

Understanding Online Community User Participation: A Social Influence Perspective

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Abstract

Purpose- The purpose of this research is to examine the determinants of online community user participation from a social influence perspective.

Design/methodology/approach- Based on 450 valid responses collected from a survey questionnaire, structural equation modeling (SEM) technology was employed to examine the research model.

Findings- The results show that both social identity and group norm have significant effects on user participation. In addition, group norm affects social identity. We did not find the effect of subjective norm on participation intention.

Research limitations/implications- This research is limited to a particular sample: students. Thus our results need to be generalized to other samples, such as working professionals.

Originality/value- Extant research has mainly focused on the effects of user motivations such as perceived usefulness, trust and commitment on online community user behavior, and seldom considered the effects of social processes including compliance, identification and internalization on user behavior. Our research tries to fill the gap.

Keywords social influence theory; online community; user participation; group norm

Paper type research paper

1. Introduction

Online community has become a very popular Internet application. According to a report issued by China Internet Network Information Center (CNNIC) in July 2010, about half of the Internet population has ever used online community (CNNIC, 2010). Especially, the proliferation of Web 2.0 technologies has triggered the rapid development of online community. For example, Facebook, the largest global online community, holds more than 200 million users around the world. Virtual worlds such as Second Life have also been adopted by users. In China, a few online communities such as Renren, Kaixin and Taobao have achieved great success. Realizing the great potential of online community, venture capital Softbank planned to invest 384 million US dollars on Oak Pacific Interactive in 2008, whose main businesses include two leading Chinese communities, Renren and Mop (Japantimes, 2009). However, compared to these popular community sites, other online communities face problems such as small number of users and low participation. Their managers are eager to know the factors affecting user participation, and then adopt effective measures to facilitate user behavior and expand the user base.

Extant research has adopted multiple theories, such as technology acceptance model (TAM), trust theory, social cognitive theory, social capital theory and social network theory, to explore online community user participation (Ridings et al., 2002; Hsu and Lu, 2007; Hsu et al., 2007; Koh et al., 2007; Toral et al., 2009). Perceived usefulness, trust and self-efficacy are found to have significant effects on user behavior. However, the group influence of online community on user behavior has

seldom been examined. Online community is composed of members sharing common interests. They interact with each other to discuss topics, exchange ideas and seek support. Thus, individual member's behavior may be influenced not only by his/her own motivations such as perceived usefulness, but also by other members and the community. Bagozzi and Lee (2002) noted that "*social processes are important determinants of decision making for people*".

According to social influence theory, individual behavior is affected by three social processes: compliance, identification and internalization (Kelman, 1974). Compliance reflects that an individual acts to comply with the opinions of other people who are important to him/her. For example, users may consider following the opinions of discussion board leaders. Identification reflects individual identification with a community, such as senses of belongingness and attachment. For example, users may develop feelings of membership, influence and value in a community with the increased usage experience. Internalization reflects that an individual accepts the influence due to the congruence of his/her values with those of group members (Dholakia et al., 2004). For example, users may transform community vision and values into their own beliefs. Compliance, identification and internalization are often represented by subjective norm, social identity and group norm, respectively (Dholakia et al., 2004; Shen et al., 2010). Information systems research has focused on the effect of compliance process, and seldom examined the effects of identification and internalization on user behavior. However, individual behavior may receive influence from three social processes. Thus, drawing on social influence theory, we

will examine the effects of three social processes, which include compliance, identification and internalization, on online community user participation.

The rest of this paper is organized as follows. We present literature review in the next section. Then we propose the research model and hypotheses in section three. Section four reports instrument development and data collection. We present data analysis and results in section five, followed by a discussion of these results in section six. Section seven presents the theoretical and managerial implications. We summarize the limitations and conclude the paper in section eight.

2. Literature review

Online community user participation has received a considerable attention in the information systems research. Many theories including TAM (Teo et al., 2003; Koh et al., 2007), commitment theory (Jang et al., 2008; Bateman et al., 2010), trust theory (Porter and Donthu, 2008; Wu et al., 2010), social cognitive theory (Hsu et al., 2007), social capital theory (Chiu et al., 2006; Wiertz and Ruyter, 2007), and social network theory (Toral et al., 2009; Martinez-Torres et al., 2010) have been used to explain online community user behavior. TAM argues that perceived usefulness and perceived ease of use are two main factors affecting user acceptance of an information technology (Davis, 1989). Commitment theory notes that commitment, which includes continuance, affective and normative commitment, affects user behavior (Bateman et al., 2010). Trust theory proposes that trust beliefs including ability, integrity and benevolence affect users' behavioral intention (Gefen et al., 2003). Social cognitive theory suggests that self-efficacy, personal outcome expectation and

community outcome expectation influence user participation (Bandura, 1986). Social capital theory notes that structural, cognitive and relationship social capital predicts user behavior (Nahapiet and Ghoshal, 1998). Social network theory proposes that online community can be described as a social network composed of nodes and edges, representing individuals and relationships, respectively (Toral et al., 2010). Network cohesion, structure and centrality are found to affect community success (Toral et al., 2009). These previous studies have found that factors such as perceived usefulness, commitment, trust, self-efficacy and outcome expectation significantly affect online community user participation and knowledge contribution. However, they have mainly focused on the motivations affecting user participation, and seldom examined the effect of social processes on user behavior.

When Davis et al. (1989) proposed TAM, they also highlighted the effect of social influence on user acceptance of an information technology. They pointed out that future research can use social influence theory proposed by Kelman as the theoretical base. Kelman (1974) identified three social influence processes: compliance, identification and internalization, which are often represented by subjective norm, social identity and group norm, respectively (Dholakia et al., 2004; Shen et al., 2010). Extant information systems research has mainly focused on the effect of compliance on user behavior. For example, Venkatesh et al. (2003) developed a unified theory of acceptance and usage of technology (UTAUT), among which social influence derived from subjective norm is an important determinant of user intention. Subjective norm is also found to affect users' intention to make online

purchase (Pavlou and Fygenon, 2006), play online games (Hsu and Lu, 2004), adopt blog (Hsu and Lin, 2008), and use advanced mobile services (Lopez-Nicolas et al., 2008). Li et al. (2008) revealed that subjective norm significantly affects user trust in organizational information systems.

In addition to compliance, researchers have begun to explore the effects of other two social processes including identification and internalization on user behavior. Dholakia et al. (2004) reported that value perceptions, which include purposive value, self-discovery, interconnectivity, social enhancement and entertainment value, affect community user participation through group norms and social identity. Shen et al. (2010) adopted social influence theory to examine instant messaging (IM) user behavior. Subjective norm, group norm and social identity were included as the determinants of user desire and intention. Pentina et al. (2008) noted that three dimensions of social identity including cognitive, evaluative and affective social identity have significant effects on online community users' purchase behavior.

3. Research model and hypotheses

Drawing on the social influence theory, we propose that online community user participation will be affected by three social processes: compliance, identification and internalization. Compliance reflects the normative influence of significant others. Identification reflects an individual's identification with the community such as senses of belongingness and membership. Internalization reflects the congruence of an individual's values with those of other members. Based on the existing literature (Dholakia et al., 2004; Shen et al., 2010), we use subjective norm, social identity and

group norm to represent compliance, identification and internalization, respectively.

Subjective norm reflects the effect of significant others' opinions on a user's behavior. When most people that are important to a user recommend him/her to participate in a community, he/she will comply with their opinions even the user has not formed positive attitudes towards this community. Both the theory of reasoned action (TRA) and theory of planned behavior (TPB) have argued that subjective norm affects behavioral intention (Fishbein and Ajzen, 1975; Ajzen, 1991). This argument has received support from extant research (Pavlou and Fygenson, 2006; Li et al., 2008). Other research also reported the insignificant effect of subjective norm on user behavior (Shen et al., 2010). Social influence theory proposes that individual behavior will be affected by compliance process. Thus, we propose,

H1: Subjective norm significantly affects online community users' participation intention.

Social identity reflects one's conception of self in terms of the relationship to another person or group (Bagozzi and Lee, 2002). Social identity describes a psychological status that users are not separate individuals but the members of a collective. Social identity as a second-order factor includes three reflective dimensions: cognitive, affective and evaluative social identity (Ellemers et al., 1999). Cognitive social identity can be reflected by categorization. Individuals form their understanding of membership through categorization process. They will understand both the similarities with other members and the dissimilarities with outsiders (Dholakia et al., 2004). Affective social identity reflects a user's emotional

involvement with a community, such as senses of attachment, belongingness and membership. Affective social identity will cultivate member loyalty towards the community (Lin, 2008). Evaluative social identity reflects a user's perceived value and importance as a member of the community.

Identification requires individual members to maintain an active relationship with other community members. Thus it will enable users to actively participate in community. Previous research has also pointed out the significant effect of social identity on user behavior (Dholakia et al., 2004; Shen et al., 2010). Thus,

H2: Social identity significantly affects online community users' participation intention.

Group norm can be defined as an agreement among members about their shared goals and expectations (Shen et al., 2010). Group norm is especially relevant to online communities because it represents group-related information and will regulate members' interaction (Dholakia et al., 2004). Users can understand group goals, values and conventions when they join a community. They may also perceive community norms through a repeat and long-term interaction with the community. When users find that their values and goals are consistent with those of other members, they will form active participation intention.

H3: Group norm significantly affects online community users' participation intention.

In addition to its effect on behavioral intention, group norm will lead users to believe that they are eligible members of the community. Once users understand and accept group norms, they will form strong identification with the community. The

effect of group norm on social identity has been supported in previous research (Dholakia et al., 2004). Thus,

H4: Group norm significantly affects social identity.

According to TRA and TPB, users' intention directly affects their actual behavior. Although actual behavior may be affected by other factors such as perceived behavioral control, extant research has found that behavioral intention is a main determinant of actual behavior (Kim et al., 2008; Sia et al., 2009). Thus,

H5: Online community users' participation intention significantly affects their actual behavior.

Figure 1 shows the research model. Social identity as a second-order factor includes three reflective dimensions: cognitive, affective and evaluative social identity.

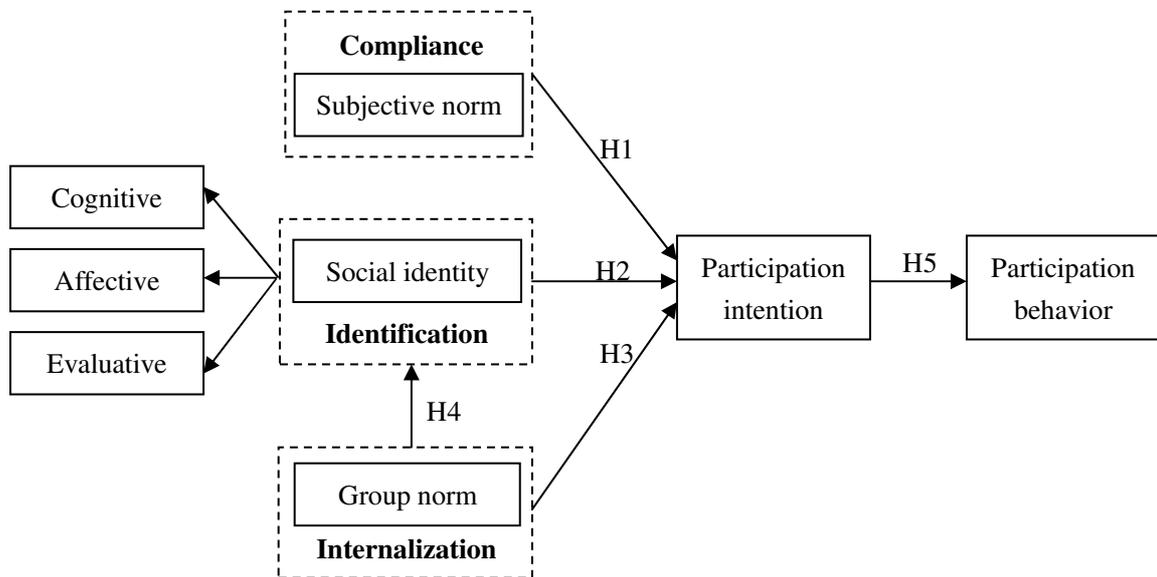


Figure 1. Research model

4. Research method

The research model includes seven constructs and each construct was measured

with multiple items. All items were adapted from extant literature to improve content validity (Straub et al., 2004). These items were first translated into Chinese by a researcher. Then another researcher translated them back into English to ensure consistency. When the instrument was developed, it was tested among ten users with rich online community usage experience. Then according to their comments, we revised some items to improve the clarity and understandability. The final items and their sources are listed in Appendix A. All items were measured with a seven-Likert scale.

Items measuring subjective norm were adapted from Taylor and Todd (1995) to reflect the influence of significant others' opinions on users. Items measuring group norm and three dimensions of social identity were adapted from Shen et al. (2007). Items of group norm reflect the strength of holding the shared goal by individual member and other members, respectively. Shared goal was defined as using online community to interact with others during the next two weeks. Items measuring cognitive social identity reflect the overlapping of users' personal cognition, image and value with group identity. Items of affective social identity reflect users' feelings of attachment, belongingness and membership. Items of evaluative social identity reflect users' feelings of importance and influence in the community. Items of participation intention and behavior were adapted from Dholakia et al. (2004). Items of participation intention reflect users' intention to conduct interaction in the community. Items of participation behavior reflect the usage frequency and time spent on using the community.

We collected data in a university campus located in an eastern China city where Internet was better developed than other regions. A CNNIC (2010) report showed that students represent the largest group (30.7%) of Internet users in China. Thus we felt that selecting students as our sample was appropriate. We randomly selected five classes and delivered 500 questionnaires among them. We asked students to fill the questionnaire based on their favorite online community usage experience. Then the questionnaires were returned and the response rate was 94%. We scrutinized all questionnaires and dropped those with too many missing values. As a result, we obtained 450 valid responses. Among them, 66.7% were male and 33.3% were female. With respect to the usage experience, 18.9%, 57.8% and 23.3% had used the community for less than one year, one to three years and over three years, respectively. The frequently used online communities included Baidu Tieba, Kaixin, Renren, Mop and Taobao community. Baidu Tieba is a comprehensive online discussion forum developed by Baidu, which is the largest Chinese search engine company. Kaixin and Renren are similar to Facebook and they represent two leading Chinese social networking sites. Mop is an entertainment-oriented community including discussion boards on music, movie and games. Taobao community is a leading online transaction community owned by Taobao, which is the largest consumer-to-consumer platform in China.

We conducted two tests to examine the common method variance (CMV). First, we conducted a Harman's single-factor test (Podsakoff et al., 2003). The results indicated that the largest variance explained by individual factor was 12.578%. Thus

none of the factors can explain the majority of the variance. Second, we modeled all items as the indicators of a factor representing the common method effect (Malhotra et al., 2006). The results indicated a poor fitness. For example, the goodness of fit index (GFI) was 0.742 (<0.90), and the root mean square error of approximation (RMSEA) was 0.150 (>0.08). With both tests, we feel that CMV is not a significant problem in our research.

5. Results

Following the two-step approach recommended by Anderson and Gerbing (1988), we first examined the measurement model to test the reliability and validity. Then we examined the structural model to test research hypotheses and model fitness.

First, we conducted a confirmatory factor analysis (CFA) to examine the validity. Validity includes convergent validity and discriminant validity. Convergent validity measures whether items can effectively reflect their corresponding factor, whereas discriminant validity measures whether two factors are statistically different. Table 1 lists the standardized item loadings, *t* values, average variance extracted (AVE), composite reliability (CR) and Cronbach Alpha values. As shown in the table, most item loadings are larger than 0.7 and *t* values indicate that all loadings are significant at 0.001. All AVEs are larger than 0.5 and all CRs exceed 0.7. This demonstrates a good convergent validity (Bagozzi and Yi, 1988; Gefen et al., 2000). In addition, all Alpha values are larger than 0.7, indicating a good reliability (Nunnally, 1978).

Table 1. Standardized item loadings, *t* values, AVE, CR and Alpha values

| Factor | Item | Standardized loadings | <i>t</i> values | AVE | CR | Alpha |
|--------|------|-----------------------|-----------------|-----|----|-------|
|--------|------|-----------------------|-----------------|-----|----|-------|

| | | | | | | |
|----------------------------------|------|------|--------|------|------|------|
| Subjective norm (SN) | SN1 | 0.78 | 16.854 | | | |
| | SN2 | 0.82 | 17.975 | 0.64 | 0.78 | 0.78 |
| Group norm (GN) | GN1 | 0.90 | 21.350 | | | |
| | GN2 | 0.83 | 19.381 | 0.75 | 0.86 | 0.85 |
| Cognitive social identity (CSI) | CSI1 | 0.75 | 17.465 | | | |
| | CSI2 | 0.80 | 19.203 | 0.56 | 0.79 | 0.78 |
| | CSI3 | 0.69 | 15.561 | | | |
| Evaluative social identity (ESI) | ESI1 | 0.80 | 18.628 | | | |
| | ESI2 | 0.63 | 13.842 | 0.53 | 0.77 | 0.78 |
| | ESI3 | 0.74 | 16.935 | | | |
| Affective social identity (ASI) | ASI1 | 0.79 | 17.579 | | | |
| | ASI2 | 0.64 | 14.270 | 0.51 | 0.76 | 0.75 |
| | ASI3 | 0.71 | 16.307 | | | |
| Participation intention (PI) | PI1 | 0.89 | 22.727 | | | |
| | PI2 | 0.89 | 22.849 | 0.79 | 0.88 | 0.88 |
| Participation behavior (PB) | PB1 | 0.91 | 20.879 | | | |
| | PB2 | 0.92 | 21.175 | 0.84 | 0.91 | 0.91 |

To examine the discriminant validity, we compared the square root of the AVE and factor correlation coefficients. As show in Table 2, for each factor, the square root of AVE is larger than its correlation coefficients with other factors. This shows a good discriminant validity (Fornell and Larcker, 1981; Gefen et al., 2000). We also listed the cross-loading matrix in Appendix B. Each item has a higher loading on its corresponding factor than the cross-loadings on other factors, showing a clear loading matrix.

Table 2. The square root of AVE (shown as bold at diagonal) and factor correlation coefficients

| | SN | GN | CSI | ESI | ASI | PI | PB |
|-----|-------------|-------------|-------------|-------------|-------------|-------------|-------------|
| SN | 0.80 | | | | | | |
| GN | 0.446 | 0.87 | | | | | |
| CSI | 0.641 | 0.520 | 0.75 | | | | |
| ESI | 0.619 | 0.519 | 0.590 | 0.73 | | | |
| ASI | 0.516 | 0.608 | 0.631 | 0.646 | 0.71 | | |
| PI | 0.543 | 0.675 | 0.614 | 0.665 | 0.578 | 0.89 | |
| PB | 0.371 | 0.408 | 0.349 | 0.382 | 0.437 | 0.477 | 0.92 |

Second, we adopted structural equation modeling software LISREL 8.72 to estimate the structural model. Figure 2 shows the estimation results. As we can see from the figure, three dimensions including cognitive, affective and evaluative social identity have high loadings on the second-order factor: social identity. The path coefficient from subjective norm to participation intention is insignificant ($\gamma=0.04$, $T=0.82$). Thus H1 is not supported. The path coefficient from social identity and group norm to participation intention is ($\beta=0.46$, $T=9.84$) and ($\gamma=0.42$, $T=7.27$), respectively. Thus H2 and H3 are supported. The path coefficient from group norm to social identity is ($\gamma=0.59$, $T=12.26$), lending support to H4. The path coefficient from participation intention to participation behavior is ($\beta=0.49$, $T=9.62$), supporting H5. Table 3 lists the recommended and actual values of some fit indices. As shown in the table, for all indices, the actual values are better than the recommended values. Thus the model has a good fitness (Gefen et al., 2000). The explained variance of social identity, participation intention and participation behavior is 34%, 64%, and 24%, respectively.

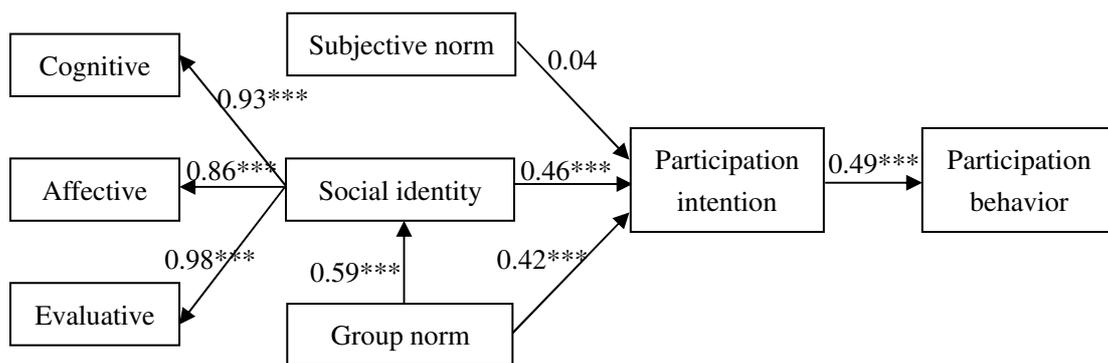


Figure 2. The results estimated by LISREL (*, $P<0.001$)**

Table 3. The recommended and actual values of fit indices

| Fit indices | χ^2/df | GFI | AGFI | CFI | NFI | NNFI | RMSEA |
|-------------------|-------------|-------|-------|-------|-------|-------|-------|
| Recommended value | <3 | >0.90 | >0.80 | >0.90 | >0.90 | >0.90 | <0.08 |

| | | | | | | | |
|--------------|------|-------|-------|-------|-------|-------|-------|
| Actual value | 1.87 | 0.929 | 0.877 | 0.973 | 0.967 | 0.960 | 0.068 |
|--------------|------|-------|-------|-------|-------|-------|-------|

(Note: χ^2/df is the ratio between Chi-square and degrees of freedom, GFI is Goodness of Fit Index, AGFI is the Adjusted Goodness of Fit Index, CFI is the Comparative Fit Index, NFI is the Normed Fit Index, NNFI is the Non-Normed Fit Index, RMSEA is Root Mean Square Error of Approximation)

6. Discussion

The results show that except subjective norm, both social identity and group norm have significant effects on participation intention. In addition, group norm strongly affects social identity. Participation intention predicts actual behavior.

As noted earlier, subjective norm, social identity and group norm represent compliance, identification and internalization, respectively. Thus online community user participation intention is mainly affected by identification and compliance rather than compliance. Shen et al. (2010) also found the similar results in the context of using IM for collaboration. The insignificant effect of subjective norm indicates that significant others' opinions will not affect online community users' behavioral decision. There exist three possible explanations for this result. First, we removed the paths from social identity and group norm to participation intention, and re-estimated the model. The results indicate that subjective norm significantly affects ($\beta=0.81$, $p<0.001$) participation intention. This shows that although subjective norm has an effect on behavioral intention, this effect will be overshadowed by the effects of social identity and group norm when both factors are involved into the model. Second, previous research has noted that subjective norm has an effect on new users' behavioral intention. However, this effect gradually diminishes with increased usage experience (Venkatesh and Davis, 2000). Our subjects are experienced users of online community. This may bias the results. We conducted a post-hoc analysis to examine

the moderation effect of user experience on participation intention. The results show that experience negatively moderates ($\gamma=-0.15$, $p=0.038$) the effect of subjective norm on participation intention. This provides support to our argument. Third, users are voluntary to participate in a community. They may feel that it is unnecessary to comply with other people's opinions. They decide whether to participate in a community mainly based on their own volitions.

Social identity as a second-order factor includes three high-loading reflective dimensions: cognitive, affective and evaluative social identity. Among them, cognitive identity reflects the overlapping of personal identity with group identity. Affective identity reflects the senses of membership, belongingness and attachment to the community. Evaluative identity reflects a member's influence and value in the community. Previous research has focused on the effect of affective identity on community user behavior. For example, Zhang (2010) reported that sense of community, which includes membership, emotional connection and influence has an effect on social networking usage. Sense of belonging has also been found to affect online community user participation (Teo et al., 2003; Lin, 2008). Our results indicate that future research needs to pay more attention to the effect of cognitive and evaluative social identity. Online community managers can organize offline activities, select influential members as board leaders and provide reliable services to enhance users' trust, membership and attachment. For example, many online automobile communities have organized self-driving tours to improve users' stickiness and identity. A few online shopping communities organize group purchase to facilitate

users' identification with the communities.

Group norm reflects the congruence of a user's values and goals with those of other members. Group norm is similar to shared vision, which has been found to affect online community users' knowledge sharing (Chiu et al., 2006). Wang et al. (2002) also noted that clear purpose and policy are vital for online community. Thus online communities should clearly define their values, norms and visions. This allows users to better understand communities' values and further transform these values into their common beliefs. For example, Renren, a well-known Chinese social networking community, has defined its vision as "because of reality, we enjoy excitement". Its main users are university students and the community verifies users' identity by requiring them to register with university e-mail addresses. Another example is xiaomuchong, which represents a popular Chinese academic community. Its vision is "becoming the first academic and research site". Its main users are graduate students and young teachers in universities. These clear visions help increase users' identification and promote their participation in communities.

7. Theoretical and managerial implications

From a theoretical perspective, this research adopted social influence theory to identify the factors affecting online community user participation. As noted earlier, previous research has used multiple theories including TAM, trust theory, commitment theory, social cognition theory, social capital theory and social network theory to explore online community user behavior. The group influence of community on user behavior has seldom been considered. Thus our research enriches previous

findings by examining the effects of social processes on online community user participation. This also advances our understanding of online community user behavior as prior research has mainly focused on the motivations affecting online community user behavior. On the other hand, although much research has found the significant effect of normative social influence (subjective norm) on user behavior, our results indicate that online community user participation is mainly formed through the identification and internalization rather than compliance process. Future research can generalize our results to other contexts including mobile communities and virtual worlds such as Second Life. In addition, our results are mainly based on the popular communities associated with social networking, entertainment and transaction. Besides these loosely-structured communities, there exist other kinds of online communities, such as professional community and open source software (OSS) community. We believe that our results can be generalized to these contexts as these communities have relatively tight structures and individual behavior will be greatly influenced by others and the community. However, this needs future empirical verification.

From a managerial perspective, our results suggest that online community managers need to concern two social processes including identification and internalization in order to facilitate user participation in online communities. They cannot just focus on user motivations such as perceived usefulness and neglect the roles of social influences because as a member of community, individual user's behavior may also receive group influence. Identification and internalization are

represented by social identity and group norm, respectively. Social identity is a multiple-dimensional concept, which includes cognitive, affective and evaluative social identity. Online community managers can enhance system and information quality, organize offline activities and build users' trust to improve their social identity, including senses of belongingness, membership and influence. The effect of group norm on social identity and participation intention also deserves attention. Online community managers need to clearly define their values and vision, thus enabling users to internalize these group norms into their own beliefs.

8. Conclusion

Online community users interact with each other in a collaborative environment. Their participation will be affected not only by their own motivations, but also by social processes. Drawing on the social influence theory, we examined the effects of three social processes including compliance, identification and internalization on online community user participation. Compliance, identification and internalization are represented by subjective norm, social identity and group norm, respectively. The results show that except subjective norm, both social identity and group norm have significant effects on user behavior. Thus online community managers should adopt effective measures to facilitate user participation through the identification and internalization processes.

There are some limitations within this research. First, we conducted this research in China, which features a collectivistic culture. This may strengthen the effect of social influence such as group norm on user behavior. Thus our results need to be

generalized to the individualistic culture. Second, we selected students as our sample. Students as young people may be potentially more influenced by others. This will bias our results. Thus, although they represent a main group of Internet users, future research can generalize our results to other samples, such as working professionals. Third, the explained variance of participation intention is about 60%. Thus there exist other possible factors affecting user participation, such as trust and usability. Future research can examine their effects. Fourth, we mainly conducted a cross-sectional study. However, user behavior is dynamic. Thus a longitudinal research may provide more insights on user behavior development.

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Appendix A: Measurement items and their sources

Subjective norm (SN) (adapted from Taylor and Todd (1995))

SN1: Most people that are important to me think that I should participate in the community.

SN2: Most people that have influence on my behavior think that I should participate in the community.

Group norm (GN) (adapted from Shen et al. (2007))

GN1: Please estimate the strength of holding the shared goal by yourself.

GN2: Please estimate the average of the strength of holding the shared goal by other members.

Cognitive social identity (CSI) (adapted from Shen et al. (2007))

CSI1: My personal identity has an overlapping with group identity.

CSI2: My personal image has an overlapping with group identity.

CSI3: My personal value has an overlapping with group identity.

Affective social identity (ASI) (adapted from Shen et al. (2007))

ASI1: I feel a strong feeling of attachment to the community.

ASI2: I feel a strong feeling of belongingness to the community.

ASI3: I feel a strong feeling of membership in the community.

Evaluative social identity (ESI) (adapted from Shen et al. (2007))

ESI1: I am a valuable member of the community.

ESI2: I am an important member of the community.

ESI3: I am an influential member of the community.

Participation intention (PI) (adapted from Dholakia et al. (2004))

PI1: I plan to participate in the community.

PI2: I plan to continue participating in the community in future.

Participation behavior (PB) (adapted from Dholakia et al. (2004))

PB1: How many times have you participated in the community during the latest two weeks?

PB2: On average, how much time do you spend on communicating with community members each time?

Appendix B: Cross-loading matrix

| | CSI | PI | GN | PB | ESI | SN | ASI |
|------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|
| SN1 | .096 | .101 | .181 | .125 | .192 | .835 | .155 |
| SN2 | .205 | .166 | .068 | .109 | .107 | .821 | .215 |
| GN1 | .084 | .186 | .826 | .138 | .171 | .089 | .250 |
| GN2 | .161 | .148 | .866 | .145 | .085 | .146 | .089 |
| CSI1 | .813 | .172 | .172 | .075 | .168 | .083 | .198 |
| CSI2 | .621 | .360 | .163 | .038 | .067 | .306 | .312 |
| CSI3 | .778 | .184 | .068 | .103 | .189 | .155 | .131 |
| ESI1 | .340 | .179 | .076 | .165 | .701 | .145 | .326 |
| ESI2 | .113 | .054 | .212 | .081 | .856 | .131 | .101 |
| ESI3 | .248 | .377 | .044 | .056 | .733 | .168 | .078 |
| ASI1 | .374 | .053 | .181 | .147 | .179 | .236 | .640 |
| ASI2 | .107 | .282 | .225 | .094 | .025 | .220 | .737 |
| ASI3 | .245 | .308 | .005 | .076 | .200 | .084 | .717 |
| PI1 | .173 | .720 | .300 | .210 | .172 | .128 | .142 |
| PI2 | .264 | .629 | .302 | .238 | .238 | .235 | .002 |
| PB1 | .067 | .112 | .162 | .923 | .090 | .095 | .075 |
| PB2 | .106 | .133 | .117 | .914 | .064 | .119 | .133 |

Author Biography

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