-expression is meaningful in explain human's behavior, then it's easy for us to understand that human behaviors are largely interactions among each other, what we call interpersonal relationships. And the purpose of interpersonal relationship is for the self-expression. Interpersonal behavior is defined as the expression of personality in relation to phenomena involved in relationship formation. The interpersonal relationship perspective includes two important concepts: the situation in which the interpersonal relationship develops and the intrapsychic condition of an individual. Psychology researchers posit that interpersonal interactions are only the overt part of interpersonal behavior, and that the more important interactions occur covertly within the minds of the two members of the dyad. They argue that covert interactions regulate overt ones and that the latter manifest the former.

FIRO Theory

The interpersonal relationship perspective offered in this study aims to provide a framework for members' virtual participation. Before virtual environments existed, relationship building could only be fulfilled in offline environments. However, research has found that virtual environments

can also satisfy people's needs for relationships (Carter, 2005, Nip, 2004). Nevertheless, the interpersonal relationship perspective on virtual participation has never been examined in previous virtual world studies.

Fundamental Interpersonal Relationship Orientation (FIRO) is a theory proposed by Schutz in 1958 to describe and explain individual behavior and the interactions of people, that is, interpersonal relationships, with simple but comprehensive characteristic orientations. To be applied empirically, FIRO was operationalized as FIRO-B (FIRO behavior). Since the introduction of FIRO, its measures have been widely adopted in social psychology research. On average, FIRO has an average of twenty-five citations annually in the Social Science Citation Index (Hurley, 1990). Furnham (1990, 1996) indicated that the FIRO-B was one of the three most widely used questionnaires in occupational psychology.

Schutz (1966, 1958) proposed that interpersonal relationships could be measured by a person's intention to interact with others. He argued that people's intention to interact with others can be measured by three dimensions—inclusion, control, and affection. Each of these three dimensions has two behavior directions—expressed and wanted behavior. In total, there are six dimensions in FIRO—expressed inclusion, wanted inclusion, expressed control, wanted control, expressed affection, and wanted affection. Based on this framework, the expressed behavior describes the extent of people's willingness to include, control, and loves others, whereas wanted behavior describes the extent of people's willingness to be included, controlled, and loved by others.

The FIRO model can be applied to all situations in which interpersonal relationships are investigated (Schutz, 1966). There are three levels of the theoretical application of the model, based on the number of persons involved in the interpersonal relationship—the individual level (one person), family level (more than two persons), and group level (more than two people). While individual-level applications described mainly an individual's orientation in the three dimensions, which provide the foundation to analyze the individual's social behaviors,

family-level applications mainly deal with how the orientations of family members in the three areas influences their relationships inside and outside the family, and group level applications deal mainly with how the match of the orientations of group members in the three dimensions, namely, the group's compatibility, affect the group's performance (Ilgen and O'Brien, 1974, Di Marco, 1974, Hill, 1977), effectiveness (Smith and Linton, 1975, Fisher et al., 1995), and efficiency (Hewett and O'Brien, 1974).

Conceptual Model and Hypothesis

The Interpersonal Needs are Human's Nature

We thus proposed that virtual participations in both virtual community and virtual world environment can be explained by the interpersonal relationship theory, specifically, it can be embodied through the FIRO theory. The reason that the interpersonal relationship theories can explain virtual world behavior lies in the very basic needs of the human nature. According to psychologists (e.g. Cantor & Malley 1991, Schutz 1966), people are born with some basic needs, such as attachments, association, close relationship, intimate, (Berscheid, 1994) (check references), based on which, a series of interpersonal relationships including martial relationship, friendship, family relationship, peer-relationship, child-adult relationship are developed (Berscheid, 1994). For an individual, perhaps his many or most important and enduring goals, are either deeply embedded in, or directly implicate, his or her close personal relationships (Cantor and Malley, 1991). Given the relationships are different, the interpersonal relationship theories are multidisciplinary and have been studied by researchers from clinical psychology, social psychology, communication, developmental psychology. The ultimate goal of the differently types of interpersonal relationship theories is to explain the human's interpersonal relationship behavior.

The interpersonal relationship researchers have been striving to find a base theory incorporating all types of interpersonal relationship theories. The social psychological theories try to explain the interpersonal relationship from the human's cognitive process; the development

psychological theories intend to explain the human's relationship model and pattern through the parents and children and child-peer relationships; while the communication theories try to find the dysfunctional communication patterns to fix the relationship building process. Even though the interpersonal relationship field is still in development, they are several theories emerging to explain the human's interpersonal relationship nature, one of which is Schutz's (1966) FIRO theory.

The FIRO theory is appropriate for the virtual world environment. Although interpersonal relationship theories were developed before virtual communities and virtual worlds existed, we believe that they are appropriate for application in the investigation of virtual worlds because relationships are not bounded by the physical body, and people's online identity is strongly associated with their offline identity (Powers, 2003). Developed by Schutz in 1958, the purpose of the FIRO model is to provide a simple explanation of why people interact with others, that is, why people develop interpersonal relationships. Schutz (1966) stated that the maxim "people need people" was the initial motivation for him to develop the FIRO theory. The entire purpose of his theory is to state, explicate, elaborate, and test the maxim that "people need people" mainly in three dimensions—inclusion, control, and affection. This theory is applicable to any context that involves interpersonal behavior, which suggests that it can be extended to the virtual world environment.

The FIRO model, illustrated in Figure 1 postulates that virtual participation is due to the fulfillment of the three levels of interpersonal relationship needs—the need for inclusion, the need for control, and the need for affection—suggested by Schutz (1966). Followed the reviewed literature, virtual participation in both virtual communities and virtual worlds is classified into Behavior to Give Information (BGI) and Behavior to Obtain Information (BOI), to understand the involvement behaviors in greater depth.

In interpersonal relationships, each person has both expressed and wanted orientation in these three dimensions. The wanted behavior represents an individual's tendency to receive attention or affection from others or to be controlled by others, whereas the expressed represents the individual's tendency to include others in his or her life, express affection, or exert control over others. Hence, the FIRO model proposed in this paper has six antecedents, developed along the three interpersonal relationship need dimensions through the wanted and expressed aspects. A detailed discussion of the hypothesis development is given as follows.

----------Insert Figure 2 Here----------

Hypothesis Development

Comparison of VCs and VWs

Although they both gather a group of people together in a virtual space, VCs and VWs differ in many ways. A VC is a virtual group formed through an electronic communication medium around a particular domain of interest, and is bound by neither space nor time. Participants in VCs interact with each other to achieve a common goal using various Internet tools, and need to follow certain community standards and rules (F. Rothaermel & S. Sugiyama, 2001, p. 299). In contrast, a VW is a networked, computer-simulated environment that visually mimics complex physical spaces, in which participants can interact with each other and virtual objects using a 3D avatar as their virtual representation (W.S. Bainbridge, 2007, p. 472). Typically, these avatars are capable of walking, running, flying, talking, whispering, shouting, signaling body language, and making gestures in the created environment (Chesney, Chuah, & Hoffmann, 2009).

The differences between VCs and VWs are summarized in Table 1. First, a VC is function based and emphasizes participant activity (Hagel & Armstrong, 1997; F. Rothaermel & S. Sugiyama, 2001), whereas a VW is an environment, and has a technological focus (W.S. Bainbridge, 2007; B. Eschenbrenner, F. F. Nah, & K. Siau, 2008). Second, a VC offers a general Internet-facilitated space in which the Internet allows users to better enjoy basic benefits. Participants communicate

with others in this space via texts in either the synchronous (i.e., chatting) or asynchronous (i.e., electronic mail) mode. A VW, however, extends the functionality of a VC by generating a dynamic environment in which users can participate or view 3D objects on a real-time (synchronous) basis. Third, VCs are based upon ongoing, mutual exchanges that take place via computer-mediated communication to meet the social and commercial needs of participants. There is not a mandatory, shared environment common to all participants in which they can live and share space and time with others. In contrast, VWs offer a simulated environment that is created by the participants for the purpose of communication and collaboration in a shared virtual space. Participants in this environment can share space as well as time and design their own spaces from a first-person viewpoint (B. Eschenbrenner, et al., 2008). Fourth, the immersion level of VC participants is relatively low, as users are aware that they are interacting with others in an online environment. Three-dimensional avatars are not necessary for communication in VCs. However, VWs operate like real societies – people can dress as they like (through 3D avatars) and talk with others verbally or textually (through synchronous communication) in the role that they choose to play. In summary, a VW is an Internet-facilitated simulated environment characterized by an advanced level of reality due to its sophisticated use of 3D avatars, first and third person viewpoints, role-playing opportunities, and real-time features.

--- Insert Table 1 Here ---

We thus make our general proposition that members' feel more expressive in virtual world environment than in virtual community environment.

Wanted Inclusion and Virtual participation

Many studies have implicitly shown that inclusion and virtual participation are strongly related. In these studies, inclusion is sometimes referred as a sense of belonging (Bressler and Grantham, 2000, Teo et al., 2003, Wang and Fesenmaier, 2004b, Rheingold, 2000), attachment (Blanchard

and Markus, 2004), or association (Kozinets, 1999). The need for inclusion, association, or belonging serves as the motivation for members to participate in VCs, stimulating the behavior either to give or to obtain information. However, these studies did not distinguish the need for wanted inclusion from the need for expressed inclusion. The hypotheses developed in this study distinguish the need for wanted inclusion from the need for expressed inclusion and develop the rationale for this type of distinction.

Wanted inclusion is people's tendency to be included in other people's activities. Behavior associated with wanted inclusion is passive and receptive, which may mean wanting to be paid attention to, noticed, and recognized by other members in the VC.

People scoring higher on wanted inclusion tend to behave over-socially (Schutz, 1966). They try to grasp every opportunity to let others seek them out. The reason they behave like this is because they think they have no opportunity to let others know who they are, i.e., they need to establish an identity in the social groups to satisfy their needs for inclusion. Therefore, building identity is another phenomenon that may be explained by wanted inclusion. This causal relationship has been identified in VCs in Baggozi and Dholakia's (2002) study, who reported that members' participation in VCs maintained the group identity so that each individual member's desire to participate would be satisfied. In Wang and Fesenmaier's 2004 study on the members' participation in an online travel community, identification was one dimension of the interpersonal relationship needs that motivated members' participation.

Fame, regarded by Schutz (1966, p21) as the extreme case (highest score of wanted inclusion) of wanted inclusion, is reported to influence members' participation in VCs. Pursuit of fame is triggered by an individual's strong desire to be included by others in a group, i.e., a high score on wanted inclusion. According to this rationale, the incentive of gaining status similar to fame was suggested as one of the potential antecedents of active contribution in Wang and Fesenmaier's (2004b) study on members' active contribution to an online travel community. In the same line

of study, Rheingold (2000) identified the desire for status and prestige as one of the key motivations of individuals' contributions to the group. Wasko and Faraj (2005) also found that earning reputation in the community was significant in influencing online active contribution. All of these reputation, status, or fame related constructs actually point to wanted inclusion, a kind of method to let members to be paid attention to or recognized by other members in VCs.

Thus, for those people who score high on wanted inclusion, their behavior would be oriented so as to satisfy their needs for wanted inclusion. They may be talkative in social groups, try to carefully maintain their identities and images, or earn reputation or fame in VCs, so that other members in the VCs would pay attention to or recognize their messages, words, etc. Giving information is one way to elicit recognition and notice from others. Gaining status by viewing more messages is another important method of gaining status. Thus, people with a high need for wanted inclusion will be active in both the behavior to obtain information and the behavior to give information (Kozinets, 1999). Whenever new messages are posted or a new topic is raised, these members would definitely respond. They want the community to know their existence. By browsing the messages they gain the feeling that they are not alone or outside the community. Browsing messages is also the prerequisite for posting messages. Given this rationale, it is proposed that people who scored higher on wanted inclusion will both obtain and give information more frequently than those scoring lower in this dimension. Thus the following hypotheses are proposed:

H1 People who score high on wanted inclusion will obtain information more frequently than those who score low.

H2 People who score high on wanted inclusion will give information more frequently than those who score low.

Expressed inclusion referred to people's tendency to include others in their own activities. Similar to wanted inclusion, expressed inclusion is associated with belonging, identity, fame, status etc. People scoring high in expressed inclusion actually try to maintain their identity in social groups. In contrast to wanted inclusion, expressed inclusion represents an initial or active

psychological tendency in one's personality. It describes one's willingness to interact with others.

People scoring higher on expressed inclusion have a strong will to include others in their own life and activities (Schutz, 1966). It means whenever they have the opportunity, they stay with people; whenever they have opportunity to participate in social activities or social organizations, they try to participate; and whenever they can include other people into their own plans, they try to include them. They behave in such an active way also because they want other people to pay attention to, recognize, and identify them. The purpose of their activities in social groups is also to establish and maintain their identities.

Previous studies have shown that VC members scoring high on expressed inclusion are active in both obtaining and giving messages. For the behavior of obtaining information, VC studies have reported that a majority of VC members are inactive members. They log into the community to find out the overall development of the community. These people feel that VCs are part of their life, and that a simple information browsing activity can fulfill their needs for expressed inclusion (Nonnecke et al., 2006). Rheingold (2000) also described this behavior as the intention to see what other members are doing, so that they feel that they are a part of the whole community. To them, the behavior of obtaining messages reflects their active tendency to include others into their life. For the behavior of giving information, several studies have reported that people post information because they feel that including the VC activities into their own life or activities is necessary. For example, Rheingold (2000) described that many parents participate in the parenting conference because they feel that they are included in the similar group; once they are involved in the parenting conference, they actively participate in all the online and offline activities, and do not want to miss the major events in the conference. Again, the findings on motivations for giving information as gaining status and fame in VCs (Wang and Fesenmaier, 2004b, Rheingold, 2000) show that this behavior can also serve as the satisfaction of the need for expressed inclusion.

Based on the above findings, it is reasonable to argue that people who score higher in expressed inclusion would be more active in browsing and posting messages, paying attention to the community, and recognizing other members' contributions to the community; they can establish and maintain their identities in VCs through these activities. Thus, expressed inclusion would be a motivation for them to post and browse messages. Thus the following hypotheses are given:

H3 People who score high on expressed inclusion will obtain information more frequently than those who score low.

H4 People who score high on expressed inclusion will give information more frequently than those who score low.

Control and Virtual participation

Need for control manifests itself as an individual's desire for power, authority, and control over others' actions. The concept of control has also been expanded since Schutz's original model to include control over an individual's environment (Adams and Galanes, 2003). However, the control construct developed by Schutz (1966) only measures control over people; control over the environment was not discussed here. The need for control can be achieved through dynamic interactions with other members in the VC environment.

Whether through expressed control or wanted control, the fulfillment of control needs is intended to gain a sense of security and safety. Although the need for control has dimensions of both expressed control and wanted control, the need for expressed control has been discussed more than that for wanted control. The obvious behavior triggered by the need for expressed control could be the acquisition of money or political power. This type of control behavior often involves coercion and is not frequently observed. Rather more subtle behaviors triggered by the need for expressed control may be persuasion, influence, making suggestions, making decisions, taking responsibility, and showing intellectual superiority. In contrast to the need for expressed control, the behaviors triggered by the need for wanted control are submission, avoiding making suggestions and decisions, and avoiding taking responsibility.

Wanted control refers to people's tendency to want to be controlled, led, or influenced by other people. People scoring higher in wanted control feel safe and secure under someone else's control. Thus, people scoring higher in wanted control behave in ways such as avoiding making suggestions, making decisions, or taking responsibilities. Hence, when interacting with people, an individual with a higher need for wanted control plays a submissive and passive role in real life, and this can be observed in a number of situations. For example, in a large meeting, there are likely to be people who always agree regardless what kind of opinions the speaker brings out. In outdoor activities like picnics or climbing mountains, some people always follow others. Some people always ask other people's opinion when making important decisions. Some people are often easily persuaded and led by others, just because their needs for wanted control are high.

Extended into the VC environment, wanted control can be observed in many previous findings in VC studies. One major reason to participate in VCs is reported to obtain suggestions and information from others, and this can be explained from the perspective of wanting control from others. For example, it is reported by Rheingold (2000) that some members seek answers from the VC to a great many questions as detailed as how to raise a child, and thus gain a sense of security. Bakardjieva (2003) observed that some people tend to rely on the VC to obtain answers and consolation when they meet problems or decision-making situations. It is also reported that when some people decide to buy products, they tend to post their situations or problems for the community to make decisions for them (Munoz, 2003).

Based on above findings, it is reasonable to argue that people scoring higher on wanted inclusion would obtain and give information frequently in VCs. When they have important decisions to make, they either seek answers by browsing for information or post their questions, situations or problems into the VC to get answers. The following hypotheses are thus given:

H5 People who score high on wanted control will obtain information more frequently than those who score low.

H6 People who score high on wanted control will give information more frequently than those who score low.

Expressed control referred to people's internal needs to control others in many types of activities. People scoring higher on expressed control often manifest themselves as taking charge, making decisions, etc. In contrast to people with high needs for wanted control, people with higher needs for expressed control behave actively toward many activities. For example, when attending a meeting they often try to control the meeting by speaking dominantly and actively; when participating in outdoor activities they are often the leaders who decide routine, progress, time, and schedule; when buying new products they have their own ideas and not easily persuaded by others.

The need for expressed control can be fulfilled through VC activities, and especially through behavior to give information. This has been reported by several studies on VCs. For instances, in an ethnographic study about social relationships and power structure in two Vietnamese VCs, Nguyen et al. (2006) observed that some members actively participate in VCs because they want to dominate discussions and influence others' behaviors and thoughts. It is also interesting to observe that some members try to post messages often and try to gain popularity so that later they would be promoted to leaders who have the power to manage others' messages or influence others' behavior and thoughts. This is consistent with the other studies about gaining status and earning reputation (Rheingold, 2000, Wasko and Faraj, 2005). Members who gain status and reputation in VCs through participation can be promoted to leaders who have power to manage other members, as well as managing messages.

Thus, people scoring high in expressed control can fulfill their needs through behavior to obtain and give information, especially the latter. When they post information, they are in fact trying to influence others through online persuasion. When other members post messages for opinions, suggestions, and decisions, this group of people would respond actively through browsing and giving information. It is thus reasonable to give the following hypothesis:

H7 People who score high on expressed control will obtain information more frequently than those who score low.

H8 People who score high on expressed control will give information more frequently than those who score low.

Affect and Virtual participation

Affection refers to the close personal emotional feelings between two people. It is a dyadic relation—that is, it can occur only between pairs of people. The terms connoting a primarily positive affection relationship are love, like, emotionally close, positive feelings, personal, friendship; terms connoting a lack of or primarily negative affection are hate, dislike, cool, emotionally distant. Thus, affection in VCs refers to the emotional feeling toward other members; it is a deeper feeling than inclusion or sense of belonging. Inclusion is the attachment to VCs, but affection toward VCs is the further level of emotional attachment within VCs. When a VC member becomes emotionally close to another, there is an emotional attachment, and this is often accompanied by an element of confiding innermost anxieties, wishes, and feelings, in order to satisfy the need for affection. When members are fulfilled in their need for affection, they develop an affective feeling toward the VC.

Many studies have explored the constructs related to affection. For example, Coon (1998) pointed out that online friendship is the most obvious reason for people to participate in VC activities. Wang and Fesenmaier (2004a, 2004b), on the other hand, pointed out that the feelings of emotional enjoyment, amusement, and entertainment members experience while participating in VCs is also significant in explaining members' participation in VCs. Such participation can give members a feeling of happiness, excitement, and enthusiasm. Nip (2004) also pointed out that the majority of messages in an online community of lesbians were expressing and sharing their feelings with others.

Wanted affection refers to people's tendency to accept friendships, love, feelings, or relationships from other people. People scoring high in wanted affection want to others to maintain emotional closeness toward them, to be cared for by others, and to be in close relationships with others. They want others to initiate affection behaviors like loving and caring toward them.

People scoring high in wanted affection tend to seek love, emotional closeness, care, and feelings from others in VCs. This has been discussed in several previous studies. For instance, Bakardjieva (2003) described two VC members who established deeper feelings with other members through sharing or getting information with other members in VCs. Both of them felt that they had a high need for affection from others, and obtaining and giving information in VCs satisfied their needs. In an investigation of two adolescent VCs, Suzuki and Calzo (2004) reported that adolescents tend to seek consolation from peers in VCs to fulfill their needs for relationship and affection. Burrows et al. (2000) reported that online social reporting and self-help are important tools for people to keep balanced social relationships, which means that there are some people with needs for affection or relationship whose needs can be satisfied from VC participation.

When people scoring high in wanted affection participate in VCs, they are actually seeking affection, love, care, emotional closeness, and relationships from other VC members. Browsing information would fulfill their needs to some extent because the information in VCs sometimes touches their heart and relates to their situations. Perhaps they find a story in VCs with the same characteristics as some event in their lives, and they feel inspired or consoled by reading the story in VCs. The comments in VCs give them a sense of warmth and care. On the other hand, some people scoring high in wanted affection seek love or consolation through posting messages. They share their weakness and show their need for affection to other members, and the replies to their sharing give them consolation. Thus, through either obtaining or giving information, people scoring higher in wanted affection can be satisfied. We thus provide the following hypotheses:

H9 People who score high on wanted affection will obtain information more frequently than those who score low.

H10 People who score high on wanted affection will give information more frequently than those who score low.

Expressed affection referred to one's tendency to get close, and to develop relationships and friendships with others. People scoring high in expressed affection like to care about others,

show empathy to them, and console and comfort them. They can gain enjoyment through giving their love, care, and consolation to others as well as through establishing close relationships with others. They are peacemakers and angels who bring love to others.

The need for expressed affection is one reason for some members to obtain and give information, and this is evident from several studies on VC participation. For example, Suzuki and Calzo (2004) reported that 12% of all the replies in two adolescent VCs contained emotional support comments. Coon (1998) reported that the friendships and relationships established in VCs are similar to true friendships and relationships in the real world, and people with a need for establishing relationships can be satisfied through them. Burrows et al. (2000) discussed that people with the need to support and comfort others can fulfill their needs through giving online help in VCs. One VC member described by Bakardjieva (2003) was even able to feel satisfied through providing technical help to others. Rheingold (2000) also illustrated several members who were able to enjoy themselves through consoling other VC members in VCs.

Based on the above findings, it is not hard to argue that, when people scoring higher in expressed affection participate in VCs, their needs can be fulfilled through either obtaining or giving information. By obtaining information, they can identify with others' needs, and find an empathetic individual with whom they think they should establish a relationship. By giving information, they can express their emotional closeness and feelings toward others. They are excited about demonstrating their fondness and care toward messages posted by others. Gradually they develop close friendships and relationships with others. So people with high needs for expressed affection would both obtain and give information more frequently than those who scored lower. We thus propose the following hypotheses:

H11 People who score high on expressed affection will obtain information more frequently than those who score low.

H12 People who score high on expressed affection will give information more frequently than those who score low.

Research Methodology

To verify our interpersonal relationship framework, three surveys from two virtual communities and a virtual world were adopted as the research method to investigate the virtual participation. The three surveys aims at verifying our theoretical framework from different angels. Normal cross-sectional survey can only verify the hypotheses at one time, leading the conclusion under the risk of weak reliability. This study use three surveys to increase the reliability of the study. The data was collected in the Microsoft Chinese Community—a value-added professional community of a large software company, Xilu Community—an integrative Chinese commercial community, and Cyworld—a combination of Second Life and MySpace. Xilu Microsoft Chinese Community was chosen because it represents a very technical and professional community. Cyworld was chosen because it is a typical virtual world website aiming at networking but also because it is a Korean e-community having 18 million members—90 percent of all Koreans in their 20s are signed up. The business model earns its owners $7.78 per member per year.

Data Collection

An online questionnaire was developed to collect data from Microsoft Chinese Community, the Xilu Community and Cyworld. For ease of management, the online questionnaire was hosted on a service provider's site (http://www.my3q.com) that provided free questionnaire creation services. The use of a service provider also allowed us to deal with the problems of access control, authentication, and multiple responses associated with the Web-based data collection approach (Stanton and Rogelberg, 2001).

The Chief Manager of Microsoft Chinese Community was contacted and he agreed to help by making my research a cooperation project with their community. Based on the agreement, the Microsoft Chinese Community announced the survey of this dissertation to all community

members. This announcement included posting the survey message to all boards, together with a link to a web page describing the project, for ten days to ensure that the maximum number of members would be exposed to the information about this dissertation. To encourage more participation, members who completed the questionnaire would be rewarded with 50 community gold cash units that can be used to buy real products from the Microsoft Chinese Community shop, together with an entry opportunity for a lucky draw to win a Microsoft wireless keyboard, a Microsoft wireless mouse, or both.

Xilu's management was contacted for their support for this study. The company was very interested and they agreed to launch this study as their own project with us. Based on the agreement, three types of promotional activities—advertising texts on the first page of the Xilu Community, banner advertising (468x60) on every subject board, and a Flash movie (350x220) on every posted message—were launched for a month to make sure that the maximum possible number of Xilu members would be informed of the survey. The advertisement of the questionnaire was exposed to all the sub-boards of the community. Members who completed the survey were rewarded with a $100 (real money) discount against Xilu's popular online service—the private coffee shop. The coffee shop, which has a regular price of $120, is an online space designed with multiple value-added functions, enabling members to conduct personal and private small group conversations.

Participants in the Cyworld survey were college students who took one or two of the five undergraduate electronic commerce courses offered by the School of Business Administration at Sungkyunkwan University. To ensure that the experiments were rigorous, the participants were tested for two weeks to determine whether they were qualified to answer the survey. First, one of the authors announced that all participants would be awarded one bonus point to their final

course grade after submitting their Cyworld homepage address for evaluation. Second, five MIS doctoral candidates evaluated the quality of each participant's Cyworld homepage on a five-point Likert scale in terms of content quality, content volume, and number of online friends. Among the students who expressed a desire to participate in the survey, 31 had Cyworld homepages that were evaluated as below average (4.1) and were therefore excluded from the survey. All participants had previous experience using Cyworld for various purposes such as uploading information and exchanging information with online friends. A chi-square test revealed no significant differences between groups delineated in terms of gender, area of study, or previous experience with Cyworld.

Variable Operationalization

The dependent variables of this study were BOI and BGI. BGI measured how eagerly one "talks," namely, posts messages in a virtual environment; BOI measured the extent to which one retrieves information from a virtual environment. BOI and BGI were operationalized using a Likert scale (1 to 7) with measures developed from the actual usage behavior in information systems (Davis, 1989, Limayem and Hirt, 2003, Ridings et al., 2002b, Straub et al., 1995, Wang and Fesenmaier, 2004b). Most of these measures, which were derived from information technology adoption studies, were based on the time spent, and the frequency of participation, in the virtual world.

In this study, we adopted Schutz's (1966) instrument—FIRO-B (Behavior) scale to measure the three dimensions of FIRO—the need for inclusion, the need for control, and the need for affection. According to Schutz (1966), each of the three dimensions has two aspects: expressed behavior and wanted behavior. Thus, the model has six constructs—expressed inclusion, wanted

inclusion, expressed control, wanted control, expressed affection, and wanted affection. There were nine items for each construct.

Instrument Validation

Four-stage survey validation was conducted to ensure the validity and reliability of the questionnaire. First, whenever possible, previously validated questions were used, and generally accepted online instrument construction guidelines (Wang and Fesenmaier, 2003, Stanton and Rogelberg, 2001, Ridings et al., 2002b) were observed as much as possible. Second, the questionnaire was pretested by one MIS professor, seven business doctoral students, and two experienced virtual world webmasters. Third, the pilot test for the questionnaire was conducted for the questionnaire in both Microsoft Chinese Community and Cyworld before real data collection. The reliability of all the constructs exceeds 0.70.

----------Insert Table 2 Here----------

Data analysis Results

562 responses were collected from the Microsoft Chinese community. After checking for data integrity, 27 responses were found to suffer from multiple responding problems thus resulting in a total of 535 effective responses. 312 responses were collected from Xilu Community and 9 of them were multiple responses, resulting in 303 effective responses. A total of 563 responses were collected from Cyworld. After checking for data integrity, multiple responses resulted in the elimination of 4 responses, thus giving a total of 559 effective responses.

Profile of Respondents

The overall profile of the respondents in the Microsoft Chinese community is that they are typically male (95%), young with the majority of them below 28 years old (82.05%), highly

educated with majority of them receiving college or above college level education (85.05%), single, with high income, and work in computer-related fields (47.85%) or are students.

The Xilu community have a higher proportion of females, are relatively older, have a higher education level and monthly income, and their occupation is almost equally distributed across all the categories offered. Apart from the proportion of female being slightly higher in the sample than in the Xilu community as a whole, the overall demographic statistics are close to the user profiles officially published by the Xilu community1. There are a large proportion of respondents between 28 and 35 years of age, which means that they may be more mature. In terms of education level, the majority of them have received college or above college level education. For the monthly income, 90.42% of the 303 respondents in the Xilu community are almost equally distributed at the four low to middle income levels, under 500RMB, 500-999RMB, 1000-1999RMB, and 2000-3999RMB. For their occupations, the category with the most respondents is student (25.41%) and those whose jobs are related to IT (11.88%).

The 559 respondents from Cyworld were from South Korean. According to the respondent profile, most respondents were male (63%), and single (97%). Their occupations varied from unemployed to professionals, with most of them being graduate/college students. Regarding their ages, the respondents were predominately (94%) in the range of 19-28. As for their education level, most of them (96%) were college graduates. Probably because most of them are students, their income are relatively low with 74% of them having an income below 500$ per month.

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[1] http://ad.xilu.com/htm/xlwyhfx.htm

Reliability of FIRO

Prior to testing our FIRO model for hypotheses validation, the research model was tested for its reliability by calculating all items' Cronbach's Alpha. Table 1 gives the Cronbach's Alpha value for each of the six dimensions of FIRO-B. The result showed that all the values are above the accepted 0.70 except EI from the Cyworld slightly lower than 0.70, which is acceptable for the exploratory study (Nunnally and Bernstein, 1994).

Validity of FIRO

The validity of FIRO was assessed with reproducibility and scalability, which was based on Guttman scale (1950). Guttman (1950) and Menzel (1953) have developed two coefficients respectively for the validity of the scale. The accepted level for coefficient of reproducibility and coefficient of scalability were suggested by Guttman (1950) as above 0.90 and Menzel (1953) as somewhere between 0.60 and 0.65 respectively. The calculation method for coefficient of reproducibility and coefficient of scalability was showed in the following equations.

$$C.R. = 1 - \frac{Errors}{Total \quad \text{Re}sponses}$$

$$C.S. = 1 - \frac{Errors}{Maximum \;\; Errors}$$

The coefficients of reproducibility and coefficients of scalability are depicted in Tables 2 and 3. The results showed that all of the reproducibility coefficients, are above the recommended 0.85 (Guttman, 1944). As for scalability test, all of our coefficients were above the suggested 0.60 level except WA was slightly lower than 0.60 in the three different datasets thus signifying acceptable scalability for our instrument.

----------Insert Table 3 here----------

----------Insert Table 4 here----------

Test of FIRO on Virtual participation

The six dimensions of FIRO's effect on virtual participation were tested by ANOVA for the categorical nature of the Guttman scale. The score of each dimension was first recoded into high and low, and then followed by an ANOVA test. The dependent variables of FIRO are BOI and BGI. Table 5 reported the ANOVA results of virtual participation in the three different types of virtual community and virtual worlds. In the Microsoft Chinese Community, EI→BGI and WA→BGI was significant at the 0.05 level and EA→BGI was significant at the 0.01 level. In the Xilu Community, EI→BOI, EI→BGI, and EC→BGI were significant at the 0.001 level; EC→BOI, WC→BOI, and EA→BGI were significant at the 0.05 level. Whereas, in the Cyworld, EI→BGI and WA→BOI were significant at the 0.05 level; EC→BOI and EA→BOI were significant at the 0.01 level; and EC→BGI, WC→BGI, EA→BGI, and WC→BOI were significant at the 0.001 level.

----------Insert Table 5 here----------

Based on the findings depicted in Table 4, 3 out of 12 hypotheses in the Microsoft community, 6 out of 8 hypotheses in the Xilu community, and 8 out of 12 hypotheses in Cyworld were found to be significant. Table 5 summarized the supported hypotheses in our FIRO model. The supported relationships in the Microsoft Chinese Community are the expressed inclusion on behavior to give information, expressed affection on behavior to give information, and wanted affection on behavior to give information.

The supported relationships in the Xilu Community are expressed inclusion on behavior to obtain information and behavior to give information, expressed control on both behavior to

obtain information and behavior to give information, wanted control on behavior to obtain information, and expressed affection on behavior to give information. The supported relationships in Cyworld are expressed inclusion on behavior to give information, expressed control on both behavior to give information and behavior to obtain information, wanted control on both behavior to obtain information and behavior to give information, expressed affection on both behavior to obtain information and behavior to give information, and wanted affection on behavior to obtain information.

----------Insert Table 6 here----------

Discussion, Implications, And Limitations

Discussion

This paper attempted to empirically explore virtual participation in virtual communities and virtual worlds from an interpersonal relationship perspective using the FIRO theory. The findings suggest that the interpersonal relationship theory is applicable as a theoretical foundation for evaluating both virtual community and virtual world members' virtual participation at different levels. The three dimensions of the FIRO model are found to significantly influence people's participation in both virtual communities and virtual worlds. Previous studies have pointed out that factors such as sense of community (Blanchard, 2007, Blanchard, 2008, Blanchard and Markus, 2004), sense of belonging and attachment (Ligorio and Van der Meijden, 2008, Blanchard, 2008), purse of power and fame (Nguyen et al., 2006, Rheingold, 2000), relational factors (Kim and Yun, 2007), community factors (Fetscherin and Lattemann, 2008), and emotional factors (Jung et al., 2007) are the reasons that people participate in virtual worlds. The results of the FIRO model in this paper not only confirm the

factors identified in previous studies, but also link these factors together to provide an appropriate conceptual framework for these factors.

The paper firstly has brought out the concept of the self-expression and interpersonal relationship framework into the virtual environment. In diversified literature on virtual community participation, researchers have been endeavoring to find real factors influencing or contributing to members' participation as either passive or active participation leads to commitment to the community (Wang and Fesenmaier, 2004b, Gupta and Kim, 2007). Among all factors mentioned above, only a glimpse of the motivations is reported in each paper. As the virtual community participation and virtual world participation share similar virtual participation and motivation factors, there should be some common framework underlining such participation motivations as well as all the factors identified. This paper just provided the effective framework transcending community types and different types of motivational factors driving the virtual participation in the virtual environment. The contribution of this paper is thus far reaching both theoretically and practically. The proposed interpersonal relationship framework has been effectively tested in the very technical community—Microsoft Chinese Community, a leisure-based virtual community, and a virtual world focusing on social relationship building, leading to the conclusion that the interpersonal relationship conceptual model are appropriate in explaining the virtual participation.

Secondly, the three interpersonal relationship dimensions all have some effects on virtual participation. The support of the inclusion dimension implies that members either tried to obtain information to include others into their life (such as the Xilu Community) or post information to include others into their life (significant in all three datasets), consistent with the notion of participation for the sense of belonging or community, or attachment (Blanchard, 2007,

Blanchard, 2008, Blanchard and Markus, 2004). However, the wanted inclusion dimension is not supported in any virtual environment in this study, which is quite strange and worth further investigation. The support of the control dimension implies that members sometimes either tried to obtain information and give information to control or influence others (significant in both Xilu Community and Cyworld) or to be led, controlled, or influenced by others (significant in both Xilu Community and Cyworld except wanted control on BGI in Xilu Community), providing support for the previous finding about members participation for the pursuit of power (Nguyen et al., 2006, Rheingold, 2000). The support of the affection dimension implies that members sometimes either try to obtain information to express their affection or emotions (significant in Cyworld) and give information to express their affection and emotions (significant in all three environments), in contrast, to obtain information to get emotional support and affection from others (significant in Cyworld) and to give information to get emotional support and affection from others in the virtual environment (significant in the Microsoft Chinese Community).

Finally, the paper has found that in different virtual communities and virtual worlds, the supported relationships vary, implying that the different types of needs are satisfied in different virtual environments. In this paper, in the very technical virtual community—the Microsoft Chinese Community, only three hypotheses, expressed inclusion, expressed affection, and wanted affection on BGI are supported, namely, members post messages because they want to include others into their life, want to reach out to give their emotional support to others and reward the emotional support from others. In the leisure-based virtual community—Xilu Community, six hypotheses are supported, implying a further level of the interpersonal relationship need satisfaction. Members in such community obtain and give information not only because they can have a sense of inclusion but also have the sense of power and influence on

others. However, in the relationship-based virtual world—Cyworld, nine hypotheses are supported, implying that most interpersonal relationship needs can be satisfied. Here, the self-expression in virtual worlds is stronger than in virtual communities.

Implications

First, the interpersonal relationship perspective and framework in this paper has been proven effectively to explain virtual participation in both virtual communities and virtual worlds. Both the virtual community and virtual world behavior are quite new and has been researched by previous studies to explore the motivations behind these behaviors but only dispersed factors haven't been identified. A framework transcending identified factors is needed to piece up them together. The findings in this study filled this gap by providing an integrated angle of the interpersonal relationship framework. All the previous identified factors can be incorporated into this framework providing a higher conceptual model for the motivations of virtual participations. The FIRO specified that people are born with the needs to interact with others, through which a series of needs including inclusion, control, and affection can be fulfilled.

Previous studies on virtual communities and virtual worlds have only pointed out the phenomenon or investigated superficial reasons such as sense of belonging, sense of attachment, sense of community, and sense of affiliation, but have failed to elaborate clearly the reasons behind these senses. Also, previous studies have not empirically tested the proposition that these needs are significant; in contrast, the result in this dissertation is empirically tested. The application of FIRO theory in this study pointed out that these senses are elicited by the deep needs inside people's hearts. This result has dug deeper into the reasons for people to participate in VCs, and explored further into the psychological and social psychological levels. The differentiation of people's needs, first into three dimensions, and then by separating each

dimension into two directions, is a subtle description of members' interpersonal relationship needs.

Second, the three dimensions of the interpersonal relationship needs can be satisfied in the virtual environment such as virtual communities and virtual worlds. The first conclusion from FIRO model, namely that people scoring higher in expressed inclusion obtain and give information more frequently than those scoring lower, can be explained as follows: people browse and post messages in virtual environment frequently because they want to include others into their own lives. With regard to another direction of inclusion dimension, the result that people scoring higher in wanted inclusion obtain and give information more frequently than those scoring lower can be explained by saying that people browse and post messages frequently because they want to be included into other people's lives; in another words, they want to be connected with other people so that they can gain psychological satisfaction. This result from the FIRO perspective theoretically tests and confirms previous results showing that the sense of belonging, sense of community, sense of attachment, and sense of association or affiliation are important reasons for people to participate in virtual environments. Also, the differentiation of the inclusion concept into two levels makes the reasons more informative.

The second conclusion from the FIRO theory relates to the control dimension, and serves as the milestone in virtual community and virtual world studies. The conclusion is that people scoring higher in expressed control give more information than those scoring lower, and people scoring higher in wanted control obtain and give information more frequently than those scoring lower. Theoretically, people who carry the need to control or influence others tend to give information more frequently, and people who carry the need to be controlled or influenced by others tend to give and obtain information more frequently. This conclusion is the first time that the control

issue in virtual communities has been raised. Prior to this dissertation, only one virtual community study (Nguyen et al., 2006) has observed the relationship between control and virtual participation, but did not elaborate the theoretical reasons.

The third conclusion of the FIRO model, which relates to the affection dimension, sheds light on virtual community and virtual world studies by elevating the reasons for virtual participation to a higher level. The conclusion that people scoring higher on expressed affection give information more frequently than those scoring lower, and that people scoring higher on wanted affection obtain and give information more frequently than those scoring lower, means that members carry psychological needs to love others and to be loved by others, and their needs can be satisfied through interacting with others in virtual environments. This conclusion is also the first time affection issues have been raised in VC studies. Previous studies such as Bakardjieva (2003), Nip (2004), Suzuki and Calzo (2004), have only suggested that some members develop deep feelings toward VCs, or establish deep feelings with other members, but they did not empirically test this suggestion or develop any theoretical framework to investigate it.

The implications of our findings for practitioners are far reaching. The move from virtual communities to virtual worlds to shows that technology can help people to take advantage of previously undreamed of features. However, the implemented technological features should support human needs, especially those related to interpersonal relationships. The results for motivation for VC and VW participation support this proposition. Cyworld, which has many virtual world features, fulfilled more social and psychological needs and stimulated more participation among members compared to the other two virtual communities.

Future Research

Given the above implications, the future research can explore the virtual participation in the following three perspectives. First, for the interpersonal relationship perspective, future research can either test the FIRO model in the other virtual environment such as online shopping, other virtual worlds such as There, online gaming environment, and online social networking sites or adopt other interpersonal relationship theories including specific cognitive theories and specific types of interpersonal relationship theories to verify the conclusion in this study. Second, the three dimensions of the FIRO model vary with the types of virtual environments, providing a starting point to explore the virtual participation. For example, the future research can study when the control needs are salient, when the inclusion needs are salient as well as when the affection needs are salient or what types of needs are strongest in which types of virtual environments. Third, the different virtual environment has different effect in satisfying the interpersonal relationship needs, raising the issue of testing the moderating effects of different virtual environments. Future research can thus design the research in such a way to test the different virtual environment or virtual social situation's effect on the virtual participation.

Limitations

The major limitation of this paper is its data collection. The data was collected from two virtual communities but only one virtual world. As there are many other types of virtual worlds such as the Second Life, the online gaming virtual worlds like the World of Warcraft, our research model would be more reliable if tested in more virtual worlds.

Reference

Aaker, J. L. (1999). The malleable self: The role of self-expression in persuasion. *Journal of Marketing Research, 36*(1), 45-57.

Angus, I. (2011). THE EXONERATION OF SOCRATES David N. McNeill: An Image of the Soul in Speech: Plato and the Problem of Socrates. (University Park: Pennsylvania State University Press, 2010. Pp. 345. $65.00.). *The Review of Politics, 73*(02), 365-369.

Arakji, R. Y., & Lang, K. R. (2008). AVATAR BUSINESS VALUE ANALYSIS: A METHOD FOR THE EVALUATION OF BUSINESS VALUE CREATION IN VIRTUAL COMMERCE. *Journal of Electronic Commerce Research, 9*(3), 207.

Ardichvili, A., Page, V., & Wentling, T. (2003). Motivation and barriers to participation in virtual knowledge-sharing communities of practice. *Journal of Knowledge Management, 7*(1), 64.

Bagozzi, R. P., & Dholakia, U. M. (2002). Intentional Social Action in Virtual Communities. *Journal of Interactive Marketing, 16*(2), 2-21.

Bainbridge, W. S. (2007). The scientific research potential of virtual worlds. *Science, 317*(5837), 472-476.

Bainbridge, W. S. (2007, 07/27/2007). The Scientific Research Potential of Virtual Worlds. *Science, 317,* 472-476.

Bandura, A. (1982). Self-efficacy Mechanism in Human Agency. *American Psychologist, 37*, 122-147.

Bandura, A. (1986). *Social Foundations of Thought and Action: A Social Cognitive Theory*. Englewood Cliffs, N.J.: Prentice-Hall.

Bishop, J. (2007). Increasing participation in online communities: A framework for human-computer interaction. *Computers in Human Behavior, 23*(4), 1881-1893.

Blanchard, A., & Horan, T. (1998). Virtual communities and social capital. *Social Science Computer Review, 16*(3), 293-307.

Blanchard, A. L. (2007). Developing a sense of virtual community measure. *Cyberpsychology & Behavior, 10*(6), 827-830.

Blanchard, A. L. (2008). Testing a model of sense of virtual community. *Computers in Human Behavior, 24*(5), 2107-2123.

Blanchard, A. L., & Markus, L. M. (2004). The Experienced "Sense" of a Virtual Community: Characteristics and Processes. *Database for Advances in Information Systems, 35*(1), 65-79.

Boyer, L., Brunner, B. R., Charles, T., & Coleman, P. (2006). Managing impressions in a virtual environment: Is ethnic diversity a self-presentation strategy for colleges and universities? *Journal of Computer-Mediated Communication, 12*(1).

Brazelton, J., & Gorry, A. G. (2003). Creating a Knowledge-Sharing Community: If You Build it Will They Come? *Association for Computing Machinery. Communications of the ACM, 46*(2), 23-25.

Briggs, R. O., Dennis, A. R., Beck, B. S., & Nunamaker Jr, J. (1993). Whither the Pen-Based Interface? *Journal of Management Information Systems, 9*(3), 71-90.

Calvert, S. L., Mahler, B. A., Zehnder, S. M., Jenkins, A., & Lee, M. S. (2003). Gender differences in preadolescent children's online interactions: Symbolic modes of self-presentation and self-expression. [Article]. *Journal of Applied Developmental Psychology, 24*(6), 627-644.

Chen, I. Y. L. (2007). The factors influencing members' continuance intentions in professional virtual communities - a longitudinal study. *Journal of Information Science, 33*(4), 451-467.

Chesney, T., Chuah, S. H., & Hoffmann, R. (2009). Virtual World Experimentation: An Exploratory Study. *Journal of Economic Behavior and Organization, 72*(1), 618-635.

Chesney, T., Coyne, I., Logan, B., & Madden, N. (2009). Griefing in virtual worlds: causes, casualties and coping strategies. *Information Systems Journal, 19*(6), 525-548.

Christie, C. A., & Azzam, T. (2004). What's All the Talk About? Examining EVALTALK, an Evaluation Listserv. *The American Journal of Evaluation, 25*(2), 219-234.

Chu, S.-C., & Choi, S. M. (2010). Social capital and self-presentation on social networking sites: a comparative study of Chinese and American young generations. *Chinese Journal of Communication, 3*(4), 402-420.

Claus von, C., & Hauke, L. (2002). Increasing margins by joining your customers. *The Journal of Consumer Marketing, 19*(6), 514.

Davis, J. (2010). Architecture of the personal interactive homepage: constructing the self through MySpace. [Article]. *New Media & Society, 12*(7), 1103-1119.

Davis, W. A. (2008). Expressing, meaning, showing, and intending to indicate. *Intercultural Pragmatics, 5*(2), 111-129.

Dholakia, U. M., Bagozzi, R. P., & Pearo, L. K. (2004). A Social Influence Model of Consumer Participation in Network- And Small-Group-Based Virtual Communities. *International Journal of Research in Marketing, 21*(3), 241-263.

Ebner, W., Leimeister, J. M., & Krcmar, H. (2009). Community engineering for innovations: the ideas competition as a method to nurture a virtual community for innovations. *R & D Management, 39*(4), 342-356.

Eschenbrenner, B., Nah, F. F., & Siau, K. (2008). 3-D Virtual Worlds in Education: Applications, Benefits, Issues, and Opportunitie. *Journal of Database Management, 19*(4), 91-110.

Eschenbrenner, B., Nah, F. F. H., & Siau, K. (2008). 3-D virtual worlds in education: Applications, benefits, issues, and opportunities. *Journal of Database Management, 19*(4), 91-110.

Ewing, T. (2008). Participation cycles and emergent cultures in an online community. *International Journal of Market Research, 50*(5), 575-590.

Fetscherin, M., & Lattemann, C. (2008). USER ACCEPTANCE OF VIRTUAL WORLDS. *Journal of Electronic Commerce Research, 9*(3), 231.

Fetscherin, M., Lattemann, C., & Lang, G. (2008). VIRTUAL WORLDS RESEARCH: A CONCEPTUAL PRIMER. *Journal of Electronic Commerce Research, 9*(3), 192.

Füller, J., Bartl, M., Ernst, H., & Mühlbacher, H. (2006). Community based innovation: How to integrate members of virtual communities into new product development. *Electronic Commerce Research, 6*(1), 57-73.

Furnham, A. (1990). The Fakeability of the 16 PF, Myers-Briggs and FIRO-B Personality Measures. *Personality and Individual Differences, 11*(7), 711-716.

Furnham, A. (1996). The FIRO-B, the Learning Style Questionnaire, and the Five-Factor Model. *Journal of Social Behavior & Personality, 11*(2), 285-299.

Gensollen, M. (2006). Online communities: file exchanges, sharing of experiences and visual participation. *Esprit*(5), 179-194.

Goffman, E. (1959). *The presentation of self in everyday life*. Garden City, N.Y.,: Doubleday.

Gonzales, A. L., & Hancock, J. T. (2011). Mirror, Mirror on my Facebook Wall: Effects of Exposure to Facebook on Self-Esteem. *Cyberpsychology Behavior and Social Networking, 14*(1-2), 79-83.

Green, M. S. (2007). *Self-expression*. Oxford

New York: Clarendon Press ;

Oxford University Press.

Hagel, J., & Armstrong, A. (1997). *Net Gain: Expanding Markets through Virtual Communities*. Boston: Harvard Business School Press.

Hall, H., & Graham, D. (2004). Creation and recreation: motivating collaboration to generate knowledge capital in online communities. *International Journal of Information Management, 24*(3), 235-246.

Hemp, P. (2006). Avatar-Based Marketing. *Harvard Business Review, 84*(6), 48-56.

Hendaoui, A., & Limayem, M. (2008). *Understanding Consumer Virtual Shopping Behavior in 3D Virtual Worlds: A Theoretical and Empirical Investigation.* Paper presented at the International Conference on Information Systems, Paris, France.

Holzwarth, M., Janiszewski, C., & Neumann, M. M. (2006). The influence of avatars on online consumer shopping behavior. *Journal of Marketing, 70*(4), 19-36.

Hua, G. Y., & Haughton, D. (2009). Virtual worlds adoption: a research framework and empirical study. *Online Information Review, 33*(5), 889-900.

Hurley, J. R. (1990). Does FIRO-B Relate Better to Interpersonal or Intrapersonal Behavior? *Journal of Clinical Psychology, 46*(4), 454-460.

Jin, D. Y., & Chee, F. (2008). Age of New Media Empires: A Critical Interpretation of the Korean Online Game Industry. *Games and Culture, 3*(1), 38-58.

Jones, E. E. (1964). *Ingratiation, a social psychological analysis*. New York,: Appleton-Century-Crofts.

Jones, E. E., & Wortman, C. B. (1973). *Ingratiation : an attributional approach*. Morristown, N.J.: General Learning Press.

Jung, T., Youn, H., & McClung, S. (2007). Motivations and Self-Presentation Strategies on Korean-Based "Cyworld" Weblog Format Personal Homepages (Vol. 10, pp. 24-31).

Kim, E. Y., & Kim, Y.-K. (2004). Predicting online purchase intentions for clothing products. *European Journal of Marketing, 38*(7), 883.

Kim, H. W., & Chan, H. C. (2007). Why People Pay for Digital Items? Presentation Desire of Online Identity *Pacific Asia Conference on Information Systems 2007, Sections 1-6* (pp. U200-U214).

Kim, K.-H., & Yun, H. (2007). Cying for Me, Cying for Us: Relational Dialectics in a Korean Social Network Site *Journal of Computer-Mediated Communication, 13*(1), 298-318.

Kim, W. G., Lee, C., & Hiemstra, S. J. (2004). Effects of an online virtual community on customer loyalty and travel product purchases. *Tourism Management, 25*(3), 343-355.

Koh, J., Kim, Y. G., Butler, B., & Bock, G. W. (2007). Encouraging participation in virtual communities. *Communications of the Acm, 50*(2), 69-74.

Kollock, P. (1999). The Economics of Online Cooperation: Gifts and Public Goods in Cyberspace. In M. A. Smith & P. Kollock (Eds.), *Communities in cyberspace* (pp. x, 323 p.). London; New York: Routledge.

Kozinets, R. V. (1999). E-Tribalized Marketing?: the Strategic Implications of Virtual Communities of Consumption. *European Management Journal, 17*(3), 252-264.

Lampel, J., & Bhalla, A. (2007). The role of status seeking in online communities: Giving the gift of experience. *Journal of Computer-Mediated Communication, 12*(2).

Leary, M. R. (1995). *Self-presentation : impression management and interpersonal behavior*. Madison, Wis.: Brown & Benchmark Publishers.

Manago, A. M., Graham, M. B., Greenfield, P. M., & Salimkhan, G. (2008). Self-presentation and gender on MySpace. *Journal of Applied Developmental Psychology, 29*(6), 446-458.

Marcus, B., Machilek, F., & Schutz, A. (2006). Personality in cyberspace: Personal Web sites as media for personality expressions and impressions. [Article]. *Journal of Personality and Social Psychology, 90*(6), 1014-1031.

Mazur, E., & Kozarian, L. (2010). Self-Presentation and Interaction in Blogs of Adolescents and Young Emerging Adults. *Journal of Adolescent Research, 25*(1), 124-144.

McKee, H. (2002). "Your Views Showed True Ignorance!!!": (Mis)Communication in an online interracial discussion forum. *Computers and Composition, 19*(4), 411-434.

McWilliam, G. (2000). Building Stronger Brands through Online Communities. *Sloan management review, 41*(3), 43.

Mehdizadeh, S. (2010). Self-Presentation 2.0: Narcissism and Self-Esteem on Facebook. *Cyberpsychology Behavior and Social Networking, 13*(4), 357-364.

Moore, J. (2010). Artistic Expression Goes Green. *Acta Analytica, 25*(1), 89-103.

Nambisan, S., & Baron, R. A. (2009). Virtual Customer Environments: Testing a Model of Voluntary Participation in Value Co-creation Activities. *Journal of Product Innovation Management, 26*(4), 388-406.

Nastri, J., Pena, J., & Hancock, J. T. (2006). The construction of away messages: A speech act analysis. [Article]. *Journal of Computer-Mediated Communication, 11*(4).

Papacharissi, Z. (2002). The Presentation of Self in Virtual Life: Characteristics of Personal Home Pages. *Journalism and Mass Communication Quarterly, 79*(3), 643-660.

Papagiannidis, S., Bourlakis, M., & Li, F. (2008). Making real money in virtual worlds: MMORPGs and emerging business opportunities, challenges and ethical implications in metaverses. *Technological Forecasting and Social Change, 75*(5), 610-622.

Preece, J., Nonnecke, B., & Andrews, D. (2004). The Top Five Reasons for Lurking: Improving Community Experiences for Everyone. *Computers in Human Behavior, 20*(2), 201-223.

Price, S., Arbuthnot, E., Benoit, R., Landry, D., Landry, M., & Butler, L. (2007). The Art of Nursing: Communication and Self-Expression. *Nursing Science Quarterly, 20*(2), 155-160.

Rheingold, H. (1993). *The Virtual Community: Homesteading on the Electronic Frontier*. Reading, Mass.: Addison-Wesley Pub. Co.

Rheingold, H. (2000). *The Virtual Community: Homesteading on the Electronic Frontier* (Rev. ed.). Cambridge, Mass.: MIT Press.

Ridings, C. M., Gefen, D., & Arinze, B. (2002). Some antecedents and effects of trust in virtual communities. *Journal of Strategic Information Systems, 11*(3-4), 271-295.

Ridings, C. M., Gefen, D., & Arinze, B. (2002). Some antecedents and effects of trust in virtual communities. *The Journal of Strategic Information Systems, 11*(3-4), 271-295.

Rothaermel, F., & Sugiyama, S. (2001). Virtual Internet Communities and Commercial Success: Individual and Community-Level Theories Grounded in the Atypical Case of TimeZone.com. *Journal of Management, 27*(3), 297-312.

Rothaermel, F. T., & Sugiyama, S. (2001). Virtual Internet Communities and Commercial Success: Individual and Community-Level Theory Grounded in the Atypical Case of Timezone.Com. *Journal of Management, 27*(3), 297-312.

Sanderson, J. (2008). The Blog is Serving Its Purpose: Self-Presentation Strategies on 38pitches.com. *Journal of Computer-Mediated Communication, 13*(4), 912-936.

Schlenker, B. R. (1985). Identity and Self-Identification. In B. R. Schlenker (Ed.), *The Self and Social Life* (pp. 15-99). New York: McGraw-Hill.

Schutz, W. C. (1966). *The Interpersonal Underworld*. Palo Alto, Calif.: Science & Behavior Books.

Stritzke, W. G. K., Nguyen, A., & Durkin, K. (2004). Shyness and computer-mediated communication: A self-presentational theory perspective. [Article]. *Media Psychology, 6*(1), 1-22.

Stuart, B., & Jan, M. (2008). BRAND VALUE IN VIRTUAL WORLDS: AN AXIOLOGICAL APPROACH. *Journal of Electronic Commerce Research, 9*(3), 195.

Surinder, S. K., Elizabeth, C., & Rebecca, J. (2007). Team collaboration in virtual worlds (Vol. 38, pp. 61-68): ACM.

Sykes, T. A., Venkatesh, V., & Gosain, S. (2009). MODEL OF ACCEPTANCE WITH PEER SUPPORT: A SOCIAL NETWORK PERSPECTIVE TO UNDERSTAND EMPLOYEES' SYSTEM USE. *MIS Quarterly, 33*(2), 371-393.

Tajfel, H., & Turner, J. C. (1986). The Social Identity Theory of Intergroup Behavior. In W. G. Austin & S. Worchel (Eds.), *Psychology of Intergroup Relations* (2nd ed., pp. 7-24). Chicago: Nelson-Hall Publishers.

Teo, H.-H., Chan, H.-C., Wei, K.-K., & Zhang, Z. (2003). Evaluating Information Accessibility and Community Adaptivity Features for Sustaining Virtual Learning Communities. *International Journal of Human-Computer Studies, 59*(5), 671-697.

Vasalou, A., & Joinson, A. N. (2009). Me, myself and I: The role of interactional context on self-presentation through avatars. *Computers in Human Behavior, 25*(2), 510-520.

Vazire, S., & Gosling, S. D. (2004). e-Perceptions: Personality impressions based on personal websites. [Article]. *Journal of Personality and Social Psychology, 87*(1), 123-132.

Wang, Y., & Fesenmaier, D. R. (2003). Assessing Motivation of Contribution in Online Communities: An Empirical Investigation of an Online Travel Community. *Electronic Markets 13*(1), 33-45.

Wang, Y., & Fesenmaier, D. R. (2004a). Modeling Participation in an Online Travel Community. *Journal of Travel Research, 42*(3), 261-270.

Wang, Y., & Fesenmaier, D. R. (2004b). Towards Understanding Members' General Participation in and Active Contribution to an Online Travel Community. *Tourism Management, 25*(6), 709-722.

Wasko, M. M., & Faraj, S. (2000). "It is What One Does": Why People Participate and Help Others in Electronic Communities of Practice. *The Journal of Strategic Information Systems, 9*(2-3), 155-173.

Wasko, M. M., & Faraj, S. (2005). Why should I Share? Examining Social Capital and Knowledge Contribution in Electronic Networks of Practice. *MIS Quarterly, 29*(1), 35-57.

Whitty, M. T. (2008). Revealing the 'real' me, searching for the 'actual' you: Presentations of self on an internet dating site. *Computers in Human Behavior, 24*(4), 1707-1723.

Wiertz, C., & de Ruyter, K. (2007). Beyond the call of duty: Why customers contribute to firm-hosted commercial online communities. *Organization Studies, 28*(3), 347-376.

Xu, B., & Jones, D. R. (2010). Volunteers' Participation in Open Source Software Development: A Study from the Social-Relational Perspective. *Data Base for Advances in Information Systems, 41*(3), 69-84.

Yates, D., Wagner, C., & Majchrzak, A. (2010). Factors Affecting Shapers of Organizational Wikis. *Journal of the American Society for Information Science and Technology, 61*(3), 543-554.

Appendix

Figure 1. Review of Reasons for virtual world Participation

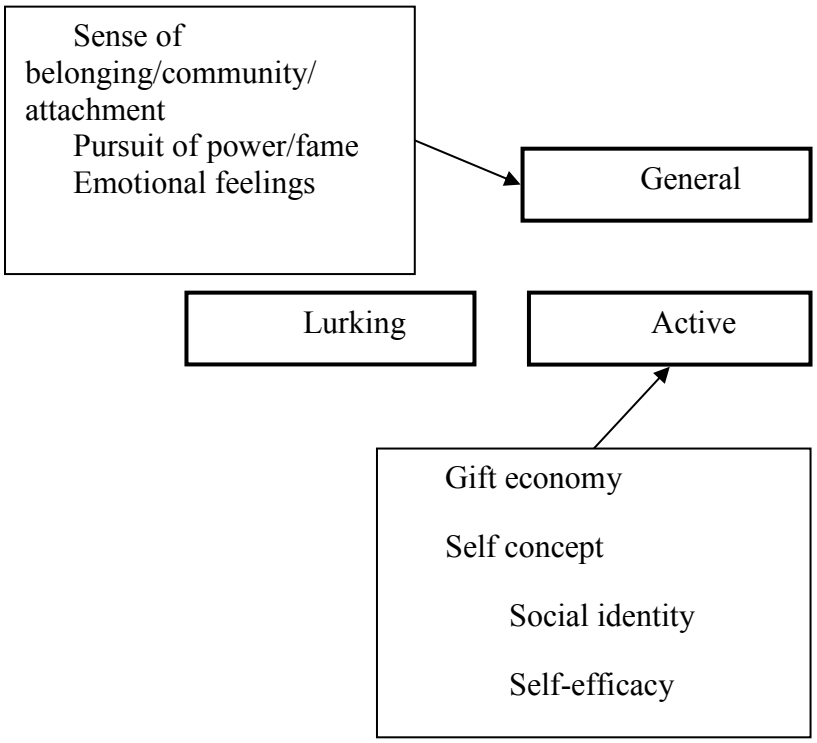

Figure 2. Research Model

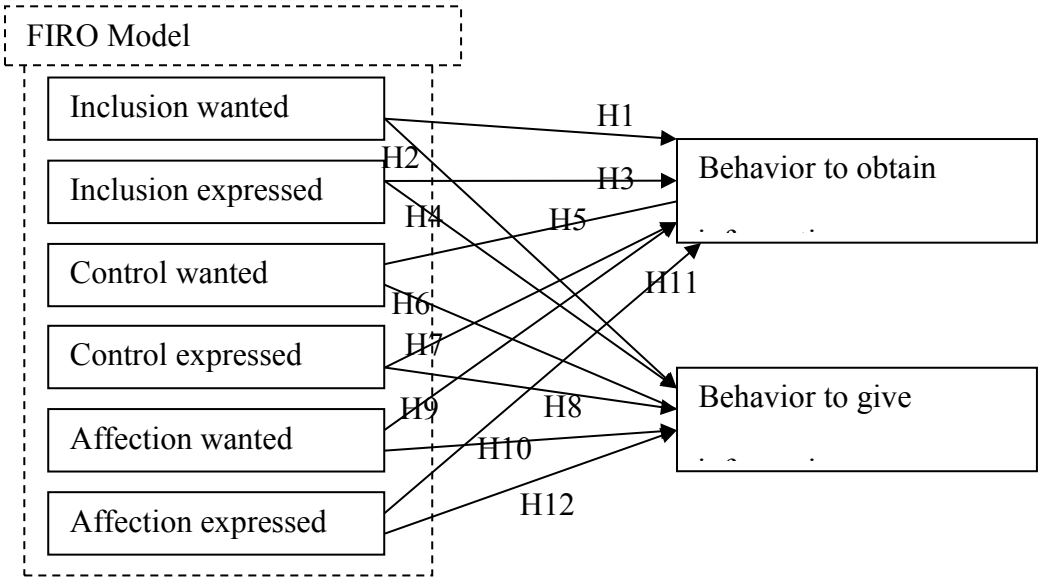

Table 1. Comparison of a VW and VC

Category	VC	VW
Emphasis	Functional	Technological
Reality level	Low	High
Main Mediators	Simple image icons (2D avatar is optional)	3D avatars (steer avatar to interact with other things)
Viewpoint	Third person viewpoint	First and third person viewpoints
Environment	Not mandatory (usually web-based)	Simulated environment (special software required)
Time	Synchronous/Asynchronous (real-time/time-delayed)	Synchronous (real-time)

Table 2. the reliability

Construct	Cronbach's Alpha (Pilot)	Cronbach's Alpha (Microsoft)	Cronbach's Alpha (Xilu)	Cronbach's Alpha (Cyworld)
EI (Expressed Inclusion)	0.75	0.70	0.72	0.67
WI (Wanted Inclusion)	0.95	0.87	0.89	0.88
EC (Expressed Control)	0.85	0.82	0.84	0.79
WC (Wanted Control)	0.77	0.81	0.76	0.76
EA (Expressed Affection)	0.81	0.85	0.81	0.78
WA (Wanted Affection)	0.92	0.83	0.82	0.73

Table 3. Coefficient of Reproducibility for FIRO

Construct	Coefficient of Reproducibility (Microsoft)	Coefficient of Reproducibility (Xilu)	Coefficient of Reproducibility (Cyworld)	Recommended value
EI	0.92	0.93	0.98	>=0.85
WI	0.93	0.93	0.95	>=0.85
EC	0.93	0.93	0.97	>=0.85
WC	0.94	0.92	0.97	>=0.85
EA	0.91	0.91	0.91	>=0.85
WA	0.87	0.88	0.89	>=0.85
Average	0.92	0.92	0.95	>=0.85

Table 4. Coefficient of Scalability for FIRO

Construct	Coefficient of Scalability (Microsoft)	Coefficient of Scalability (Xilu)	Coefficient of Scalability (Cyworld)	Recommended value
EI	0.68	0.71	0.92	>=0.60
WI	0.66	0.63	0.87	>=0.60
EC	0.74	0.70	0.88	>=0.60
WC	0.78	0.71	0.88	>=0.60
EA	0.60	0.61	0.75	>=0.60
WA	0.46	0.51	0.59	>=0.60
Average	0.65	0.65	0.82	>=0.60

Table 5. One-way ANOVA of FIRO on Virtual participation

		Microsoft		Xilu		Cyworld	
Construct	DV	F	Sig.	F	Sig.	F	Sig.
EI	BOI	1.089	.369	3.116	.001***	1.653	0.097
	BGI	2.342	.014*	7.283	.000***	2.139	0.025*
WI	BOI	.846	.574	1.858	.058	1.461	0.159
	BGI	1.655	.097	1.342	.215	1.335	0.216
EC	BOI	.669	.737	2.048	.034*	2.678	0.005**
	BGI	1.380	.194	3.126	.001***	4.140	0.000***
WC	BOI	1.136	.335	2.161	.025*	3.674	0.000***
	BGI	1.634	.102	1.448	.167	5.184	0.000***
EA	BOI	.983	.453	1.421	.178	2.839	0.003**
	BGI	2.535	.007**	2.280	.017*	3.518	0.000***
WA	BOI	1.561	.124	.798	.619	2.271	0.017*
	BGI	2.192	.021*	1.490	.151	1.672	0.093

*significant at .05 level **significant at 0.01 level *** significant at 0.001 level

Table 6 Supported Relationships

Hypotheses	Relationships	Supported or Not Microsoft	Supported or Not Xilu	Supported or Not Cyworld
1	EI→BOI	Not supported	Yes	Not supported
2	EI→BGI	Yes	Yes	Yes
3	WI→BOI	Not supported	Not supported	Not supported
4	WI→BGI	Not supported	Not supported	Not supported
5	EC→BOI	Not supported	Yes	Yes
6	EC→BGI	Not supported	Yes	Yes
7	WC→BOI	Not supported	Yes	Yes
8	WC→BGI	Not supported	Not supported	Yes
9	EA→BOI	Not supported	Not supported	Yes
10	EA→BGI	Yes	Yes	Yes
11	WA→BOI	Not supported	Not supported	Yes
12	WA→BGI	Yes	Not supported	Not supported