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Roles of community commitment and community atmosphere: an empirical study of online community success

Liu Lili
School of Economics and Management, Xidian University, Xi'an, China

Du Rong
School of Economics and Management, Xidian University, Xi'an, China

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Lili Liu, Rong Du
School of Economics and Management, Xidian University, Xi'an, China

Abstract: Online communities have become quite popular, and both practitioners and researchers have focused on the determinants of and the evaluation of online community success. The success of online community is not only embodied in the usage but also on the members' intention to stick with the community over time. Based on the updated DeLone and McLean's IS Success Model, and incorporating the theory of organization commitment, we propose a research model to investigate the key factors that lead to online community success. In our model, we depict the roles of community commitment and community atmosphere. On the basis of the existed scales, we develop an instrument and design a questionnaire. We conduct a survey and collect 273 answered responses in Xi'an. We use AMOS7.0 to make an analysis of the collected data. Our result indicates that continuance and affective community commitment have prominent influences on members' usage behavior; but system quality, information quality, and community atmosphere do not affect the three components of community commitment simultaneously. System quality and information quality help to increase members' continuance community commitment, and information quality and community atmosphere have a significant effect on affective commitment. This study may enrich the understanding of online community success by considering the roles of community commitment and their relationship with members' usage.

Keywords: online community success, community commitment, community atmosphere, system quality, information quality

1. INTRODUCTION

The online community has a 30-year history, and it is co-evolving with the advance of computer mediated communication (CMC) technologies and the widespread adoption of the Internet. Especially, the online community breaks through the limitation of space and time, connecting people with the same interest from different places. Now people seek information, jobs, discussion, data, social support, even make collaborative decision in thousands of online communities. For many of us, it is common to go some online communities for help when we cannot work out.

Jenny Preece [1] defined the online community as "any virtual social space where people come together to get and give information or support, to learn, or to find company". They have a variety of forms and shapes. They can be local, national, international, small or large. They also have certain purpose, such as, for commercial purpose, social support. Notwithstanding the various types and focuses, people participate in the online community with the only reason that they could get benefit from the presence and activity of others there. On the Internet, there are many choices and switching costs is low, so online communities are characteristically easy to enter and leave, which may make the access to some website as a one-off transaction [2]. Meanwhile, for the same kind of online community, individuals may prefer this to that. But, the determinant of the community is the voluntary participation of the members, sharing their knowledge and experience, providing the information, social and emotional support to other members or visitors. Therefore, the online community, in order to success, firstly should match the need of the visitors, and then attract them to stick with the community over time.

Researchers have done many studies on the subject of community success, e.g., the antecedent factors [3, 4, 5]. Several studies focus on the assessment of the success, from the perspective of usability, sociability [1, 6, 7] etc. In this paper, we will explain and assess the community by the organization commitment theory that considered both individual and the community. Organization commitment is a sort of bond between an employee and the organization he or she is working for [8]. It affects the employee's turnover intention and their work performance. We analogously hypothesize that the community commitment affect the individual behaviors—choose this community or that, repeatedly participate in a specific community.

2. LITERATURE REVIEW

2.1 Online community

In 1993, Howard Rheingold first used the term virtual community and considered it as a certain social group of people on the Internet [9]. With the Internet-based technology, online communities are not only used for information sharing among the members with common interests, but also for commercial purposes. The online community is benefit for both members and community providers. Consequently, researchers have been spending more effort on the key determinants of successful online communities and the assessment of online community success.

Form the technical respective, online communities can be viewed as a web-based information system. The original IS (information system) success model developed by DeLone and McLean [10] consists of six constructs: system quality, information quality, user satisfaction, individual impact, and organization impact. Many researchers have studied the online community based on this IS model, adopting the constructs from it, such as information quality and system quality [11-14].

Different from information system, social interaction between the members is a special attribute of the online community, which is a crucial factor furthermore. Preece proposed the framework with usability and sociability. Usability refers to the technical component, though sociability is concerned with the human-human interaction. Lin and Lee [11] introduced the loyalty that measured member involvement in an online community. They concluded that system quality, information quality and service quality significantly affected member loyalty to an online community. Similarly, members' satisfaction, and sense of community [13] also have been used to explain and evaluate the success of an online community. Spaulding [15] noted that the success of online communities depended on an attitude of contribution, dedication of resources, building a critical mass, and matching community and business needs. Exploring from different angles, Khe Foon Hew [2] examined the determinants of success in terms of members' perceived professional development through participation in an online community, and revealed seven key constructs: a willingness to share knowledge, high quality content, diversity of views, technology, and relevant discussions, a respectful environment and rapid response to members' queries.

The original study on the community success use members' satisfaction, sense of community, etc, as the determinate factors which affect community success. But, the online community, as mentioned early, to survive and thrive, should focus on maintaining existing members—that is, making the members desire to be part of the community and make contributions. It is analogous that a successful organization needs to decrease the employee's turnover and increase their performance. The research in the organizational behavior has confirmed the organization commitment raised between the employees and the organization affects the employees' behavior. We hypothesize that the community commitment can influence the members' behaviors too.

2.2 Organization commitment

Organization commitment refers to an employee's psychological bond to an organization [16]. As part of their research, Meyer and Allen theorized that organization commitment is a multi-dimensional construct

consisting of three components: continuance commitment, affective commitment, and normative commitment.

Continuance commitment has been defined as "the extent to which employees feel committed to their organization by virtue of the costs that they feel are associated with leaving." It relates to consciousness of the costs of leaving the organization, both financial and non-financial. Employees with continuance commitment would focus their efforts on the work to preserve the employment relationship [17]. Affective commitment has been defined as "positive feelings of identification with, attachment to and involvement in the work organization". It deals with the sense of affection to and acceptance of the organization and the organization's goals, so also referred to as identification commitment [18]. Normative commitment as the third component of organization commitment has been defined as "the employee's feelings of obligation to remain with the organization." The employees who have a strong normative commitment stay within the organization, not for personal interest, because they feel obliged to do so [19].

It has been demonstrated that the organization commitment directly affects employees' performance [20, 21, 22], and the commitment to the organization would reduce the chances of the employee s' absenteeism and turnover [23].

In online community, information recognized as the most important resource is contributed by the members. Therefore, the members and their specific behaviors-helping other members, sharing knowledge, etc.-are the key to the online community success. So, the organization commitment theory, which effects in shaping employees' engagement and behavior, is particularly appropriate theory to apply in online community. Batenma, Gray and Butler [24] had argued that members had psychological bonds to a particular online community. Consistent with the organization commitment theory, they constructed three corresponding constructs: continuance community commitment, affective community commitment and normative community commitment. Though empirical test, they also demonstrated each component of community commitment had a unique impact on each behavior (reading threads, posting replies and moderating discussions). In this paper, we take it as the determinant of the online community success.

3. RESEARCH MODEL AND HYPOTHESES

DeLone and McLean (1992) proposed the six dimensions of IS success model. With the advent and explosive growth of e-commerce, they proposed minor refinements to the original model and constructed an updated DeLone and McLean IS Success Model [25]. Numerous studies have applied this model in the context of various internet-based information systems, including decision support systems [26], Internet shopping malls [27], and online community environments [4]. In this paper, we incorporate the idea of community commitment in the DeLone and McLean's model, exploring the relationship between information quality, system quality, and community atmosphere and community commitment, and their impacts on community members' usage, so to assess online community success.

Drawing from both the updated DeLone and McLean IS Success Model and the organization commitment theory, we propose an integrated model to measure online community success, as shown in Figure 1. The formal definitions for each construct in Fig 1 are presented in Table 1.

Table 1. Definitions of constructs

Construct	Definition
System quality (SQ)	The extent of how well a system performs its functionalities.
Information quality (IQ)	The quality of the content of information contains in the online community.
Community Atmosphere (CA)	The prevalence of norms and attitudes that are intended to facilitate member participation in community
Continuance Community Commitment (CCC)	A bond between a member and a particular community that is based on the member's belief that his or her involvement provides net benefits that are not

	easily available elsewhere.
Affective Community Commitment (ACC)	A bond between a member and a particular community that is based on the member's strong emotional attachment to that community.
Normative Community Commitment (NCC)	A bond between a member and a particular community that is based on the member's sense of obligation towards that community

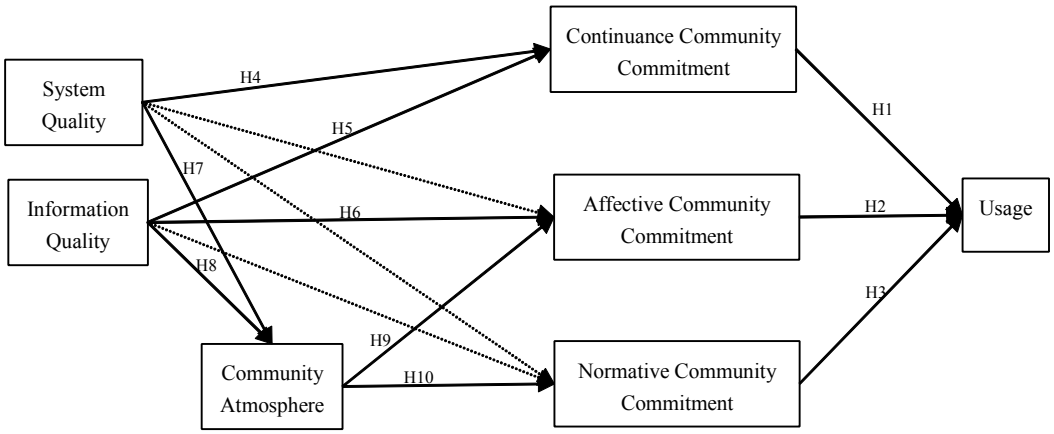

Figure 1. A research model of online community success

In online community, the three types of community commitment have different association with different member attitudes and behaviors. Continuance community commitment (CCC) has been defined as "a bond between a member and a particular community that is based on the member's belief that his or her involvement provides net benefits that are not easily available elsewhere." Continuance community commitment leads members to use the community for their own informational benefit. In online community, member also should cost energy and time to obtain informational benefit, if they consider that they will take more cost to receive the same benefit elsewhere they will continue participating in this community. Hence, the members who have the continuance community commitment to the special community will use the community now and then. Affective community commitment (ACC) has been defined as "a bond between a member and a particular community that is based on the member's strong emotional attachment to that community." It is positive feelings of identification with, and involvement in the community. If a member has a strong emotional attachment to community generally like that community, which indicates he or she is interest in and wants to browse the web frequently, not only at the time he or she need information, furthermore, help the members who have some problem to settle consciously. Normative community commitment (NCC), as "a bond between a member and a particular community that is based on the member's sense of obligation towards that community", is focus on the obligation to contribute to the community. Though the three kind of bonds form between the members and the special community impact different behavior with the community, they all increase the usage of the community. So, we propose the following hypotheses.

H1: A member's level of continuance community commitment towards a community will have a significant positive impact on the usage.

H2: A member's level of affective community commitment towards a community will have a significant positive impact on the usage.

H3: A member's level of normative community commitment towards a community will have a significant positive impact on the usage.

System quality (SQ) is the quality of the online community in terms of ease of search, communication,

accessibility, screen design, and reliability. Higher system quality facilitates members to fulfill their information needs more quickly. A nice experience will increase the belief that the members use the community again. Therefore, the higher system quality enable drive the users to continue to use the community. Thus we propose the following hypotheses.

H4: System quality will have a significant positive impact on continuance community commitment.

Information quality (IQ) is defined as the quality of the information contains in the online community. It represents the degree to which the quality of the information is perceived. In the organization, the basic requirement of employee is the payment. The high level of pay satisfaction will let the organization gets the desired feedback from the employee. Analogously, the level of the information quality the members get can affect the probability that he or she continue to participate in and the member's assessment of the community. Furthermore, the higher information quality will make the members like it and identify with it, arising strong emotional attachment to this community. Hence, we hypothesize the following.

H5: Information quality will have a significant positive impact on continuance community commitment.

H6: Information quality will have a significant positive impact on affective community commitment.

Community atmosphere (CA) is the prevalence of norms and attitudes that are intended to facilitate member participation in community. The system quality and the information quality is the foundation of the formation of well community atmosphere. That is, there are positive relationships between them and the community atmosphere.

Literature on organization commitment identifies that friendly relations can let employees' commitment towards the organization excels. In the virtual community, a respectful and pro-sharing environment facilitates members to discuss their opinions freely and help others without the fear of being criticized. Those are conductive to develop an affective bond to community and feel an obligation to visit the. Therefore, we hypothesize the following.

H7: System quality will have a significant positive impact on the community atmosphere.

H8: Information quality will have a significant positive impact on the community atmosphere

H9: Community atmosphere will have a significant positive impact on affective community commitment.

H10: Community atmosphere will have a significant positive impact on normative community commitment.

Though we hypothesize these relationships, it is possible that system quality has effect on affective and normative community commitment. To control for the other possible relationships not hypothesized here, we include these other potential associations in our model shown with dashed lines in Figure 1.

4. INSTRUMENT DEVELOPMENT AND DATA COLLECTION

We operationalized the constructs by borrowing the previous established measures and revising the items to fit the online community context. All questions were measured using five-point Likert-type scale, raging from "strongly disagree" to "strongly agree". Table 2 shows the items and respective sources in literature.

In 2012, we conducted a questionnaire survey in Xi'an, China. The respondents are native Chinese speakers, so the original items have been translated into Chinese and then back-translated for several times by different groups of our researchers to assure the fitness of the items. At first, we did a pilot survey in Xidian University. Based on the feedback, we made a minor modification to some items. We chose "Baidu knows", a Chinese online community, as a typical online community for us to look into in this study. Because a large portion of the users in this online community are students, we chose college students as the main respondents in our survey. We distributed hard copies of our questionnaires to students on campus. Meanwhile, the survey was posted online for two weeks. We received 273 responses in total. After discarding those having multiple missing

values or that was otherwise unusable, 255 were valid responses.

Table 2 Constructs Measurement

Construct	Items	Source
System Quality	In terms of system quality, I would rate this site highly.	Reference [14], Wixom and Todd (2005)
	Overall, this site is of high quality.	
	Overall, I would give the quality of this site a high rating.	
Information Quality	Overall, I would give the information from this site high mark.	
	Overall, I would give the information provided by this site a high rating in terms of quality.	
	In general, this site provides me with high-quality information.	
Community Atmosphere	It is common to for members to cooperate with each other in this community.	Reference [3], Hew (2009)
	There may be some constructive criticisms but not personal attacks.	
	Everybody's opinions are respected in the site.	
	The site is a very positive environment.	
Continuance Community Commitment	I am sure that there are other sites where I could find the same content and services that I get at this site.	Reference [24], Bateman et al (2011)
	I keep coming to this site because there are few alternative sites available.	
	If I stopped coming to this site, it would take me a long time to find a site that could replace it.	
	The content of this site is too valuable for me to stop visiting.	
Affective Community Commitment	I feel like a part of the group at this site.	
	I have a real emotional attachment to this site.	
	I feel a strong sense of belonging to this site.	
	I feel a strong connection to this site.	
Normative Community Commitment	I feel an obligation to continue visiting this site.	
	This site deserves my loyalty.	
	I keep coming to visit this site because I have a sense of obligation to it.	
	I visit this site partly out of a sense of duty.	
Usage	I frequently use this site.	Reference [13], Zhang (2010)
	I regularly visit this site.	
	I log into my account very often.	

5. DATA ANALYSIS AND RESULTS

Firstly, we assessed the reliability and validity of the instrument. Then, structural equation modeling was used to test the structural model, using the software of AMOS7.0.

5.1 Reliability and validity of the instrument

The test of the instrument includes the internal consistency reliability and structure validity of the constructs.

Reliability was assessed both for the entire scale and for each of the construct by using Cronbach's alpha which is the most appropriate type of reliability measure. Table 3 lists the values of Cronbach's alpha. They all exceeded the recommended value of 0.7[28], ranging from 0.755 to 0.920, which indicated adequate internal consistency.

Table 3 Reliability of constructs

Construct	The number of items	Cronbach's α
System Quality	3	0.759
Information Quality	3	0.780
Community Atmosphere	4	0.826
Continuance Community Commitment	5	0.920
Affective Community Commitment	4	0.812

Normative Community Commitment	4	0.844
Usage	3	0.755
Total	0.9	

Table 4 Convergent validity

Constructs	Items	Standardized	AVE
SQ	Sq1	0.79	0.53
	Sq2	0.73	
	Sq3	0.64	
IQ	Iq1	0.63	0.55
	Iq2	0.88	
	Iq3	0.70	
CA	Ca1	0.65	0.54
	Ca2	0.73	
	Ca3	0.74	
	Ca4	0.77	
CCC	Ccc1	0.73	0.71
	Ccc2	0.94	
	Ccc3	0.83	
	Ccc4	0.89	
	Ccc5	0.77	
ACC	Acc1	0.67	0.54
	Acc2	0.64	
	Acc3	0.87	
	Acc4	0.74	
NCC	Ncc1	0.65	0.58
	Ncc2	0.77	
	Ncc3	0.90	
	Ncc4	0.74	
Usage	U1	0.56	0.51
	U2	0.70	
	U3	0.56	

We conducted CFA to assess the structure validity. The structure validity of the measurement comprises of convergent validity and discriminant validity. Convergent validity can be established by examining the average variance extracted (AVE) of constructs and the estimated standardized loadings of items. The value of the AVE for each construct was calculated and shown in Table 4. We noted that all the value were higher than the common benchmark of 0.5 [29]. Moreover, the estimated standardized loadings were above the commonly used cut-off value of 0.50 [30]. Overall, the convergent validity for the constructs was supported.

Discriminant validity is supported when the square root of AVE for each construct is greater than the correlations between that construct and other constructs [31]. Table 5 shows the correlation matrix of the correlations between the constructs, with the square root of AVE on the diagonal. It can be seen that the square root of each construct was larger than the correlation of that construct with all other constructs, thereby indicating the measure has adequate discriminant validity.

In summary, the measurement model had adequate reliability, convergent validity and discriminant validity.

Table5 Discriminant validity (Square Root of AVE and Correlation between the Constructs)

	SQ	IQ	CA	CCC	ACC	NCC	U
SQ	0.73						
IQ	0.37	0.75					
CA	0.42	0.38	0.74				
CCC	0.45	0.40	0.33	0.84			
ACC	0.32	0.40	0.44	0.38	0.74		
NCC	0.39	0.40	0.41	0.47	0.38	0.76	
U	0.39	0.42	0.45	0.51	0.54	0.51	0.71

5.2 Structural model

The test of the structural model includes the path coefficients between two constructs, which indicate the strength of the relationships. The SEM analysis was performed by AMOS7.0.

Table 6 lists the model fit indexes. It can be seen that the structural model had a good fit as most fit statistic met the recommended thresholds. That is to say the model reached an acceptable level and can be used to explain the hypotheses.

Fig 2 depicts the final result of the hypotheses testing, including the path coefficients and significance values. It shows most of the postulated hypotheses were supported.

As expected, continuance community commitment and affective community commitment were found to significantly affect behavioral intention to use online community, H1and H2 were supported. Though the normative community commitment was found to be non-significantly associated with the usage, thus refuting

hypothesis H3. Normative commitment is a sense of obligation, the highest level of commitment. In a community context, it is unusual to arise the feeling of indebtedness for the members. Thus the normative community commitment cannot affect the members' behavior significantly

Table6. Goodness of Fit Indices for the Structural Model

Fit index	Ideal standard value	Acceptable standard value	Scores
χ^2	N/A	N/A	542.6
df	N/A	N/A	286
χ^2/df	≤2.00	≤3.00	1.87
GFI	≥0.90	≥0.80	0.866
RMSEA	≤0.05	≤0.08	0.059
AGFI	≥0.80	≥0.70	0.835
NFI	≥0.90	≥0.80	0.852
CFI	≥0.90	≥0.80	0.923
PNFI	≥0.5		0.750
PCFI	≥0.5		0.813

Furthermore, system quality and information quality had a significant positive effect on community atmosphere, with standardized path coefficient of 0.35 and 0.29 respectively, providing support for H7 and H8. The continuance community commitment is affected by the system quality and the information quality, which indicated that as system quality and information quality increase, members are more likely to use this community again. Moreover, the affective community commitment is significantly affected by the information quality (0.25, p<0.001) and the community atmosphere (0.39, P<0.001), so H6 and H9 were supported. Noted that the information quality and the community atmosphere had a significantly directly effect on the affective community commitment, but the system quality affected it indirectly through the community atmosphere.

The relationships shown with dashed line were not supported. As shown in Figure 2, The high level of system quality and information quality, and friendly atmosphere cannot raise the normative community commitment. And, the affective community commitment was found to be non-significantly associated with system quality.

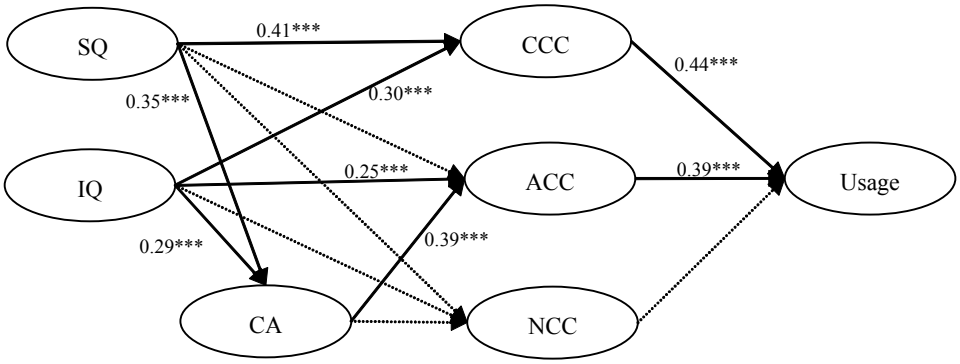

Figure. 2 AMOS Results for the Research Model

6. DISCUSSIONS AND CONCLUSION

6.1 Implications for Research

Drawing upon the theories from updated DeLone and McLean IS Success Model and the organization commitment, we proposed a research model to evaluate online community success. This study offers theoretical implications by utilizing the community commitment to explain members' usage behavior in a special community, and taking it as the dependent construct for assessing the online community success.

Though empirical analysis, we found that only two kinds of member-community bonds could operate in online community setting. Continuance and affective community commitment had the most prominent influence on the members' usage behavior, as manifested by the large path coefficient between them.

Continuance community commitment derived by satisfactory experience on the community with high system quality and information quality. Though they only consume the content, as audiences, they may encourage content providers, which also is a key to community success.

Affective community commitment is the emotional connection to the community. The member who has affective community commitment will identify with the community and hold its values and goals, which lead them to engage in the conversation with other members and response the questions. Just these members contribute time and information to the community, and keep the long-term success of the community.

Inconsistent with organization commitment theory, the connection between the normative community commitment and the usage was not significant. We interviewed some respondents, who commented that they could generate the emotional attachment to a special community, but, with respect to normative community commitment like the obligation, they could not feel the sense of that. This also makes sense. In the organization context, employees generate normative commitment when they believe that they receive benefit from the organization that they cannot adequately reciprocate, such as overmuch payment, promotion, or assistance. Those benefits have a profound and lasting effect on employees. In online community, the members are not easy to generate the analogous sense of indebtedness. Therefore, the normative community commitment has an insignificant influence on the usage.

As the antecedence of the community commitment, system quality, information quality and community atmosphere didn't affect the three components of the commitment directly and simultaneously. As a IS, system quality and information quality is important to increase the members' continuance community commitment. Nevertheless, to attract and maintain members, the community should increase the affective commitment, which also requires high information quality and a pro-sharing and respectful community atmosphere.

6.2 Implications for practice

Social networking sites such as Baidu Knows, and Tianya.com have attracted millions of members, and have become part of our everyday life. This research raises practical implications for community manager and developers to consider.

First, the community developers should make great effort to improve the system quality which is important to continuance community commitment. Developing better user interfaces, ease of navigation, fast response, and great reliability, the managers are more likely to attract members to use community again.

Second, the community developers should increase affective community commitment to community. As our result shown, it had a significant relationship with the usage. The switching cost for these services is usually low. As quickly as members gather together to a popular site, they can also quickly move on to another one. The developer should promote pro-sharing norms to encourage the collaboration between members. Meanwhile, they can offer incentive and punitive measure to promote sharing and suppress immoral behavior.

6.3 Limitations and Suggestions for Future Research

Most of the respondent for the survey were college students. The results may not be generalized to other

settings, such as other categories of online community for work professionals without further research.

Another limitation is the measure of the usage. As the primary online community success measure, we did not measure the actual usage of community. The actual behavior of a member could differ from the self-reported perceptual usage. So, future research can collect data from server logs to conduct analysis.

Finally, in this paper, the constructs were modeled as reflective constructs. For system quality, information quality and community atmosphere, it is worthwhile to model them as formative constructs to identify different components, which is valuable for the developer to take objective effective measures.

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