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# AN IDENTITY-BASED THEORY OF INFORMATION TECHNOLOGY DESIGN FOR SUSTAINING VIRTUAL COMMUNITIES

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## Abstract

*A variety of information technology artifacts, such as those supporting reputation management and digital archives of past interactions, are commonly deployed to support virtual communities. Despite the ubiquity of these artifacts, research on the impact of various IT-based features on virtual community communication is still limited. Without such research, the mechanisms through which information technologies influence community success are not well-understood, limiting the design of community infrastructures that can enhance interaction in the community and minimize dysfunction. This paper proposes that identity management is a critical imperative in virtual communities and concerns related to communication of identity serve to shape an individual's interactions and perceptions in the community. Sensitivity to this perspective can help in drawing design guidelines for the IT infrastructure supporting the community. Drawing upon the social psychology literature, this paper proposes an identity-based view to understanding how the use of IT-based features in virtual communities can improve community sustainability. Specifically, identity consonance, defined as the perceived fit between a focal person's belief of his or her identity and the recognition and verification of this identity by other community members, is proposed as a core construct that mediates the relationship between the use of community IT artifacts and member satisfaction and participation. We analyze four types of community IT artifacts and suggest that they influence identity consonance. The conceptual framework and propositions presented in this article offer a fresh perspective on virtual communities and suggest important implications for the design of the supporting IT infrastructure.*

**Keywords:** Virtual community, identity consonance, community information technology design

## Introduction

Considerable attention is being focused on virtual communities and the value they can create for organizations for at least two reasons. First, the more successful e-commerce companies, such as eBay and Amazon, rely on a strong community base. By creating a strong sense of community among their customers, these businesses are able to increase customer loyalty and satisfaction, which thereafter link to growth in market share and firm profit (Anderson and Sullivan 1993; Armstrong and Hagel 1996; Wernerfelt 1991). Second, organizations are investing in community infrastructures with the goal of facilitating communication and learning (Butler 2001). A growing number of companies are building virtual communities of practice to facilitate peer-to-peer help (Constant et al. 1996), foster new ideas and innovation (Teigland and Wasko 2003), and build knowledge competencies (Saint-Onge and Wallace 2003). Companies are beginning to recognize that communities can be supported and leveraged to benefit both the members of communities and the organization by facilitating knowledge creation and transfer.

Virtual communities provide organizations with a new way to reach their customers and to coordinate their knowledge exchange among employees (Boyd 2003). However, the benefit of virtual communities can only be achieved when ongoing activities and

participation are supported (Butler 2001; Finholt and Sproull 1990). Unfortunately, not many communities can successfully retain their members and motivate member participation and knowledge contribution. For example, the vast majority (91.2%) of communities at MSN ([www.msn.com](http://www.msn.com)) had less than 25 members and the average number of posts for these sites were from 1 to 20 (Farnham 2002). The factors that contribute to the sustainability of a virtual community is a puzzle that continues to intrigue researchers and practitioners.

The objective of this paper is to provide a theoretical framework to understand the impact of IT-based features on virtual community sustainability, with the goal of informing the design of community IT infrastructures. Technologies may lead to different outcomes in terms of member behavior and on-going activities of the community (Yates and Orlikowski 1992). The human-computer interaction literature suggests that software built to support real time conversation (e.g., instant messaging), social feedback (reputation systems), and social networks allows users to create new social relationships (Boyd 2003). However, much of the work in this area does not yet have a rigorous theoretical underpinning. On the other hand, community infrastructures with increasingly sophisticated IT are being put in place. To bridge this widening gap between virtual community research and practice, the mechanisms through which community features, such as a rating system and user profiles, influence virtual community success are analyzed in this study by drawing upon theories from social psychology.

Purposive behaviorists suggest that human behavior is directed by three goals: behavior efficiency, relationship building, and self-image management (Tolman 1932). We believe that participation in an online community is also motivated by three goals: to obtain useful information guiding efficient behavior, to build and maintain relationships, and to manage online identity. Moreover, among these three goals, identity management is essential for the achievement of the other two goals in a virtual environment.

First of all, information acquisition is more efficient when the expert is identifiable. In other words, if community members are able to establish their identities as experts in distinct areas, people looking for information in a particular area can accomplish their decision-making tasks more efficiently and effectively by identifying to whom they should turn. Knowing the identity of knowledge contributors helps knowledge seekers recognize source credibility. For example, when a book is sold on Amazon.com, anyone can post a review without revealing their true identity. Recently, multiple cases have been detected where some authors posted fake five-star reviews of their own books. Customers have also become more cautious when reading book reviews and are pressing Amazon.com to validate the identity of the reviewers. According to the elaboration likelihood model, information seekers perceive knowledge as more useful and tend to adopt it when the source credibility is high (Sussman and Siegal 2003; Zhang and Sussman 2003). Without knowing the identity of the knowledge contributor, knowledge adoption is difficult, indicating a less efficient knowledge exchange (Nickerson 1999).

Second, from a relationship-building perspective, people with similar interests or attitudes, in similar social groups, or with similar experience are more likely to communicate and build relationship with each other (Newcomb 1961). A more accurate online identity can help community members identify similar others to build relationships (Jensen et al. 2002). In this sense, identity formation in a virtual community facilitates the relationship-building goal of virtual community participants.

Finally, besides helping virtual community members achieve their behavior efficiency and relationship-building goals, identity formation also promotes knowledge contribution. Research on pro-social behavior in a virtual environment indicates that people help “strangers” not only because of altruism but also for reputation (Donath 1999; Faraj and Wasko 2003; Lerner and Tirole 2000), future reciprocation (Ackerman 1998), and self-esteem (Faraj and Wasko 2003; Gu and Jarvenpaa 2003; Hertel et al. 2003; Kollock 1999). Many studies have provided evidence that recognition and acknowledgment from group members increase a focal person’s overall participation (Hertel et al. 2003; Stasser et al. 1995; Thomas-Hunt et al. 2003). Establishing one’s online identity provides a great deal of motivation for knowledge contributors, helping them increase their reputation, the possibility of future reciprocation, and self-esteem (Axelrod 1984; Donath 1999). Without appropriate acknowledgement, a participant may perceive that her effort is not recognized or rewarded and withdraw from future contribution. In this sense, identity recognition maintains the sustainability of community activities by motivating knowledge contribution.

In summary, identity plays an important role in efficient information exchange and online relationship building. It also motivates knowledge contribution in an online community. However, the importance of identity formation in a virtual environment is mostly overlooked by previous research. In this study, we adopt an identity-based approach and analyze in-depth how identity communication is enabled by information technologies in a virtual community. The remainder of this paper proceeds as follows. Next, the literature on identity, virtual community, and identity communication is briefly reviewed. This is followed by the specific research model and propositions. The paper concludes with a discussion of the implications of the model and directions for future research.

## Related Literature

The concept of *identity* has been developed in work by Erickson (1968). Despite the widely academic and popular use, the concept of identity is still elusive and vague. There are numerous definitions of identity in the extant literature and most of them comprise two components: personal identity and social identity. A personal identity is “a set of attributes, beliefs, desires, or principles of action that a person thinks distinguish her in socially relevant ways” (Fearon 1999, p. 2). Personal identity sometimes is also called dispositional identity because it describes individual traits (e.g., brave, optimistic, or intelligent). A social identity is “an individual’s self-concept which derives from his knowledge of his membership in a social group together with the value and emotional significance attached to that membership (Tajfel 1981, p. 255). In other words, a social identity is formed when people identify themselves as members of a social group. Table 1 provides some of the most frequently cited definitions of identity.

Personal and social identities can be built and communicated online in a virtual community (Donath 1999). A *virtual community* refers to a group of people (virtual community members) who communicate with one another in a technology-supported cyberspace, develop a relationship, and/or try to achieve some goals (Lee et al. 2002). Carver (1999) classified online communities into four types: communities of communication, communities of information, communities of entertainment, and communities of transaction. While these communities are different in goals and focus, identity formation and communication always play an important role in efficient information exchange and online relationship building.

Self-verification theory suggests that people are motivated to confirm their identities (Goffman 1959; Swann 1983; Swann et al. 2000). Goffman (1959), in his seminal work, *The Presentation of Self in Every Day Life*, argued that people want to explain themselves to others regarding their identities before concentrating on the work or other goals that bring them together. Other social psychologists support Goffman’s theory and suggest that individuals can use a variety of tactics to communicate their identities, including self-description, attitude statements, public attribution, nonverbal behavior (e.g., physical appearance or body language), social associations, and other behavioral tactics (e.g., helping behavior) (Jones et al. 1981; Jones and Pittman 1982; Leary 1996). Previous studies also provide empirical evidence that people were more satisfied and were more inclined to continue the relationship if others could confirm their identities (De La Ronde and Swann 1998; McNulty and Swann 1994).

Although the research on identity communication online is sparse, we believe that, similar to being in a physical world, participants in a virtual community also need a sense of certainty and continuity by obtaining identity confirmation from other people with whom they interact. For example, a virtual community member who believes that she is knowledgeable in JAVA

**Table 1. Sample Definitions of Identity**

Definition	Source
“Identity is one’s feelings about oneself, especially with regard to character, goals, and origins.”	Adapted from Erickson’s (1968) concept of “Identity Crisis”
“Social identity is the individual’s knowledge that he belongs to certain social groups together with some emotional and value significance to him of this group membership.”	Tajfel 1981, p. 255
Self is construed in three levels: individual level, interpersonal level and group level. Individual level identity is the “differentiated, individuated self-concepts”; interpersonal self is “the self-concept derived from connections and role relationships with significant others”; and collective self “corresponds to the concept of social identity.”	Brewer and Gardner 1996
“The individual’s self-appraisal of a variety of attributes along the dimensions of physical and cognitive abilities, personal traits and motives, and the multiplicity of social roles including worker, family member, and community citizen.”	Whitbourne and Connolly 1999, p. 28
“Identity refers to either (a) a social category, defined by membership rules and (alleged) characteristic attributes or expected behaviors, or (b) socially distinguishing features that a person takes a special pride in or views as unchangeable but socially consequential, or (a) and (b) at once.”	Fearon 1999, p. 1

programming will feel less uncertainty about the outcome of cooperating with others and contributing JAVA knowledge if she feels that other community members hold the same belief about her. Due to a relative lack of identity cues in computer-mediated communication, individuals may be even more motivated to express their identities in a virtual world to obtain identity affirmation from others. Experiments have shown that individuals demonstrated more self-disclosure using computer-mediated communication than face-to-face communication (Tidwell and Walther 2002). How individuals use community artifacts to express and communicate their identities, and how identity confirmation from other community members influences the satisfaction and knowledge contribution of the focal person are described next in the proposed model.

## Theoretical Model and Research Propositions

### *The Identity Consonance Construct*

Identity consonance, the key concept of our theoretical perspective, is defined as the *perceived fit between a focal person's belief about his or her identity and the recognition and verification of this identity by other community members*. Two similar constructs can be found in the recent literature: interpersonal congruence (Polzer et al. 2002) and identity comprehension (Thatcher et al. 2003; Thatcher and Zhu 2004). In the group diversity literature, interpersonal congruence is a group-level construct defined as “the degree to which group members see others in the group as others see themselves” (Polzer et al. 2002, p. 298). Polzer et al. tested that interpersonal congruence fostered harmonious interaction and creative group performance. Similarly, identity comprehension is defined as “the degree to which important others understand a focal person's identities and the relative importance of their identities to the focal person” (Thatcher 2004, p. 2).

The identity consonance construct defined in this paper is different from interpersonal congruence and identity comprehension in three ways. First, identity consonance is a perceptual construct. The psychology literature has provided abundant evidence that people may perceive more self-confirmation than actually exists (Swann et al. 2004). Hence, the perception of consonance may be biased. However, it is an individual's perception that ultimately determines her interpretation of community experience and behavior. Therefore, the perceived instead of objective fit between an individual's self-view and other's appraisal is adopted in this study to predict community member behavior. Second, identity consonance is an individual level construct, which differentiates it from interpersonal congruence. Finally, the identity consonance construct focuses on both identity recognition and verification, while identity comprehension simply evaluates the recognition of important identities by significant others. For instance, group members may understand that the identity as a programming expert is important to an individual (identity comprehension is high) but do not verify or acknowledge the “expert” identity (identity consonance is relatively low).

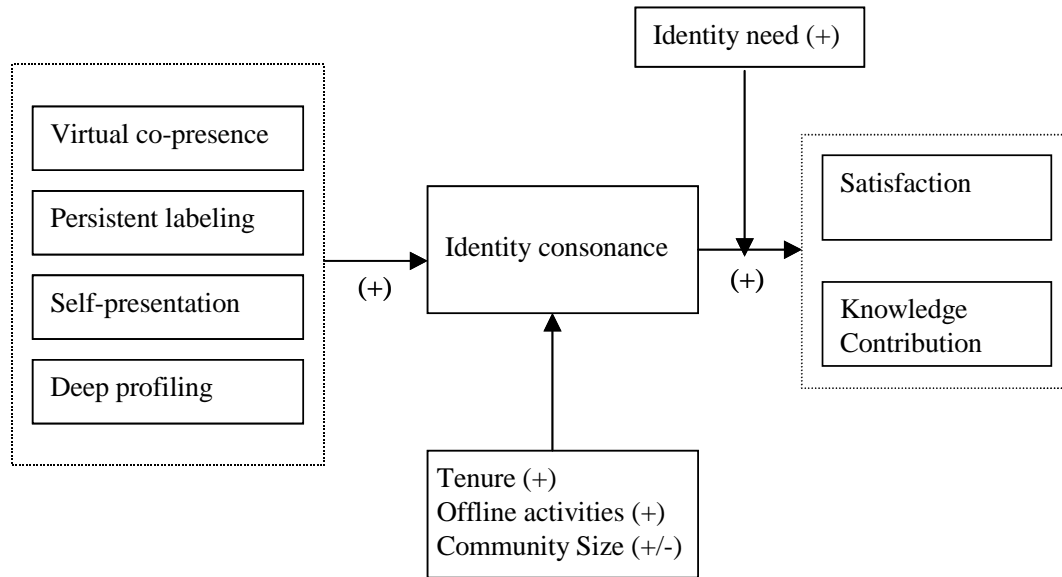
The level of identity consonance can be further evaluated as personal identity consonance and social identity consonance (see Swann et al. 2004). As reviewed earlier, identity has two components: personal identity and social identity. When the personal identity consonance is high, an individual perceives that her personal traits and characteristics are recognized and verified by others. For example, John may think of himself as a good engineer. He may be motivated to interact with other people if he believes they also think of him as a good engineer. When the group (social) identity consonance is high, an individual perceives that other members recognize her group membership. For instance, John's identity may be as a member of a social group, such as an elite developer group. If he perceives that other people in the community recognize him as a member of such a group, he may be motivated to participate more and benefit the community.

The remainder of this section presents the antecedents and consequences of identity consonance in a virtual community (Figure 1). Attribution theory and self-verification theory are adopted as the primary theoretical framework for our propositions.

### *Community Artifacts Facilitating Identity Consonance*

In spite of the ubiquitous use of many community artifacts such as reputation systems and interaction archives, no theoretical underpinning has been provided to explain how these technologies can promote the success of a virtual community. Next, drawing upon attribution theory, we suggest that the use of four types of community artifacts (virtual co-presence, persistent labeling, self-presentation, and deep profiling) will lead to identity consonance, which in turn influences an individual's satisfaction and knowledge contribution in a virtual community.

Attribution theory explains how people use available information to develop social perceptions about other people's dispositions (Heider 1958; Jones and Davis 1965; Kelley 1972). One key arena in attribution research is actor-observer difference, defined



**Figure 1. Theoretical Model**

as the different attributions made by behavior actors and observers (Jones and Nisbett 1972). Researchers have suggested that the observer may not be aware of the behavioral contexts or constraints faced by the actor, therefore is likely to use stereotypes or over-attribute dispositional factors about the actor. In contrast, actors may use self-serving attribution to make inference of their behavior in favor of their own self-images. This attribution difference leads to a different understanding of a focal person's identity. For instance, if a person fails a test, is it because s/he is not smart, or is it because the test is difficult? Experiments have shown that the subjects who took the test emphasized situational factors (i.e., the test is difficult), while the subjects who were observers made the inference that the actor was not intelligent (Jones and Nisbett 1972).

Attribution differences can result in low identity consonance because an individual and other community members make different inferences of the focal person's behavior. Attribution difference is expected to be particularly strong in computer-mediated contexts because identity cues are less available compared to face-to-face communication (Gu and Jarvenpaa 2003; Lea and Spears 1992). Information of behavioral contexts and constraints is also masked because of the unsynchronized and distant interaction between virtual community members. In such settings, actor-observer difference is likely to be more significant.

Several interventions have been proposed to reduce actor-observer difference. First, increasing individual *accountability* may reduce actor-observer bias (Tetlock 1985; Wells et al. 1977). Accountability is defined as the expectation that one is responsible to justify his/her feeling and behavior to others (Lerner and Tetlock 1999). A feeling of accountability can be achieved by manipulating the presence of others or the identifiability of individuals (Lerner and Tetlock 1999). See Lerner and Tetlock (1999) for an extensive literature review. Second, mechanisms that exchange the perspectives of actors or observers help reduce attribution difference. For example, in a lab experiment, when the actors saw a videotape of their own behavior as seen by the observers, attribution difference was reduced (Storms 1973). In some other studies, the contexts or environment under which a behavior was conducted was brought to the attention of observers, enhancing their understanding of the actors (Regan and Totten 1975).

Next, we describe how some community artifacts can reduce attribution difference by increasing accountability and facilitating perspective exchange. We describe four categories of community artifacts that will increase identity consonance: *virtual co-presence*, *persistent labeling*, *self-presentation*, and *deep profiling* (the examples are summarized in Table 2).

### Virtual Co-Presence

Goffman (1963) defined co-presence as “a form of physical co-location in which individuals become accessible, available, and subject to one another” (p. 22). He also suggested that a sense of co-presence is a requirement for both the perceiver and the

**Table 2. Community Artifacts Reducing Attribution Difference and Increasing Identity Consonance**

	<b>Virtual Co-Presence</b>	<b>Persistent Labeling</b>	<b>Self-Presentation</b>	<b>Deep Profiling</b>
Intervention	Accountability and Perspective Exchange	Accountability	Perspective Exchange	Perspective Exchange
Sample Community Artifacts	<ul style="list-style-type: none"> <li>• Instant Messenger</li> <li>• Chat room</li> <li>• “Who is online” feature</li> <li>• “Who is doing what” feature</li> </ul>	<ul style="list-style-type: none"> <li>• UserID</li> <li>• UserID across different communities (e.g., MS Passport)</li> </ul>	<ul style="list-style-type: none"> <li>• User Name</li> <li>• Signature</li> <li>• Avatar or nickname</li> <li>• Profile</li> <li>• Personal page</li> </ul>	<ul style="list-style-type: none"> <li>• User Name</li> <li>• Member directories and search engine</li> <li>• Reputation and rankings</li> <li>• Feedback</li> <li>• “Who did what” feature</li> <li>• Interaction archive</li> </ul>

perceivee to engage in identity communication. Without co-presence, individuals may feel their identity expression cannot be observed and recognized. If we adopt a broader definition of co-presence, electronic proximity can also bring about a sense of co-presence. Slater et al. (2000) defined virtual co-presence as a subjective feeling of being together with others in a virtual environment. For instance, using synchronized communication tools such as a chat room and instant messenger may bring a sense of being together. Also, some online communities show explicitly which members are currently connected online, or provide information about what an online user is doing (e.g., reading a message or typing a reply). The use of these features improved an individual’s sense of co-presence with other community members.

As reviewed earlier, a sense of accountability can be manipulated by the presence of others. Co-presence, physical or virtual, can increase individuals’ perceived accountability (Erickson et al. 2002; Erickson and Kellogg 2000; Gerhard et al. 2002; Lerner and Tetlock 1999) of their behavior, which in turn, drawing upon the evidence from attribution theory, may reduce the attribution difference between community members, thereby leading to a high identity consonance.

**Proposition 1:** *A virtual community member’s use of community artifacts facilitating virtual co-presence is positively related to his/her identity consonance.*

### Persistent Labeling

Anonymous communication online is double-edged, having both positive and negative impacts on virtual group communication (Davenport 2002). Anonymity, promoting free speech and a sense of privacy, also reduces accountability because people no longer feel that they can be identified and evaluated.

Even though the revelation of real-world identity (i.e., name) is usually not required for most online communities, users maintaining a permanent ID (label) online may perceive more accountability than those having no persistent label. Members who keep a label for a relatively longer time have usually gained more identity capital and are more identifiable. According to attribution theory, increased accountability due to identifiability will lead to a higher identity consonance.

**Proposition 2:** *A virtual community member’s use of community artifacts supporting persistent labeling is positively related to his/her identity consonance.*

### Self-Presentation

People often use stereotypes to infer other community members’ dispositions. However, an individual’s actual identity or disposition can be very different from what might be inferred from stereotyping. Self-presentation helps an individual communicate her/his identity, so other community members can form a more sophisticated understanding of her/his identity which is more likely to be accurate.

Community artifacts for self-presentation are listed in Table 2. We have observed multiple virtual communities to find how these artifacts are used to express individual identity. For example, a signature file can be appended to a post. It is usually a statement of personal style and value. Here is a sample signature that expresses an individual's identity as a knowledgeable sport fan:

*Qiaqia's top 5 saddest sports moments in 2003:*  
 1. Yankees lost in the world series...2. Steelers lost in OT in the playoff...  
 3. Fitzgerald did not win Heisman....4. Steelers couldn't win 2 games in a row....  
 5. Pitt football didn't win Big East and go to a BCS Bowl...

Similarly, an avatar is a visual symbol that usually presents some personality. The use of avatars helps other members better understand the social or personal identity of the focal person. Also, user profiles may include any information about a user. Some virtual communities provide statistics or log files regarding a user's activities, such as the total number of posts and the total amount of time of site visiting. User profiles can also include identity information (e.g., photos, background, experience, interests, and habits) that the user wishes to disclose to others.

The asymmetric attributions by actors and observers are partially due to information asymmetry (i.e., the observer's lack of information of the actor's environmental and personal characteristics). Experiments have found that providing the same information to both parties eliminated the attribution differences (Hansen and Lowe 1976). A focal person actively using the community artifacts identified above makes available his/her behavioral contexts, social associations, dispositional traits, and value systems to other community members, which, according to prior studies, may reduce the actor-observer attribution differences and lead to a high identity consonance.

**Proposition 3:** *A virtual community member's use of community artifacts facilitating self-presentation is positively related to his/her identity consonance.*

## Deep Profiling

For efficient identity communication, personal and social identity information needs to be provided to the community to construct a mental representation about the focal person. Even though many identity cues available in the physical world are missing, computer-mediated communication could also have some advantages over face-to-face communication. Knapp and Vangelisti (2000) suggested five stages in relationship formation: initiating, experimenting, intensifying, integrating, and bonding. If member profiles and interaction archives contain a large amount of interaction information, the pace of relationship building and interpersonal recognition may be accelerated. A great deal of identity information may have been provided before individuals interact very much. Archives serve as an extended memory of social information, helping users, especially new members of a community, to understand a focal person's identity.

According to attribution theory, community artifacts in this category help reduce attribution difference and promote identity consonance. First, community archives record more context information of previous social interactions than traditional mechanisms like word-of-mouth. As explained earlier, unawareness of an actor's behavioral contexts may result in attribution difference. Therefore, interaction archives with context information help observers understand the identity of the actor. Second, ranking (or reputation) systems, archives, and feedback help an actor reflect on her own behavior and hence take the perspective of an observer. Examining oneself from a third person's perspective can help reduce self-serving attribution errors, which in turn minimizes the gap between the self-view of an actor and the appraisal of the observers (Bem 1972). Albright and Molloy (1999) empirically testified that an opportunity to observe oneself in social interaction increased the accuracy of a person's social judgments of herself.

**Proposition 4:** *A virtual community member's use of community artifacts supporting deep profiling is positively related to his/her identity consonance.*

## Consequences of Identity Consonance

### Satisfaction

Self-verification theory indicates that people seek confirmation of their identity (Swann 1983). The majority of studies on self-verification have investigated and found a strong relationship between identity verification and satisfaction (De La Ronde and



Swann 1998; McNulty and Swann 1994; Swann 1983; Swann et al. 2004). Individuals in a virtual community whose identities are recognized and verified by others will feel better understood and are more likely to believe they will be treated in ways desired. However, we believe that this may only apply to those individuals who identify themselves as a community member. For an individual who randomly visits a community to obtain some information and walks away, the necessity of future interaction is low and the identity recognition from others will have limited impact on the individual's feeling and behavior.

**Proposition 5:** *For individuals who identify themselves with the community, identity consonance is positively related to their satisfaction with the community.*

## **Knowledge Contribution**

What motivates knowledge contribution among strangers in computer-mediated contexts has been explored by several studies recently. Constant et al. (1996) examined the use of email for help seeking and giving within an organization and suggested that citizenship behavior and the desire to benefit the organization were the major motivations for helping behavior. Other work by Constant et al. (1994) showed that people were more willing to share information that expresses their identities (i.e., personal expertise) than share information not identity-related. Wasko and Faraj (2000) suggested that altruism, generalized reciprocity, and community interest were important motives. Also, Subramani and Peddibhotla (2003) examining individual contribution to product reviews of an Internet store suggested that social affiliation, professional self expression, reputation benefits, and social capital help explain the motivations underlying contribution.

Based upon the above research, community members' motivation of knowledge contribution can converge to two core expectations: individual interests and group interests. For individual interests, community members contribute knowledge to gain reputation, future reciprocity, self-expression, and social capital. In this sense, a high level of identity consonance fulfills such expectations and promotes further contributions. For group interests, community members contribute knowledge because they want to benefit a group and its members. However, they must first engender a feeling of being part of that group before contributing. In other words, the social identity as a group member and other related identity must be first recognized. By reaching this consensus regarding identities, people will feel confident and obtain a sense of continuity and coherence (Swann et al. 2000).

No matter what motivates individuals to contribute to a virtual community, personal or group interests, identity consonance represents a prerequisite and an important motivation for knowledge contribution and participation. Numerous studies have provided evidence that acknowledgment from group members increases a focal person's contribution (Hertel et al. 2003; Stasser et al. 1995; Thomas-Hunt et al. 2003). Hence, we propose that:

**Proposition 6:** *A virtual community member's identity consonance is positively related to his/her knowledge contribution.*

## **Moderating Effects**

People try to present and confirm their identities or self-image to both internal (oneself) and external (others) audiences. However, they may not weigh the two types of audiences equally (Markus and Wurf 1987; Thatcher and Zhu 2004). Depending on an individual member's goals and dispositional traits, she may rely more on others' appraisal or place more emphasis on verification from self to obtain a sense of satisfaction (Thatcher and Zhu 2004). In this study, individuals who weigh the internal audience more than external audiences are defined as having a low identity verification need, while individuals who weigh external audiences more than internal audience have a high identity verification need. The level of identity need is dependent on both an individual's goal of participating in an online community and her disposition.

Because the identity consonance construct describes the perceived fit between an individual's belief of her identity and the recognition from external audiences, the relationship between identity consonance and satisfaction and knowledge contribution will be stronger for virtual community members with a high identity need. For individuals with a low identity need, instead of relying on other people's affirmation, they emphasize more the ideal and consistent self-view held by themselves to direct their behavior and achieve a sense of satisfaction (Shamir 1992).

**Proposition 7a:** *The relationship between identity consonance and member satisfaction will be stronger for a virtual community member with a high identity need.*

**Proposition 7b:** *The relationship between identity consonance and knowledge contribution will be stronger for a virtual community member with a high identity need.*

### **Control Variables**

Besides using community artifacts to form one's online identity, several other variables may influence the level of identity consonance. First, individual tenure in a virtual community can have a positive link to identity consonance. Members who have been with a virtual community for a longer time are shaping and communicating their identities in day-to-day interactions with other members, and therefore may perceive a higher fit between their own self-view and those of others. Second, offline activities can be positively related to identity consonance. Identity communication online can be broadened and reinforced during face-to-face communication. Through the offline activities, virtual community members will be able to express and obtain more identity cues (Fulk et al. 1987). Finally, the size of a community may have an impact on identity consonance. Butler (2001) examined the opposing forces of community size and concluded that size had both positive and negative influences on community structures. Identity confirmation from more in-group members can increase satisfaction and motivation. However, it is also more difficult to gain identity confirmation from a large number of community members.

### **Discussion and Conclusion**

Despite the fast growth of online communities and the ubiquity of various community technologies, a theory relating the design of community technology and virtual community effectiveness is still lacking. The proposed conceptual model analyzing online community satisfaction and knowledge contribution from an identity perspective represents one of the first attempts to bridge the gap between virtual community practice and research. The proposed framework has two key implications for the information systems community. First, investigation of virtual community design can help us better understand what features of the community technology can efficiently improve the sustainability of a virtual community. The extant community design literature usually proceeds in a pragmatic style that employs guidelines without formal theoretical justification (Turoff et al. 1993). The mechanics through which community features increase the sustainability of a virtual community have not yet been precisely explained. Drawing upon attribution theory, this paper provided a theoretical underpinning for understanding how four categories of virtual community artifacts (virtual co-presence, persistent labeling, self-presentation, and deep profiling) improve community sustainability. Second, in contrast with prior literature where the importance of identity formation and verification are mostly overlooked, this study represents one of the first attempts to theoretically integrate the identity construct into virtual community research. Understanding the role of identity in computer-mediated communication sheds light on virtual collaboration in virtual teams or virtual communities of practice.

The model also has important managerial implications. First, the propositions provide practical guidelines for organizations that expect to create value by supporting customer or employee communities. The framework proposed in this research is useful for community developers to design their IT infrastructure to support a sustained virtual community. Further, geographically distributed organizations can also gain some insight into the importance of identity consonance in a virtual team.

Finally, limitations of this study, which imply productive future research, should be mentioned. First, the conceptual model and propositions need to be tested empirically. As an ongoing research effort, we are currently observing and conducting interviews with virtual community participants to discover the important dimensions of identities in a virtual environment. We are also developing operational measures and in preparation for an empirical test of the model with data collected from members of multiple virtual communities. Second, in this study, we chose to adopt an identity-based approach to examine knowledge contribution in a virtual environment. Other research on pro-social behavior links other constructs to knowledge contribution, such as affiliation, self-esteem, and reciprocation (e.g., Faraj et al. 2003). It would be beneficial and interesting to examine how identity consonance relates to these constructs.

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## References

- Ackerman, M. S. "Augmenting the Organizational Memory: A Field Study of Answer Garden," *ACM Transactions on Information Systems* (16:3), 1998, pp. 203-224.
- Albright, L., and Malloy, T. E. "Self-Observation of Social Behavior and Metaperception," *Journal of Personality and Social Psychology* (77:4), 1999, pp. 726-734.
- Anderson, E. W., and Sullivan, M. W. "The Antecedents and Consequences of Customer Satisfaction for Firms," *Marketing Science* (12:2), 1993, pp. 125-143.
- Armstrong, A. G., and Hagel, J. "The Real Value of on-Line Communities," *Harvard Business Review* (74:3), 1996, pp. 134-141.
- Axelrod, R. *The Evolution of Cooperation*, Basic Books, New York, 1984.
- Bem, D. J. "Self Perception Theory," in *Advances in Experimental Social Psychology*, L. Berkowitz (Ed.), Academic Press, New York, 1972, pp. 1-62.
- Boyd, S. "Are You Ready for Social Software?," *Darwin*, May 2003 (available online at <http://www.darwinmag.com/read/050103/social.html>).
- Brewer, M. B., and Gardner, W. "Who Is This 'We'? Levels of Collective Identity and Self-Representation," *Journal of Personality and Social Psychology* (71:1), 1996, pp. 83-93.
- Butler, B. "Membership Size, Communication Activity, and Sustainability: A Resource-Based Model of Online Social Structures," *Information Systems Research* (12:4), 2001, pp. 346-362.
- Carver, C. "Building a Virtual Community for a Tele-Learning Environment," *IEEE Communication Magazine* (37:3), 1999, pp. 114-118.
- Constant, D., Kiesler, S., and Sproull, L. "What's Mine Is Ours, or Is It? A Study of Attitudes About Information Sharing," *Information Systems Research* (5:4), 1994, pp. 400-421.
- Constant, D., Sproull, L., and Kiesler, S. "The Kindness of Strangers: The Usefulness of Electronic Weak Ties for Technical Advice," *Organization Science* (7:2), 1996, pp. 119-135.
- Davenport, D. "Anonymity on the Internet: Why the Price May Be Too High," *Communication of the ACM* (45:4), 2002, pp. 33-35.
- De La Ronde, C., and Swann, W. B. "Partner Verification: Restoring Shattered Images of Our Intimates," *Journal of Personality and Social Psychology* (75:2), 1998, pp. 374-382.
- Donath, J. S. "Identity and Deception in the Virtual Community," in *Communities in Cyberspace*, M. A. Smith and P. Kollock (Eds.), Routledge, New York, 1999, pp. 29-59.
- Erickson, E. *Identity: Youth and Crisis*, W. W. Norton & Company, Inc., London, 1968.
- Erickson, T., Halverson, C., Kellogg, W. A., Laff, M., and Wolf, T. "Social Translucence: Designing Social Infrastructures That Make Collective Activity Visible," *Communications of the ACM* (45:4), 2002, pp. 40-44.
- Erickson, T., and Kellogg, W. A. "Social Translucence: An Approach to Designing Systems That Support Social Processes," *Transactions on Computer Human Interface* (7:1), 2000, pp. 59-83.
- Faraj, S., and Wasko, M. "Knowledge Exchange in Network of Practice," Working Paper, Decision and Information Technologies Department, University of Maryland, College Park, MD, 2003.
- Farnham, S. "Predicting Active Participation in MSN Communities: It's All in the Conversation," Working Paper, Microsoft Research, Redmond, WA, 2002.
- Fearon, J. "What's Identity (as We Now Use the Word)?," Working Paper, Political Science Department, Stanford University, Stanford, CA, 1999.
- Finholt, T., and Sproull, L. "Electronic Groups at Work," *Organization Science* (1:1), 1990, pp. 41-64.
- Fulk, J., Steinfield, C., Schmitz, J., and Power, J. "A Social Information Processing Model of Media Use in Organizations," *Communication Research* (14:5), 1987, pp. 529-552.
- Gerhard, M., Moore, D. J., and Hobbs, D. J. "An Experimental Study of the Effect of Presence in Collaborative Virtual Environments," in *Intelligent Agents for Mobile and Virtual Media*, R. Earnshaw and J. Vince (Eds.), Springer Verlag, London, 2002, pp. 113-123.
- Goffman, E. *The Presentation of Self in Every Day Life*, Doubleday, New York, 1959.
- Gu, B., and Jarvenpaa, S. "Online Discussion Boards for Technical Support: The Effect of Token Recognition on Customer Contributions," in *Proceedings of the 24<sup>th</sup> International Conference on Information Systems*, S. T. March, A. Massey and J. I. DeGross (Eds.), Seattle, WA, 2003, pp. 110-120.
- Hansen, R. D., and Lowe, C. A. "Distinctiveness and Consensus—Influence of Behavioral Information on Actors and Observers Attributions," *Journal of Personality And Social Psychology* (34:3), 1976, pp. 425-433.
- Heider, F. *The Psychology of Interpersonal Relations*, Wiley, New York, 1958.
- Hertel, G., Niedner, S., and Herrmann, S. "Motivation of Software Developers in Open Source Project: An Internet-Based Survey of Contributors to the Linux Kernel," *Research Policy* (32:7), 2003, pp. 1159-1177.

- Jensen, C., Davis, J., and Farnham, S. "Finding Others Online: Reputation Systems for Social Online Spaces," in *Proceedings of the Human Factors in Computing Systems*, Minneapolis, MN, 2002, pp. 447-454.
- Jones, E. E., Berglas, S., Rhodewalt, F., and Skelton, J. R. "Effects of Strategic Self-Presentation on Subsequent Self-Esteem," *Journal of Personality and Social Psychology* (41:3), 1981, pp. 407-421.
- Jones, E. E., and Davis, K. E. "From Acts to Dispositions: The Attribution Process in Social Psychology," in *Advances in Experimental Social Psychology*, L. Berkowitz (Ed.), Academic Press, New York, 1965, pp. 219-266.
- Jones, E. E., and Nisbett, R. E. "The Actor and the Observer: Divergent Perceptions of the Causes of Behavior," in *Attribution: Perceiving the Causes of Behavior*, E. E. Jones, D. E. Kanouse, H. H. Kelley, R. E. Nisbett, S. Valins, and B. Weiner (Eds.), General Learning Press, Morristown, NJ, 1972, pp. 79-94.
- Jones, E. E., and Pittman, T. S. "Toward a General Theory of Strategic Self-Presentation," in *Psychological Perspectives on the Self*, J. Suls (Ed.), Lawrence Erlbaum Associates, Inc., Hillsdale, NJ, 1982, pp. 231-262.
- Kelley, H. H. "Attribution in Social Interaction," in *Attribution: Perceiving the Causes of Behavior*, E. E. Jones, D. E. Kanouse, H. H. Kelley, R. E. Nisbett, S. Valins, and B. Weiner (Eds.), General Learning Press, Morristown, NJ, 1972, pp. 1-26.
- Knapp, M. L., and Vangelisti, A. L. *Interpersonal Communication and Human Relationships*, Allyn and Bacon, Boston, 2000.
- Kollock, P. "The Economics of Online Cooperation," in *Communities in Cyberspace*, M. A. Smith and P. Kollock (Eds.), Routledge, New York, 1999, pp. 220-242.
- Lea, M., and Spears, R. "Paralanguage and Social Perception in Computer-Mediated Communication," *Journal of Organizational Computing* (2:3), 1992, pp. 321-341.
- Leary, M. R. *Self-Presentation: Impression Management and Interpersonal Behavior*, Westview Press, Boulder, CO, 1996.
- Lee, F., Vogel, D., and Limayem, M. "Virtual Community Informatics: What We Know and What We Need to Know," *Proceedings of the 35<sup>th</sup> Hawaii International Conference on System Sciences*, R. H. Sprague (Ed.), IEEE Computer Society Press, Los Alamitos, CA, 2002, pp. 2863 - 2872.
- Lerner, J. S., and Tetlock, P. E. "Accounting for the Effects of Accountability," *Psychological Bulletin* (125:2), 1999, pp. 255-275.
- Lerner, J. S., and Tirole, J. "The Simple Economics of Open Source," *Journal of Industrial Economics* (50:2), 2002, pp. 197-234.
- Markus, H., and Wurf, E. "The Dynamic Self-Concept: A Social Psychological Perspective," *Annual Review of Psychology* (38), 1987, pp. 299-337.
- McNulty, S., and Swann, W. B. "Identity Negotiation in Roommate Relationships: The Self as Architect and Consequence of Social Reality," *Journal of Personality and Social Psychology* (67:6), 1994, pp. 1012-1023.
- Newcomb, T. M. *The Acquaintance Process*, Holt, Rinehart, and Winston, New York, 1961.
- Nickerson, R. S. "How We Know—and Sometimes Misjudge—What Others Know: Imputing One's Own Knowledge to Others," *Psychological Bulletin* (125:6), 1999, pp. 737-759.
- Polzer, J. T., Milton, L. P., and Swann, W. B. "Capitalizing on Diversity: Interpersonal Congruence in Small Work Groups," *Administrative Science Quarterly* (47:2), 2002, pp. 296-324.
- Regan, D., and Totten, J. "Empathy and Attribution: Turning Observers into Actors," *Journal of Personality and Social Psychology* (32:5), 1975, pp. 850-856.
- Saint-Onge, H., and Wallace, D. *Leveraging Communities of Practice for Strategic Advantage*, Butterworth-Heinemann, Burlington, MA, 2003.
- Shamir, B. "Home: The Perfect Workplace?," in *Work, Families and Organization*, S. Zedeck (Ed.), Jossey-Bass Publishers, San Francisco, 1992, pp. 272-311.
- Slater, M., Sadagic, A., and Schroeder, R. "Small-Group Behavior in a Virtual and Real Environment: A Comparative Study," *Presence: Teleoperators and Virtual Environments* (9:1), 2000, pp. 37-51.
- Stasser, G., Steward, D., and Wittenbaum, G. M. "Expert Roles and Information Exchange During Discussion: The Importance of Knowing Who Knows What," *Journal of Experimental Social Psychology* (31:3), 1995, pp. 244-265.
- Storms, M. "Videotape and the Attribution Process: Reversing Actors' and Observers' Points of View," *Journal of Personality and Social Psychology* (27:2), 1973, pp. 165-175.
- Subramani, M. R., and Peddibhotla, N. "Contributing to Document Repositories: An Examination of Prosocial Behavior," Working Paper, Information and Decision Sciences Department, University of Minnesota, Minneapolis, MN, 2003.
- Sussman, S. W., and Siegal, W. S. "Informational Influence in Organizations: An Integrated Approach to Knowledge Adoption," *Information Systems Research* (14:1), 2003, pp. 47-65.
- Swann, W. B. "Self-Verification: Bring Social Reality into Harmony with the Self," in *Social Psychological Perspectives on the Self*, J. Suls and A. G. Greenwald (Eds.), Lawrence Erlbaum Associates, Inc., Hillsdale, NJ, 1983, pp. 33-66.
- Swann, W. B., Milton, L. P., and Polzer, J. T. "Should We Create a Niche or Fall in Line? Identity Negotiation and Small Group Effectiveness," *Journal of Personality and Social Psychology* (79:2), 2000, pp. 238-250.
- Swann, W. B., Polzer, J. T., Seyle, D. C., and Ko, S. J. "Finding Value in Diversity: Verification of Personal and Social Self-View in Diverse Groups," *Academy of Management Review* (29:1), 2004, pp. 9-27.

- Tajfel, H. *Human Groups and Social Categories*, Cambridge University Press, Cambridge, England, 1981.
- Teigland, R., and Wasko, M. M. "Integrating Knowledge through Information Trading: Examining the Relationship between Boundary Spanning Communication and Individual Performance," *Decision Sciences* (34:2), 2003, pp. 261-286.
- Tetlock, P. E. "Accountability: A Social Check on the Fundamental Attribution Error," *Social Psychology Quarterly* (48:3), 1985, pp. 227-236.
- Thatcher, S. M. B. "Does It Really Matter If You Understand Me? The Implications of Identity Comprehension for Individuals in Organizations," Working Paper, Management Information Systems Department, University of Arizona, Tucson, AZ, 2004
- Thatcher, S. M. B., Doucet, L., and Tuncel, E. "Subjective Identities and Identity Communication Processes in Information Technology Teams," in *Research on Managing Groups and Teams*, M. A. Neale, E. A. Mannix and J. T. Polzer (Eds.), Elsevier Science, Ltd, London, UK, 2003, pp. 53-90.
- Thatcher, S. M. B., and Zhu, X. "Changing Identities in a Changing Workplace: Identification, Identity Enactment, Self-Verification and Telecommuting," Working Paper, Management Information Systems Department, University of Arizona, Tucson, AZ, 2004
- Thomas-Hunt, M. C., Ogden, T. Y., and Neale, M. A. "Who's Really Sharing? Effects of Social and Expert Status on Knowledge Exchange Within Groups," *Management Science* (49:3), 2003, pp. 464-477.
- Tidwell, L. C., and Walther, J. B. "Computer-Mediated Communication Effects on Disclosure, Impressions, and Interpersonal Evaluations: Getting to Know One Another a Bit at a Time," *Human Communication Research* (28:3), 2002, pp. 317-348.
- Tolman, E. C. *Purposive Behavior in Animals and Men*, Appleton-Century-Crofts, New York, 1932.
- Turoff, M., Hiltz, S. R., Bahgat, A., and Rana, A. T. "Distributed Group Support Systems," *MIS Quarterly* (17:4), 1993, pp. 399-417.
- Wasko, M., and Faraj, S. "It Is What One Does: Why People Participate and Help Others in Electronic Communities of Practice," *Journal of Strategic Information Systems* (9:2), 2000, pp. 155-173.
- Wells, G. L., Petty, R. E., Harkins, S. G., Kagehiro, D., and Harvey, J. "Anticipated Discussion of Interpretation Eliminates Actor-Observer Differences in the Attribution of Causality," *Sociometry* (40:3), 1977, pp. 247-253.
- Wernerfelt, B. "Brand Loyalty and Market Equilibrium," *Marketing Science* (10:3), 1991, pp. 229-245.
- Whitbourne, S. K., and Connolly, L. A. "The Developing Self in Midlife," in *Life in the Middle: Psychological and Social Development in Middle Age*, S. L. Willis and J. D. Reid (Eds.), Academic Press, San Diego, CA, 1999, pp. 25-45.
- Yates, J., and Orlikowski, W. J. "Genres of Organizational Communication: A Structural Approach to Studying Communication and Media," *Academy of Management Review* (27:2), 1992, pp. 299-326.
- Zhang, W., and Sussman, S. W. "Knowledge Adoption in Online Communities of Practice," in *Proceedings of the 24<sup>th</sup> International Conference on Information Systems*, S. T. March, A. Massey and J. I. DeGross (Eds.). Seattle, WA, 2003, pp. 96-109.