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THE INTERPERSONAL RELATIONSHIP PERSPECTIVE ON VIRTUAL COMMUNITY PARTICIPATION

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Abstract

Understanding virtual community (VC) participation is of importance to VC organizers and VC researchers. Although VC participation has been explored from diverse perspectives, few studies offer a comprehensive theoretical framework to explain why people participate in VCs. This paper contributes to virtual community research by proposing and empirically validating an exploratory theoretical framework based on the interpersonal relationship perspective using two interpersonal relationship models—the Triandis interpersonal behavior model, based on a social psychological perspective, and the Fundamental Interpersonal Relationship Orientation (FIRO) model, based on a communicational perspective—to explain two types of VC participation: behavior to obtain information (BOI) and behavior to give information (BGI). The data analysis results showed that the two interpersonal relationship models are effective in explaining VC participation. The interpersonal relationship perspective of VC participation not only offers a comprehensive theoretical framework but also opens up a new avenue of VC research.

Keywords: Virtual communities, virtual community participation, interpersonal relationship, FIRO, Triandis.

Introduction

Research on virtual communities (VCs) is becoming an important area in the field of information systems because of the wide application and acceptance of VCs in marketing (Bickle et al. 2004; Hagel 1999; Kim et al. 2004; Kozinets 1999; Shalo 2002), business transactions (Hagel et al. 1997; Rothaermel et al. 2001), knowledge management (Davenport 1996), social support (Burrows et al. 2000; Norris 2002), and society in general (Agres et al. 1998; Romm et al. 1997). A central line of research in VC participation investigates why members participate in them. This is important, because the growth of and contribution to VCs mainly depends on the participation of members.

Many VC studies have endeavored to find a theoretical framework to explain VC participation. In a number of studies, diverse factors have been reported to be related to the participation of members in VCs, such as a sense of community or attachment (Blanchard et al. 2004); a sense of belonging (Bressler et al. 2000; Rheingold 2000; Teo et al. 2003; Wang et al. 2004b); the pursuit of power, fame (Nguyen et al. 2006; Rheingold 2000; Wang et al. 2004b; Wasko et al. 2005), or status (Rheingold 2000); and emotional feelings (Bakardjieva 2003). Some other studies are based on the gift economy perspective (Kollock 1999; Rheingold 1993; Ridings et al. 2002; Wang et al. 2004a; Wang et al. 2004b; Wasko et al. 2000; Wasko et al. 2005), social identity theory (Tajfel et al. 1986), self-efficacy theory (Bandura 1982; Bandura 1986), self-presentation (Schlenker 1985), and the trust perspective (Ridings et al. 2002). A virtual community may also be a place in which people form relationships as they do in an offline community (Carter 2005; Nip 2004). Previous studies have neglected the interpersonal relationship aspect of participation in VCs; the studies seem independent and quite different from each other, yet they all explain the same behavior and fail to provide a systematic framework to explain VC participation. Another oversight in previous VC participation research is that participation behavior is often investigated either as general participation or active participation, whereas two types of behavior, lurking and active participation actually exist.

This paper offers a new perspective by which to explain VC participation. The interpersonal relationship perspective is introduced as a framework through which to explore the participation of VC members, using two interpersonal relationship models—the Triandis model (Triandis 1977; Triandis 1980), based on a social psychological perspective, and the Fundamental Interpersonal Relationship Orientation (FIRO) model (Schutz 1958; Schutz 1966), based on a communicational perspective. Specifically, the paper attempts to demonstrate that members in VCs participate to fulfill their interpersonal relationship needs. Further, two types of participation behavior, behavior to obtain information (BOI) and behavior to give information (BGI), are investigated. The data were collected from three large representative Chinese VCs and analyzed with SEM for the Triandis Model and ANOVA for the FIRO model. The results show that both interpersonal relationship models can explain VC participation.

Literature Review

A review of studies on the antecedents of VC participation is undertaken, followed by a review of the interpersonal relationship theories in the two models—the Triandis interpersonal behavior model and the FIRO model.

Review of VC Participation

Studies have shown that the factors influencing the behavior of VC members vary with the type of participation activity. Three general types of participation behavior have been identified in the literature—general participation, lurking, and active participation. Each of these three behaviors contributes to the overall development of VCs.

General participation, defined either as the time spent, or the frequency of participation, in VCs (Wang et al. 2003; Wang et al. 2004a; Wang et al. 2004b) or the intention to participate in VCs (Bagozzi et al. 2002; Teo et al. 2003), has been investigated in several studies, and the results show that social psychological reasons, such as a sense of community or attachment (Blanchard et al. 2004), a sense of belonging (Bressler et al. 2000; Rheingold 2000; Teo et al. 2003; Wang et al. 2004b), the pursuit of power, fame (Nguyen et al. 2006; Rheingold 2000; Wang et al. 2004b), or status (Rheingold 2000), and emotional feelings (Bakardjieva 2003) are major motivations for VC participation.

Lurking refers to viewing, but not posting messages, in a VC. People who lurk are called lurkers. Lurking behavior has been reported in a series of studies (Brazelton et al. 2003; Christie et al. 2004; McKee 2002; Preece et al. 2004), but has not been extensively investigated.

In fact, posting messages in VCs generates more interest from VC researchers than lurking or general participation, because active VC participation contributes to the continued success of VCs, even though this behavior is spontaneous, unrewarding, and time-consuming. Three approaches have been proposed to explore and explain active participation.

Several researchers have adopted the gift economy viewpoint (Kollock 1999; Rheingold 2000; Wang et al. 2003; Wasko et al. 2000). Others have used social identity theory (Dholakia et al. 2004; Tajfel et al. 1986), self-efficacy theory (Bandura 1982; Wang et al. 2004b), or self-presentation theory (Papacharissi 2002; Schlenker 1985), which are sub-theories of self-concept theory, to investigate participation in VCs. According to self-concept theory, individuals can gain satisfaction and build their ideal selves through managing their social identity (Tajfel et al. 1986), self-presentation (Schlenker 1985), and self-efficacy (Bandura 1982; Bandura 1986) in social groups. VCs enable members to build their social identity, manage the impressions that others have of them, and increase their self-efficacy. Activities in VCs such as answering messages, tackling difficult questions, and sharing experiences can facilitate members in achieving their ideal selves.

Social constructs, such as culture (McKee 2002), trust (Ridings et al. 2002), centrality in the network and self-related expertise (Wasko et al. 2005), and friendship (Carter 2005), are based on social capital theories, and researchers taking this approach propose that trust, social networks, and other social factors that people acquire in VCs are valuable resources and beneficial for their social recognition.

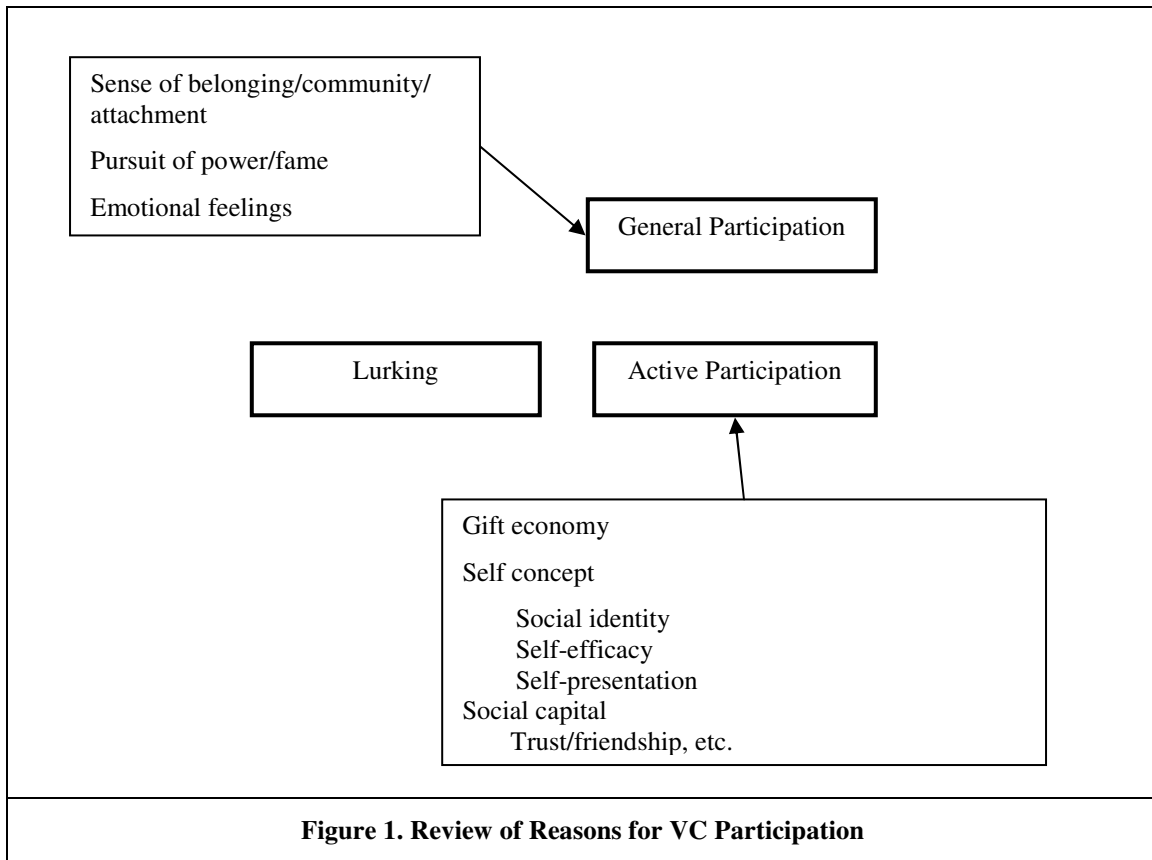


Figure 1 shows the main factors identified in previous studies for VC participation. Although VC participation has been explored from a number of perspectives, no conclusive agreement regarding why people participate in VCs has been reached. There is a need for a comprehensive and systematic theoretical framework to find out why people participate in VCs. Empirical studies to test a theoretical framework of VC participation are also needed. Specifically, previous studies leave five gaps to be filled. First, a systematic theoretical framework is needed to explain VC participation; second, lurking behavior should be distinguished from general participation and posting

behavior; third, the antecedents of lurking behavior need to be theoretically investigated; fourth, the antecedents of active participation have not been conclusively documented; and fifth, empirical studies are few.

The Interpersonal Relationship Perspective and Theories

The interpersonal relationship perspective offered in this study aims to fill the five gaps noted above. Before VCs 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 VC participation has never been examined in previous VC studies.

There are three perspectives by which interpersonal relationships can be viewed—psychological, social psychological, and communicational. Interpersonal psychological theory serves as the foundation for the other two theories by modeling the mental representation of people's interactions (Pincus et al. 2003). In the interpersonal psychological theory schema, the interpersonal communicational and social psychological theories complement each other as the covert and overt mental representations of the interpersonal relationship process. Compared to the psychological approach of psychiatry and personality identification, the communicational and social psychological approaches for explaining the function of and cognitive reasons for interpersonal behavior are more appropriate to investigate the interpersonal relationships in the VC environment.

To demonstrate the fitness of the interpersonal relationship perspective to explain VC participation, we adopt both the communicational and the social psychological perspective. Two models, the FIRO model (Schutz 1966), based on the communicational perspective, and the Triandis interpersonal behavior model (Triandis 1977; Triandis 1980), based on the social psychological perspective, which are comprehensive and have been validated by many studies, are employed in this paper.

The FIRO Model

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 (1958; 1966) 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 (Di Marco 1974; Hill 1977; Ilgen et al. 1974), effectiveness (Fisher et al. 1995; Smith et al. 1975), and efficiency (Hewett et al. 1974).

The Triandis Interpersonal Behavior Model

An interpersonal behavior model was proposed by Triandis in 1977 and developed further by the researcher in 1980, with the objective of building a synthesized model to include centripetal variables of attitudes, values, and other acquired behavior dispositions that could be used to describe different types of interpersonal behavior.

The core of the Triandis model is the mechanism of the motivations for behavior, which can be described by two equations built on intention and habit relationships:

$$P_a = (w_H H + w_I I) I.F$$

$$I = w_S S + w_A A + w_C C.$$

The first equation represents the probability of a behavior P_a as a function of the sum of habits (H) plus behavioral intentions (I), multiplied by the organism's physiological arousal (P) and by the facilitating conditions (F). The second equation describes behavioral intention as a function of social factors (S), affect (A), and perceived consequences (C). w represents weight, which ranges from 0 to 1. According to the first equation, behavior is jointly determined by habit and intentional motivations, which supplement each other. When an individual is familiar with a certain behavior, his or her ability to perform this behavior will be high and his or her action toward this behavior will become automatic, which lays the ground for this behavior to become habitual. Accordingly, the intention toward the behavior is a self-conscious and self-instructional command of the individual. The relationship between habit and behavior is like a zero-sum game. When an individual's automatic behavior is high, that is, his or her habit toward this behavior is high, the individual's intention toward this behavior is low. However, even in the presence of the habit and intention, if the external environment does not permit the behavior to happen, the individual cannot perform the behavior.

The second equation shows how behavioral intention is jointly determined by affect, perceived consequences, and social factors. Affect refers to an individual's cognitive feeling toward the behavior, social factors refer to the internalization of the individual's subjective culture of the group of people with whom he or she interacts most often, and consequences refers to the values the behavior may bring to the individual after he or she performs the behavior.

In addition to these two core equations, the Triandis model suggests there are other relationships among the variables. For example, habit has a positive influence on affect, which suggests that previous automatic experience of a habit will strengthen an individual's emotional feeling.

The Triandis model has proved useful for explaining attitude-behavior relationships. It can be used across disciplines, and so can be regarded as even more useful than models such as Fishbein's model (1975) of attitudes (Sheth 1982). The most often used relationship is attitude-behavior relationships. There is a tradeoff between an attitude-behavior relationship and a habit-behavior relationship, however. If the attitude-behavior relationship is strong, then the habit-behavior relationship is weak (Verplanken et al. 1994).

Conceptual Model

Although interpersonal relationship theories were developed before VCs existed, we believe that they are appropriate for application in the investigation of VCs because relationships are not bounded by the physical body, and people's online identity is strongly associated with their offline identity (Powers 2003). A review of the interpersonal relationship perspective and the two theories employed in this study follows.

The Interpersonal Relationship Perspective

Interpersonal behavior is defined as the expression of personality (and hence the investigation of its nature) focusing on phenomena involving more than one person—that is to say, when some form of relating occurs (Benjamin 1984; Kiesler 1996; Pincus et al. 2003). This perspective focuses on the mental processes of an individual, and the major application is in psychiatry (Pincus et al. 2003; Westerman 2005). The unit of analysis is the mental processes. One important concept of interpersonal behavior is the interpersonal situation in which the interpersonal relationship occurs. Another important concept is the individual's intrapsychic configuration, which refers to the stable psychological state of an individual. An individual's intrapsychic configuration appears to be present at birth and is

difficult to change. According to paradigms developed in the psychological interpersonal relationship field, interpersonal behavior occurs inside the minds of the dyad (two people). Interpersonal behavior is much more the interaction between the intrapsychic processes and the mental perceptions of the interpersonal situation or environment of the dyad's members than the superficial interaction between the dyad members. The interpersonal interactions are only the overt interpersonal behavior, while the more important interactions are covert, happening inside the minds of the dyad's members. The covert interactions regulate the overt interactions, and the overt interactions manifest the covert interactions.

The communicational perspective views an interpersonal relationship as a communication process, which is defined as an interactional process between members of a dyad, either face-to-face or through some medium. This perspective focuses on the process of the relationship, and the unit of analysis is the dyad itself (Cappella 1987). This perspective explores the function of the interpersonal relationship at the strategic level, which means that this perspective tries to answer why people initiate interpersonal relationships, and what kind of goals they wish to achieve through the interpersonal communication process.

Interpersonal relationships are viewed, from the social psychological perspective, as a subset of social behaviors, and are determined by the cognitive conceptions of the participants of what is appropriate. Motivation, attitude, and attitude change toward behavior are very important factors that influence behavior (Triandis 1977). This perspective explores the cognitive factors that influence the behaviors (Baron et al. 1998).

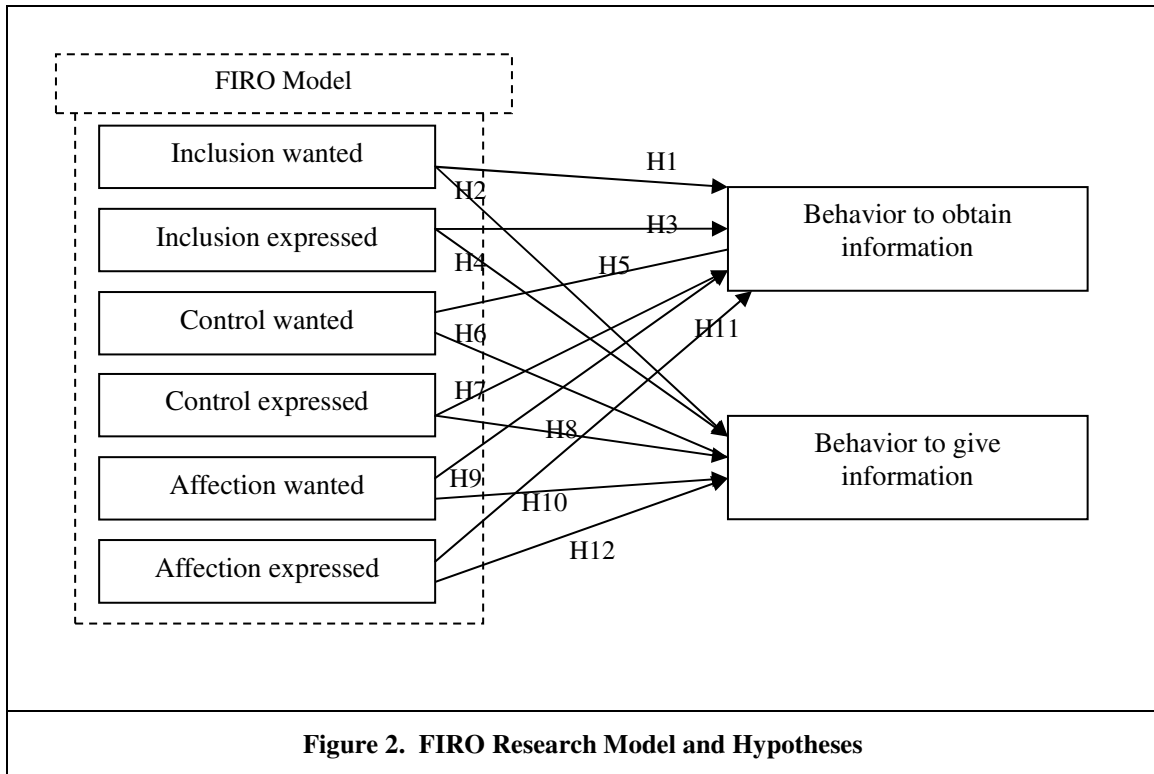
Because of the way in which interpersonal relationships are viewed by the communicational and social psychological perspectives, these perspectives were chosen in this paper to constitute the theoretical foundation to comprehensively illustrate the way in which the interpersonal relationship perspective can effectively explain VC participation. The psychological perspective is rejected because its application is in clinical psychiatry, and it is not easily applied directly to other environments for empirical testing. Also, it does not clearly state the motivation for the interpersonal relationship (Pincus et al. 2003). In fact, the communicational and social psychological perspectives are the extension and application of concepts developed from the psychological perspective (Berscheid 1994). The functional purpose of achieving interpersonal goals from the communicational perspective actually plays the role of covert interactions from the intrapsychic processes, and the cognitive representation of the social psychological perspective plays the role of overt interactions between an individual and his or her environment.

Two models—Triandis's model, based on the social psychological perspective, and the FIRO model, based on the communicational perspective—are adopted in this paper to investigate the motivations for the participation of members in VCs. We choose these two models because they are comprehensive and transcend the different types of interpersonal relationships. Depending on the aims of the research, other interpersonal relationship theories may be more appropriate, as the researchers may be focusing on specific interpersonal relationships such as family or marital relationships, or friendship (Berscheid 1994). However, the purpose of this paper is to theoretically explain VC participation, and an abstract and comprehensive theory is better in this case than theories that deal with specific and subtle interpersonal relationships. Both of the models are abstract and can transcend the relationship type.

Although the two models chosen differ in their structure, factors, and mechanism, they share a focus on the prediction of VC behavior from an interpersonal relationship perspective. Moreover, there are elements of these approaches that complement each other theoretically as well as topically. The FIRO model, based on the communicational perspective, explains the covert mental processes of individuals, whereas the Triandis model explains the overt interactions of the dyad's members from the psychological perspective. These two theoretical models, built upon a psychological framework, provide a complete perspective of the major aspects of interpersonal relationships. Thus, their mutual consideration may also offer greater insights into the antecedents of VC participation.

The FIRO Model

The FIRO model, illustrated in Figure 2, postulates that VC 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). VC participation, again, is classified into BGI and BOI, to understand the participation 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.

From the communicational perspective, the FIRO model is appropriate for the VC environment. 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 VC environment. Thus, the following hypotheses are developed.

- 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.*
- 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.*
- 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.*
- 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.*
- 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.*

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.

The Triandis Model

Although the Triandis interpersonal relationship model has long been regarded as an adoption theory or behavior choice model in the IS and marketing fields, it is in fact an interpersonal relationship theory that attempts to explain behaviors toward others in a complicated social environment. Triandis made the following statement regarding the purpose of his model.

In any interpersonal encounter, the behavior is determined by the participants' conceptions of what is appropriate, since they have been taught that some behaviors are correct and others are not. But their behavior is also determined by what other people pressure them to do, how much they enjoy or dislike this behavior, what consequences they see connected with the behavior, and how much they value these consequences. (Triandis 1977)

The Triandis interpersonal relationship model is a representative and comprehensive interpersonal behavior theory to explain interpersonal relationships. This model attempts to explain interpersonal relationship behavior and encompasses all the social psychological variables related to actual behavior and antecedents of attitude. The most salient feature of the Triandis model is arguably the distinction between the internalized antecedents, represented by habit and the rational antecedents, represented by intention. According to the model, behavior is not only influenced by a person's cognitive, deliberate, and rational factors, but also determined by his or her internalized and automatic factors, which have been neglected in IS adoption studies in past decades. The Triandis model provides the automatic antecedents of behavior, rather than the intentional antecedents. When an individual is familiar with the behavior he or she is doing, this individual will internalize this behavior as an automatic behavior, which is in fact a habit. The habit and intention supplement each other, but only one of them is salient in this model.

Because of the interpersonal relationship orientation of VCs, the Triandis interpersonal relationship model is appropriate for the elaboration of VC participation. Also, because VC software is easy to use, the Triandis model can focus on participation issues rather than technical acceptance issues.

The Triandis interpersonal relationship model depicted in Figure 3 proposes that VC participation behaviors (BOI and BGI) can be explained by the participation habits and behavioral intentions (BI) of VC members. BI is in turn determined by the affect, perceived consequences, and social factors concerning VCs, whereas habit has an effect on affect. Based on these two interpersonal relationship models, nine hypotheses are proposed.

H13: Members' behavior to obtain information will positively influence their behavior to give information.

H14: Habit will have a positive effect on VC members' behavior to obtain information.

H15: Habit will have a positive effect on VC members' behavior to give information.

H16: Behavioral intention will have a positive effect on VC members' behavior to obtain information.

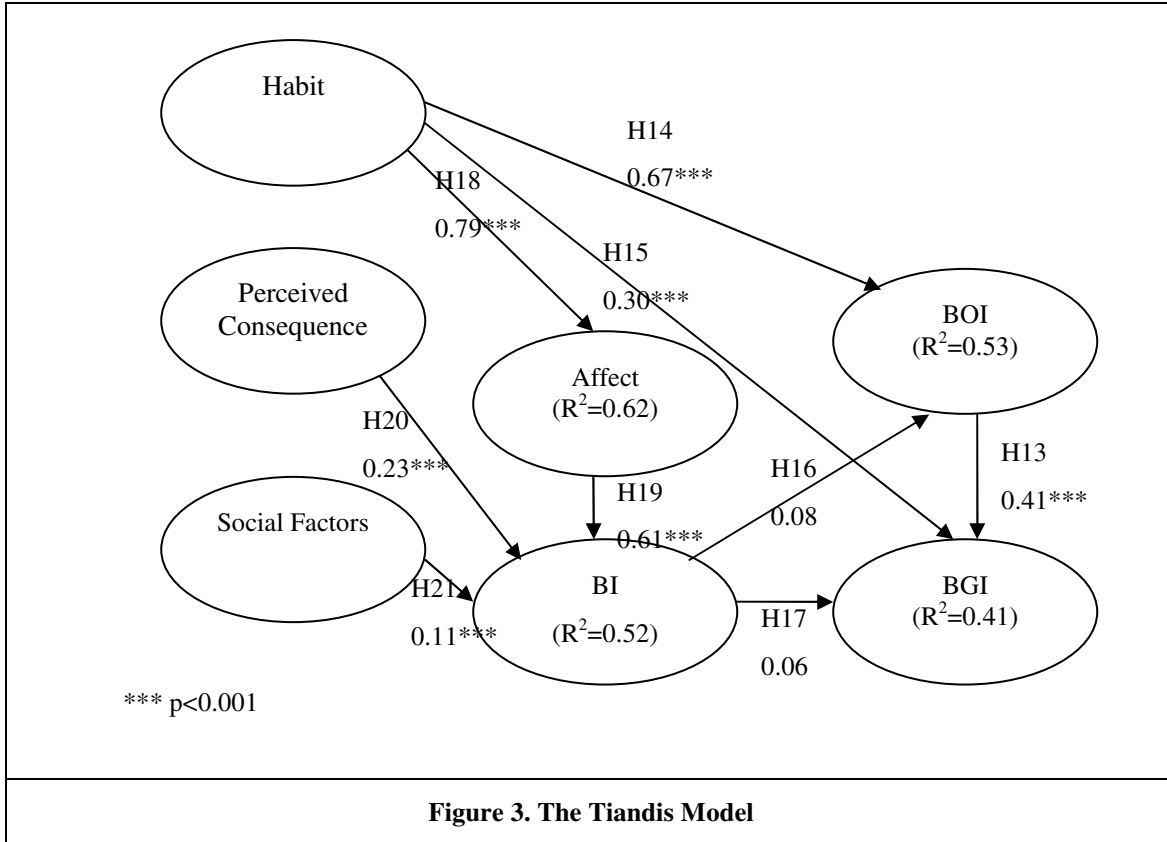
H17: Behavioral intention will have a positive effect on VC members' behavior to give information.

H18: The habit of VC members' activities will have a positive effect on their affect toward participating in VCs.

H19: VC members' affect will have a positive effect on their behavioral intention to participate in VCs.

H20: The perceived consequences of VC members will have a positive effect on their behavioral intention to participate in VCs.

H21: The social factors of VC members will have a positive effect on their behavioral intention to participate in VCs.



Research Methodology

In this study, an online cross-sectional survey of online forums was adopted as the research method to investigate the behavior of VC members. Three VC companies participated in our study: Tencent Community, a commercial community; Xilu Community, a commercial community; and Microsoft Chinese Community, a value-added professional community of a large software company. These three communities were selected because they were of a different nature and represented three of the largest VCs in China. In addition, to avoid the interaction effect incurred by the types of VC reported in a previous study (Dholakia et al. 2004), these three VCs were selected because they were different in terms of social orientation, with Tencent high, Xilu middle, and Microsoft low in social orientation.

Data Collection

An online questionnaire was developed to collect data from members of the three participating VCs in China in the spring of 2004. 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 et al. 2001).

Variable Operationalization

The dependent variables of this study were BOI and BGI. BGI measured how eagerly one "talks," namely, posts messages in a VC; BOI measured the extent to which one retrieves information from a VC. 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 et al. 2003; Ridings et al. 2002; Straub et al. 1995; Wang et al. 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 VC.

In this study, we adopted Schutz's (1966) instrument 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.

The variables in the Triandis model were operationalized according to the initial suggestion of Triandis and the suggestions of previous studies using a Likert scale (1 to 7). We adapted the habit construct that Limayem and Hirt (2003) developed for VC participation. The measure of behavior intention was adapted from Davis (1989), Davis et al. (1989), Moon and Kim (2001), and Teo et al. (1999). The measure of affect was adapted from Triandis (1980), who suggested the use of four pairs of semantic differential items—pleasant-unpleasant, enjoyable-disgusting, exciting-depressing, and joyful-hateful. Perceived consequence was measured by the construct developed by Limayem and Hirt (2003) in their study of WebBoard for supporting Internet communication. Social factors were measured using two approaches. First, we adapted some of the items from previous studies (e.g., (Baumann et al. 1993; Limayem et al. 2003)). Second, we used open questions to solicit additional information on the social factors. This method has been used by Limayem and Hirt (2003) to develop environment-specific factors with great success.

Instrument Validation

To ensure the validity and reliability of the questionnaire, four-stage survey validation was conducted. First, whenever possible, previously validated questions were used, and generally accepted online instrument construction guidelines (Ridings et al. 2002; Stanton et al. 2001; Wang et al. 2003) were observed as much as possible. Second, the questionnaire was back translated to ensure its validity. Third, the questionnaire was pretested by one MIS professor, seven business doctoral students, and two experienced VC webmasters. Fourth, a pilot test for the questionnaire was conducted in two small VCs.

Data Analysis Results

A total of 1,406 responses were collected from the three participating communities. After checking for data integrity, multiple responses resulted in the elimination of 76 responses, and 18 responses were eliminated because they were ineffective, thus giving us a total of 1,312 effective responses.

Profile of Respondents

Regarding the 1,312 valid responses, 98% of the respondents were from mainland China, Hong Kong, Macau, or Taiwan. Most respondents were male (75%) and single (78.7%). Their occupation varied from unemployed to professional, and most of them were engineers/computer technicians or students. The respondents were predominately (67.9%) in the range of 19 to 28 years of age. More than half of them (72.3%) were college graduates, and close to 5% were enrolled in or had completed postgraduate studies. The profile of our respondents is very similar to the VC profiles announced on the official site of the CNNIC¹ (China Internet Network Information Center), which suggests the appropriate representation of respondents in this VC study.

Reliability and Validity

Because of word limitations, the reliability and validity tables are not included. The Cronbach's alpha values of all of our variables were above 0.70, a level considered acceptable for exploratory research (Nunnally et al. 1994), which supports the reliability of our measurements for model testing.

The validity of the FIRO model was measured by two coefficients—reproducibility (Guttman 1950) and scalability (Menzel 1953), and the results were above the acceptable level.

The validity of the Triandis model was examined with CFA. The item reliability, convergent validity measured by AVE (average variance extracted), and discriminant validity were all within acceptable levels.

¹<http://www.cnnic.net.cn/index/0E/00/11/index.htm>

Test of the FIRO Model on VC Behavior

The six dimensions of the FIRO model’s effect on VC behavior were tested by ANOVA. The score of each dimension was first recoded into high and low, and an ANOVA test followed. The dependent variables of the FIRO model were BOI and BGI. Table 4 shows the ANOVA results of VC behavior.

Table 1 shows that, based on the findings, 10 out of the 12 hypotheses were supported. Table 1 and figure 3 show the supported and unsupported hypotheses in our FIRO model.

Table 1. Supported Relationships		
Hypothesis	Relationship	Supported or Not supported
1	EI→BOI	Supported
2	EI→BGI	Supported
3	WI→BOI	Supported
4	WI→BGI	Supported
5	EC→BOI	Not supported
6	EC→BGI	Supported
7	WC→BOI	Supported
8	WC→BGI	Supported
9	EA→BOI	Not supported
10	EA→BGI	Supported
11	WA→BOI	Supported
12	WA→BGI	Supported

Test of the Triandis Model on VC Behavior

Lisrel 8.54 was conducted to assess the measurement and structural model of Triandis for its fitness in our study. The values of our measurement model and structural model, along with the recommended values, are reported in Table 2. Overall, our measurement model and structural model suggest an acceptable level of fit.

Table 2. Results of Measurement and Structural Model							
	χ^2	df	TLI	CFI	GFI	AGFI	RMSEA
Recommended Value			≥ 0.90	≥ 0.90	≥ 0.8	≥ 0.8	≤ 0.10
Measurement Model	2293.94	303	0.97	0.97	0.86	0.83	0.081
Structural Model	2967.94	313	0.96	0.96	0.83	0.79	0.09

Table 3 shows that seven out of the nine hypotheses are supported (except BI→BOI and BI→BGI) at the significance level of 0.001.

Table 3. The Results of the Triandis Model			
Hypothesis	Relationship	Effect	Result
13	BOI→BGI (+)	0.41***	Supported (+)
14	Habit→BOI (+)	0.67***	Supported (+)
15	Habit→BGI (+)	0.30***	Supported (+)
16	BI→BOI (+)	0.08	Not supported
17	BI→BGI (+)	0.06	Not supported
18	Habit→Affect (+)	0.79***	Supported (+)
19	Affect→BI (+)	0.61***	Supported (+)
20	PC→BI (+)	0.23***	Supported (+)
21	SF→BI (+)	0.11***	Supported (+)

***Significant at the 0.001 level.

The overall explanatory power of the Triandis model was examined using the R² and the individual path coefficients, which are depicted in Table 4.

Table 4. The Explanatory Power of the Triandis Model	
Dependent variable	Effect Size
Behavior to obtain information (BOI)	53%
Behavior to give information (BGI)	41%

Discussion, Contributions, Limitations, and Implications

Discussion

This paper attempted to empirically explore VC participation from an interpersonal relationship perspective using two interpersonal relationship models—the Triandis model and the FIRO model. The findings suggest that the interpersonal relationship perspective and the two interpersonal relationship theoretical models are applicable as a theoretical foundation for evaluating the participation behavior of VC members.

Consistent with the hypothesis of the interpersonal relationship perspective, the communicational interpersonal relationship perspective of the FIRO model effectively explains the BOI and BGI of VC members. The three dimensions of the FIRO model are found to significantly influence people’s participation in VCs. Previous studies have pointed out that factors such as the sense of community, the sense of attachment (Blanchard et al. 2004), the sense of belonging (Bressler et al. 2000; Rheingold 2000; Teo et al. 2003; Wang et al. 2004b), the pursuit of power, fame (Nguyen et al. 2006; Rheingold 2000; Wang et al. 2004b; Wasko et al. 2005), or status (Rheingold 2000), and emotional feelings (Bakardjieva 2003) are the reasons that people participate in VCs. 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 a good conceptual framework for these factors. Table 1 summarizes the proposed hypotheses.

In the Triandis model, seven out of the nine hypotheses were supported (Table 3), which suggests that the Triandis model is theoretically applicable to explain VC participation. Overall, the variables from the Triandis model explain 53% of the variance of behavior to obtain information and 41% of the variance of behavior to give information.

The interpersonal relationship perspective adopted in this paper supports the notion that VC participation is due to people’s need to interact with others. The FIRO model, based on the communicational perspective, illustrates this by including the three needs that people desire. To fulfill these three types of needs, people need to interact and establish relationships with others. VCs are platforms that allow them to network and establish relationships to fulfill their needs. The Triandis model, based on the social psychological perspective, provides additional explanation of

people's behavior based on their cognitive schema and shows that VC participation is due to the VC environment, which nurtures a VC participation habit.

It is interesting that theories developed to explain behavior offline is effective in explaining online behavior. Both the FIRO and the Triandis model were developed to explain people's interpersonal behavior and they are seldom applied in the virtual environment. This might be the first time the FIRO model has been applied in the virtual environment. Its effectiveness in this context makes one wonder if there is any difference between people's offline and online behavior. One possible explanation is that people's need for interpersonal relationships is the same, whether the relationship is offline or online. Also, people's needs may be fulfilled online when they cannot be fulfilled offline.

The interpersonal relationship perspective investigated in this paper is also comprehensive by its theoretical completeness. The support for both the Triandis and the FIRO model showed that the different angles of the interpersonal relationship perspective have been empirically validated. As stated in the section on the conceptual model, there are three perspectives through which to view interpersonal relationships—psychological, communicational, and social psychological—with the communicational and social psychological perspectives serving as the application and extension of the psychological perspective. The communicational perspective in fact plays the covert role of the interpersonal relationship process and the social psychological perspective plays the overt role of the interpersonal relationship process.

Because of the measurement issue of the two interpersonal relationship models, the explanatory power of these two models is not directly comparable. However, theoretically, they complement rather than compete with each other. Based on the psychological angle of the interpersonal relationship perspective, the covert process should come before the overt process, that is, the FIRO model should come before the Triandis model. This means that members participate in VCs first because they naturally have different types of interpersonal needs, here, the need for inclusion, control, and affection; then the cognitive schema develops to fulfill these needs, and here the Triandis model gives the cognitive schema to fulfill the interpersonal needs. The application and explanation of these two research models depends on the purpose of the investigation: if the covert process and inside factors are being investigated, the FIRO model is more appropriate; for the explanation of the cognitive schema of the behavior, the Triandis model is more appropriate.

Implications

Theoretical Implications

First, this paper has furthered the existing studies of VCs by proposing that the interpersonal relationship perspective is effective in explaining VC participation, using two interpersonal relationship models. In particular, this paper addresses the need for a systematic conceptual framework to explain VC participation and the need for more empirical studies to test the theoretical framework of VC participation.

In the VC literature, researchers have endeavored to discover the in-depth reasons why people are so interested in participating in VCs. Various angles and perspectives, such as the gift economy, the sense of community, attachment, or belonging, and self-efficacy, have been investigated in previous VC studies, and previously validated technology adoption models such as the TAM have been adapted for the VC context. However, none of these models has been consistently effective in explaining VC participation. The interpersonal relationship perspective adopted in this paper addresses the dynamically interactive nature of VC participation and uses the FIRO model, based on communicational perspective, and the Triandis interpersonal behavior model, based on the social psychological perspective, to explain complementarily the two processes of interpersonal behavior—the covert and overt processes. The Triandis model hypothesizes, based on the social psychological perspective, that people participate in VCs because of their automatic psychological tendency—the habit to participate in VCs, and the findings of this paper strongly support this hypothesis. The FIRO model proposes that people have three needs, and their behavior in social situations serves to satisfy these needs in three dimensions. VCs can provide such a platform for them to communicate so that their needs can be fulfilled through establishing interpersonal relationships. Thus, the interpersonal perspective has broadened the existing understanding of VC participation.

In addition, the use in this paper of the interpersonal relationship perspective to explore VC participation has also added to VC studies with the empirical validation of the two interpersonal behavior models. The previous VC

literature often conceptually proposes reasons for the participation of members in VCs but seldom validates those reasons. The empirical validation in this paper fills this gap. Future researchers can conduct more empirical validation studies to contribute to the VC literature.

Furthermore, the findings of the two interpersonal relationship models add to the VC literature. The BOI's positive effect on BGI, habit's heavy effect on VC participation, the wanted and expressed needs for inclusion, control, and affect's effect on BGI, the wanted need for inclusion, control, and affect's effect on BOI, and the effect of expressed need for inclusion on BOI give researchers starting points from which to explore VCs.

Managerial Implications

The results in this paper have important managerial implications for VC organizers, and especially for those aiming to develop effectively prosperous VCs.

The general conclusion that members participate in VCs because they want to establish interpersonal relationships with other VC members has strategic implications for VC organizers who are developing or want to develop VCs. According to Chuang (2005), one of the most important factors for the successful sustainability of VCs is good maintenance of the chartered VC mission, the governance mechanism of VCs, and the satisfaction of members with VCs. A VC may have a mission other than relationship building, but for the community to be sustained, relationship building among members must be taken into consideration. Thus, VC organizers should incorporate the interpersonal relationship perspective into their strategic plan for VC operation so that the needs of members are fulfilled and they continue to participate in VCs. For example, Doug Dohring, chairman and CEO of Neopets, Inc. (Neopets), a successful and profitable VC, has incorporated the relationship-building function into the VC's strategic plan and has gained success both in attracting and in keeping members (Eisenmann et al. 2002). The strategic plan should be fulfilled on two levels: the design and development level and the activity level. A portion of funds from the overall operation of VCs should be allotted to relationship building at these two levels.

The design level consideration refers to functions that can be built into the overall framework of the VC software. Functions that can promote interactions among members can be designed into VC software structure to develop personal relationships. For instance, some VCs provide chat functions so that members can interact both publicly and privately. This helps members to communicate more and establish personal relationships. Some VCs provide a friend list in the profiles of members so that members can feel a sense of closeness with other members.

The activity level consideration refers to the management issues associated with the topics in VCs. To facilitate relationship building, VC organizers can initiate theme activities periodically to foster interactions among members so that relationships can be established. Once relationships are established, the attachment of members to the VC will be higher and they will not as readily leave the community. This kind of activity should be provided often to keep the community fresh.

Limitations

The first limitation of this paper is the nature of the data collection, a cross-sectional survey, which makes it difficult to observe the process by which VC participation develops. Because the BOI and BGI are factors that change over time and the trade-off relationship between the VC participation habit and behavioral intention varies over time, the dynamic interactions of these relationships can be better examined in a longer period of study. Thus the conclusions from this paper need further validation. Also, the relative strength of the weights of these two interpersonal relationship models may be different at times other than the time at which we collected the data. Future researchers could conduct similar studies of other VCs, or conduct a longitudinal study to further validate the conclusions of this paper.

The second limitation of this paper lies in the sample. There are thousands of members in a VC, but only a fraction of them are online at a given time; thus, the response rate is hard to estimate. Also, the sample was self selecting which means that only members who were interested in the content of the study responded, and this may weaken the randomness of the sample. Hence, this paper could not address the question of whether respondents and non-respondents in VCs differ in their behavior. This aspect of the study needs further investigation.

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