

The Relationship Between Users' Relational Capital and Knowledge Contribution in the Social Q&A Community

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ABSTRACT:

The development of Web2.0 technology has promoted the emergence and growth of social Q&A community. The core value of Q&A community comes from the knowledge contribution of community members, and the influence of members' relationship and interaction can be explained by social capital theory. The three dimensions of social capital have different effects on the behavior of knowledge contribution. Among them, there are significant differences in the results obtained by scholars on the dimension of relational capital. Therefore, we argued that there exist other variables between relational capital and knowledge contribution. In this paper, virtual sense of community was included in the model of relational capital and knowledge contribution, and data analysis of valid questionnaires was conducted through SPSS24.0. The research shows that community identity and reciprocity of relational capital have a direct positive influence on users' knowledge contribution behavior, and community identity has a greater influence. The sense of virtual community plays a part of intermediary role between the relational capital and users' knowledge contribution behavior. Community identity and reciprocity affect users' sense of virtual community, and then have a positive impact on users' knowledge contribution behavior.

Keywords: *Relational Capital, Sense of Virtual Community, Knowledge Contribution, Social Q&A Community*

1. INTRODUCTION

With the continuous development of the Internet and information technology, as a branch of virtual community, social Q&A community has attracted extensive attention and become an important platform for information exchange. Different from ordinary social media, social Q&A community refers to a community in which individuals with common interests follow certain interaction norms and spread knowledge and experience to others through computer media^[1]. They communicate with each other, seek suggestions and exchange ideas to promote the development of the community. Therefore, knowledge contribution is one of the key factors to maintain the operation of virtual communities^[2].

However, there exists the problem of low contribution rate of members in the community. Only 9% of members are willing to contribute. Therefore, it becomes an urgent problem to study the factors that influence users' knowledge contribution behavior. In the social Q&A community, there is no special reward to motivate members, so it is not reasonable for members to sacrifice their time and energy to contribute knowledge. So, What influences people's willingness to contribute? Scholars used social capital theory^[3], social exchange theory^[4],

identity theory^[5], rational behavior theory^[6] and other theories for analysis. They put forward many motivational factors. Chen^[6] believed that motivation can be divided into individual motivation and collective motivation. And individual motivation includes self-efficacy, reciprocity, trust, commitment and so on. The collective level includes social interaction, community identity, social relations, rewards and punishments. However, we find that scholars have conflicting results on the influence of reciprocity, identification, trust and other factors. Jin^[7] believed that trust, feedback, reciprocity and identity communication are crucial to knowledge contribution. However, Chen^[6] thought the influence of individual trust and reciprocity on knowledge contribution is not significant, while altruism and individual expectation of return are the main factors. Due to the influence of these factors, there are different voices, so it is necessary to carry out further research. Most studies have only investigated the direct impact of social capital on knowledge contribution^[8], while few have investigated the moderating or mediating factors of the impact of social capital on knowledge contribution. Virtual sense of community can reflect the actual psychological experience of community members, shape individuals' views and positions on specific issues, and provide motivation for returning to the community in the future. Therefore, virtual sense of community plays a very important role.

Therefore, our study extends the connotation and dimension of relational capital to verify and analyze the influencing factors of community users' knowledge contribution behavior. In addition, this paper explores the mediating role of virtual sense of community, in order to deeply study the different action paths of various dimensions of relational capital to knowledge contribution. We used SPSS 24.0 to analyze the data collected from 304 valid questionnaires, understanding the role of relational capital and virtual sense of community in users' knowledge contribution. This paper provides theoretical support for knowledge contribution behavior of social Q&A community, and also provides more effective operational suggestions for managers of Q&A community.

The rest of the paper is structured as follows. This article first reviews the previous research, highlights the main relevant theories of network knowledge sharing and the most frequently mentioned factors of knowledge sharing willingness (Session 2), and establishes a research model based on social capital theory (Session 3). Our data collection method is introduced in Session 4. The empirical results of this study (Session 5) show that community identity and reciprocity positively affect the behavior of knowledge contribution, and the virtual sense of community plays a partial intermediary role in this process. Implication is given in Session 6, conclusions are in Session 7.

2. BACKGROUND

The knowledge contribution behavior of Q&A community is an important source of value for community survival and development. Members post information in the community, usually rich, novel and interesting posts, which attract a large number of users' attention and prompt them to carry out discussions in the community. It seems unreasonable for members to contribute knowledge for free to spend their time without substantial benefit. So what motivates people to share their knowledge? Scholars have put forward the motivation factors of knowledge contribution based on different theories, but they have different conclusions about the influence of these motivation factors. Under the theory of social capital, predecessors mainly studied the direct impact of social capital on knowledge contribution, but paid little attention to the intermediary factors. Based on the social capital proposed by Nahapiet and Ghoshal^[9], this paper reveals the basic motivation of knowledge contribution behavior in Q&A communities. Starting from the most important dimension of relational capital, this paper studies the influence of relational capital on knowledge contribution, and at the same time uses the virtual sense of community as the intermediary variable to improve the model framework.

3. RESEARCH MODEL AND HYPOTHESES

3.1. Social capital theory

The earliest definition of social capital came from Nahapiet and Ghoshal^[9], they proposed that social capital consists of three distinct dimensions: structural, relational, and cognitive, all of which have mutual relations with each other. And the impact of the three dimensions of social capital on knowledge contribution has been confirmed, but different factors have different impacts on knowledge contribution^[10]. It is worth noting that scholars put forward that trust and reciprocity under the relationship dimension are the most important factors to be concerned about in social capital, but some scholars have different views^[6].

Relational capital is identified as an important promoter of collective action and describes the individual qualities of interpersonal relationships, representing the motivational characteristics of interpersonal interactions. Relational capital emphasizes building relationships among virtual communities members. Tsai and Ghoshal^[11] proposed that the exchange and combination of relational capital and resources is positively and significantly correlated, and it may be accumulated by those who have a sense of virtual community in virtual communities^[12]. Our study considers community identity and reciprocity as the main factors of relational capital.

3.2. Research hypotheses

3.2.1. Community identity

Community identity refers to the process that members consider themselves as a member of the group and then continuously show themselves. Community identity is considered as an important element of virtual community, which mainly describes how community members acquire self-concept from the group^[8]. In the process of sharing their experience, members have a consistent sense of identity, which effectively promotes communication among members. Guo^[12] proved that community identity plays an important role in the development of virtual communities, which has a positive impact on the knowledge contribution of community members. When people identify with groups, they focus on the goals of the group, and have more opportunities for communication. Therefore, community identity foster the motivation and encourage them to share knowledge frequently. Therefore, the following hypothesis is proposed:

H1a: Community identity is positively correlated with users' knowledge contribution behaviors.

In the social Q&A community, community identity refers to the members' good impression and sense of belonging to the virtual community, which can improve the enthusiasm of individuals to contribute knowledge and deepen the

connotation of knowledge. Through continuous interaction, members identify with the community and consider themselves as part of the virtual community^[13], so as to continuously enter the community to express themselves and realize personal value. In other words, members share experiences and knowledge in the Q&A community. If they find people with common interests in the community, and their suggestions or opinions are considered valuable by other members, then they will have a sense of belonging. Guo^[12] also believed that community identity can further promote the sense of belonging, identity and attachment to relevant virtual communities. Therefore, the following hypothesis is proposed:

H2a: Community identity is positively correlated with users' sense of virtual community.

3.2.2. Reciprocity

The concept of reciprocity comes from the theory of social exchange. Reciprocity is a motivation with the ultimate goal of adhering to certain moral principles. For example, after people have received help from others in the community before, they feel obliged to help others. This is the principle of reciprocity. In organizational behavior, reciprocity is often regarded as an expectation. That is, when people make knowledge contributions, they expect their knowledge to be helped by other community members. Chang^[8] found that members will be more motivated to contribute knowledge if they can get rewards after contributing knowledge. That is, members who feel a strong sense of reciprocity within the community are more motivated to contribute knowledge, and members of the virtual community who often help others are more likely to get help more quickly^[14]. When members have a relatively high level of reciprocity, they have a more positive awareness and evaluation of the relationships among other members of the community. At the same time, when members have high expectations of reciprocity, they will be more confident that their contribution to the community will get feedback from others. As a result, links between different members will be strengthened. Chiu^[15] also demonstrated the relationship between reciprocal norms and knowledge contribution. Therefore, the following hypothesis is proposed:

H1b: Reciprocity is positively correlated with users' knowledge contribution behaviors.

The reciprocity principle of the members in the community reflects the expectation of the members to other members and the community. After helping others, members also want to get help from others in the community. When their reciprocal expectations are met, they promote a sense of community identity. Zuo^[10] found that mutual help among members in social Q&A communities is more important than in traditional e-commerce sites, and reciprocity is the most important factor affecting the quality of online word-of-mouth. The higher the members' expectation of reciprocity, the stronger their sense of belonging and attachment to the community. Reciprocity is one of the reasons why community members are willing to share

knowledge and emotions. It is also because of the existence of reciprocity that community members know that their efforts will be rewarded. Repeated reciprocal behaviors will also enhance the sense of participation and immersion among members, thus exerting an impact on their virtual sense of community. Zhang^[16] proposed that relational capital would positively affect the sense of virtual community. Therefore, the following hypothesis is proposed:

H2b: Reciprocity is positively correlated with users' sense of virtual community.

3.2.3. Virtual community sense

The sense of virtual community is an important part of the development of virtual community. A sense of virtual community provides support for individuals to share knowledge in a virtual community, and people who participate in a social Q&A community may wish to build a sense of community with others who have the same problem. With the increasing sense of virtual community, members often feel a greater sense of belonging and emotional support, a sense of responsibility to the community, and a tendency to contribute knowledge to the group^[12]. In a social Q&A community, members prefer to share knowledge with people who resonate with them. When members share their views with others, they will have a sense of belonging to the community and are willing to contribute knowledge to the community^[12]. Chen^[17] believed that virtual community immersion can positively promote users' willingness to input knowledge. This suggests that if users are willing to spend more time and energy in a social Q&A community, they are more likely to respond to other people's questions or interact with other members of the community. Previous studies have shown that a strong sense of virtual community can promote the occurrence of user behaviors. For example, Talo^[18] believed that a sense of virtual community is positively correlated with community participation behaviors, and users' sense of virtual community can promote the participation of members^[19]. Therefore, the following assumptions are made:

H3: Users' sense of virtual community is positively correlated with their knowledge contribution.

The mediating effect of the virtual sense of community has been proved from different angles. As members' sense of belonging grows stronger, they contribute more and more knowledge. Conversely, if members do not have a sense of belonging in the community, they tend to hoard knowledge and hinder their knowledge contribution^[12]. As users participate in the Q&A process, social capital will accumulate continuously, the relationship between them will become closer and closer, and the sense of belonging to the community will become stronger. They feel that they are part of the community and are constantly involved and immersed in it. As a result of continuous participation, their sense of virtual community is enhanced and their knowledge contribution behavior is further promoted. Many scholars have verified the mediating role of virtual

community sense. For example, Tsai^[20] found that virtual community sense played a partial mediating role in trust and users' purchase intention. Guo^[12] pointed out that community identity can better promote the knowledge contribution of community members through virtual sense of community. Therefore, the following assumptions are proposed:

H4a: Virtual sense of community plays a mediating role in the influence of community identity on users' knowledge contribution behavior.

H4b: Virtual sense of community plays a mediating role in the influence of reciprocity on users' behavior of knowledge contribution.

3.2.4. Research model

In summary, we have developed a research model, as shown in Figure 1.

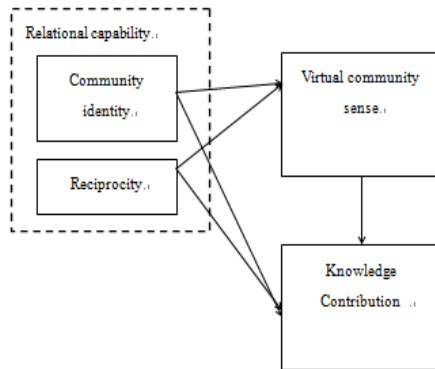


Figure 1 Research model

4. METHODS

4.1. Data collection

The survey lasted for two months, from early August 2019 to the end of September 2019. The respondents were social Q&A community users and sent questionnaires to people in different industries. The questionnaires were divided into paper questionnaires and electronic questionnaires. A total of 400 questionnaires were issued, of which 346 were returned with a recovery rate of 86.5%. Through the validity test of the questionnaire, the invalid questionnaires were deleted, and a total of 304 valid questionnaires were recovered, with the effective rate of 87.86%. The discrimination of invalid questionnaires follows the following principles: (1) the first part of the questionnaire selects the respondents who have not participated in the social Q&A community; (2) nearly all the answers in the questionnaire are unique; (3) there are too many "uncertain" options in the questionnaire; (4) the answer time is less than 3 minutes when the questionnaire star is used online.

4.2. Measures

In order to ensure the reliability and validity of the scale, the measurement items of variables in the model are all from scholars' literatures and improved according to the actual situation in China. Community identity and reciprocity were measured by referring to the scale of Chiu^[15]. Virtual community sense refers to the scale of Tsai^[21]; The measure of knowledge contribution refers to Hsu^[22]scale. Variable measurement according to the actual situation of China's social Q&A community for the perfect, measured in the form of single topic selection, using Likert scale rank of 5, all of the variables were measured using five-point Likert scales (1=strongly disagree, 5=strongly agree).

By reviewing the literature and combining the research objects, it can be known that demographic variables have an impact on users' behaviors. Therefore, age, gender and education level are taken as control variables in the research to make the research results more accurate. After determining the scale, the initial scale was modified under the guidance of the tutor, and students were invited to evaluate the validity and popularity of the measurement items, so as to form the final draft.

4.3. Data analysis

We use SPSS24.0 to analyze the reliability and validity of the questionnaire items. CITC and Cronbach's coefficients were used to test the reliability of samples. The results showed that CITC was greater than 0.5 and the coefficient of coefficients was more than 0.7, indicating that the reliability measurement results were better. To KMO samples sample adequacy measure and Bartlett sphere test whether meet the conditions of factor analysis, the results found that the relational capital, user knowledge contribution behavior, virtual community KMO value were 0.740, 0.832, 0.808, 0.846, is more than 0.7, the Sig=0.000 less than the significance level, indicating that the questionnaire has good structure validity, samples of each dimension factor analysis can be done item data.

We used SPSS24.0 for variable correlation analysis and Pearson correlation coefficient as the index. The community identity, reciprocity, virtual community and knowledge contribution behavior correlation coefficient respectively: 0.559, 0.378, 0.772. The correlation coefficients of relational capital (community identity, knowledge reciprocity) and virtual sense of community are respectively: 0.675, 0.467, the correlation coefficient of virtual community sense and user knowledge contribution is: 0.772. They were all significantly positively correlated at the confidence level of 0.01. It is found that there is a positive correlation between relational capital, virtual sense of community and knowledge contribution behavior of users in social Q&A community.

Table 1 The results of the model regression coefficients

	Knowledge contribution					Virtual community sense		
	M0	M1a	M1b	M3	M4	M0	M2a	M2b
Gender	-.102	-.091	-.084	-.072	-.072	-.039	-.026	-.016
Age	-.004	.005	.009	-.003	.004	-.010	.002	.007
Education level	-.083	-.099	-.089	-.042	-.046	-.054	-.073	-.060
Community Identity		.559	.491		.074		.676	.584
Reciprocity			.164		.008			.220
Virtual community sense				.767	.713			
R ²	.017	.330	.352	.603	.606	.005	.461	.501
Adjust R ²	.007	.321	.341	.597	.598	-.005	.454	.492
ΔR	.017	.312	.022	.585	.254	.005	.456	.040
F	1.757	36.762	32.352	113.371	76.060	.477	63.994	59.785
ΔF	1.757	139.35	10.19	440.49	147.78	.477	253.34	23.56
Sig.		.000	.000	.000	.000		.000	.000
VIF		1.001	1.220	1.005	2.003		1.001	1.220
Durbin-Watson			1.943	1.934	1.937			1.901

We use a Stepwise regression method, in which gender, age and educational background data are taken as control variables, while user knowledge contribution behavior is taken as the dependent variable. We gradually introduce community identity and reciprocity into independent variables to test the influence of independent variables on dependent variables, such as model M0, M1a and M2a. Similarly, control the background data, take the virtual sense of community as the dependent variable, gradually introduce community identity and reciprocity, and test the influence degree of independent variables on intermediary variables, such as model M0, M1b and M2b. M3 is to test the influence of virtual community sense on users' knowledge contribution. M4 puts community identity, reciprocity and virtual sense of community together into the model as independent variables. Through comparison with model M1b, the mediating effect of virtual sense of community is obtained. Table 1 is the summary table of the calculated results of the model regression coefficient. M0 uses background data to estimate the user's knowledge contribution, $R^2=0.017$, indicating that gender, age and education level have no significant influence on the user's knowledge contribution behavior.

Under the premise of controlling background information, M1a and M1b first introduce community identity ($R^2=0.330$ and adjusted $R^2=0.321$), and then introduce reciprocity ($R^2=0.352$ and adjusted $R^2=0.341$), indicating that relational capital can explain 34.1% of users' knowledge contribution behaviors, among which community identity can better explain users' knowledge contribution behaviors than reciprocity. The regression coefficients of community identity and reciprocity are 0.491 and 0.164, respectively, and $\text{sig} < 0.01$, so H1a and H1b are valid. In the same way, the regression coefficient of community identity and knowledge reciprocity was 0.584 and 0.220 respectively, and the regression coefficient was 0.584 and 0.220 respectively, so the research hypothesis H2a and H2b were valid. In model M3, the regression coefficient of virtual sense of community is 0.767, and $\text{sig} < 0.01$, so the research hypothesis H3 is valid. M4 takes relational capital and virtual sense of community as new independent variables and conducts regression equation analysis to test the effect of relational capital on

users' knowledge contribution behavior. $R^2=0.606$ adjusted $R^2=0.598$, indicating that the relational capital and the intermediary variable virtual sense of community can explain 59.8% of users' knowledge contribution behavior. By comparing the test results of M1b and M4, it was found that the regression coefficients of community identity and reciprocity on users' knowledge contribution behavior decreased from 0.491 and 0.164 to 0.074 and 0.008, $\text{sig} < 0.01$ was significant in the confidence interval. This indicates that virtual sense of community plays a partial mediating role in the influence of community identification and reciprocity on users' behavior of knowledge contribution, so the research hypothesis H4a and H4b are established.

By testing the regression model, it was found that the significance probability of F statistic was 0.000, less than 0.01, indicating that the overall effect of the regression model was good. Using the stepwise regression method, the difference expansion factor (VIF) of the variables in the regression result is less than 10, indicating that there is no collinearity between variables. The durbin-watson values of the regression model are all around 1.9, close to 2, so there is no sequence correlation in the model.

5. RESULTS AND DISSICUSION

SPSS24.0 was used to analyze and verify the research hypothesis. The empirical analysis results were consistent with the theoretical analysis result. Reciprocity and community identification of relational capital can directly affect members' knowledge contribution behavior and prove the mediating role of virtual community sense in this process.

In the context of social Q&A community, users are both producers and consumers of knowledge. They are free to ask questions and express their opinions in the community, but asking questions in the community will not receive substantial rewards. We can use the principle of reciprocity to explain users' continuous knowledge contribution behavior, which means that users who frequently seek knowledge are more likely to contribute knowledge to others, which shows that users contribute knowledge

because they expect their problems to be solved in the future. As an important aspect of relational capital, community identity has a positive impact on knowledge contribution. The social Q&A community is user-centered. Users' recognition of other members and the community will play a good role in motivating users themselves. When their own knowledge is approved by more people, their psychology is greatly satisfied, which will motivate members to make continuous knowledge contributions^[23]. Community identity and reciprocity have positive impact on users' sense of virtual community, and virtual sense of community has positive impact on users' behavior of knowledge contribution. The stronger the relationship between users and the stronger the identification of users to the social Q&A community, the stronger the sense of virtual community of members, and the greater the contribution of community members. Users regard themselves as a member of the community, enhancing their sense of identity and belonging to the community, thereby enhancing their desire to contribute to knowledge^[13], which is consistent with the results of previous studies^[24].

6. IMPLICATION

6.1. Theoretical implication

In this study, virtual sense of community is taken as the mediating variable to explore the influence of relational capital on users' knowledge contribution behavior in the context of social Q&A community. It not only enriches the application of social capital theory in social Q&A community, but also has certain guiding significance for community managers. Although much research has been done on users' knowledge contribution, they are relatively scattered. Moreover, most studies only study the direct relationship between social capital and users' knowledge contribution, without focusing on the in-depth study on the dimension of relational capital. I hope this study can make some theoretical contributions to user knowledge in the social Q&A community:

(1) Expand the contribution of user knowledge contribution behavior research. Social Q&A community is a step by step subdivision of virtual community. Most scholars^[5,6]'s studies on knowledge contribution are limited to the direct impact on knowledge contribution. In this study, virtual sense of community is introduced as the mediating variable, and the influence factors on users' knowledge contribution are studied in a more detailed and in-depth way, which will contribute to the model research of users' knowledge contribution in the future.

(2) Contributions to the study of social capital theory. In this paper, the application of social capital in the field of relatively new socialized question-and-answer communities is studied. In addition, most previous research on social capital is based solely on the research of Nahapiet & Ghoshal (1998), and it is studied from the three dimensions of structural capital, relational capital and

cognitive capital. However, the three most important and most divergent dimensions of relational capital have not been further analyzed by scholars. This paper, combined with the social Q&A environment, further divides relational capital into two variables: community identification and reciprocity, deepens the understanding and understanding of relational capital, and proves that relational capital can effectively improve users' knowledge contribution behavior, which is a beneficial supplement to the research on influencing factors of users' knowledge contribution.

6.2. Practical implication

First, a social Q&A community should be clearly defined as a place for users to exchange knowledge. Community managers should create and maintain a good atmosphere to enhance members' sense of community belonging^[12]. At the same time, it increases the platform for members to communicate and interact, provides users with a form of their attention, and encourages free users to pay attention to other users, so as to motivate contributors to a certain extent. In addition, the knowledge community should improve the user feedback mechanism in a timely manner, and strengthen the interaction between users through mechanisms such as approval, thanks, responses, comments, and attention.

Secondly, the social Q&A community should strengthen the relationship of reciprocity and identity among users. With the continuous development of information technology, communities should take into account the problems faced by users, such as information overload. Use methods such as machine learning to engage users in knowledge contribution by providing them with more accurate and interesting content. Finally, the social Q & A community should ensure the foundation of user information security, and encourage users to improve more personal information, enhance the user's sense of belonging, and maintain the user's long-term relationship with the community. The users' monthly information is perfect, which makes it easier to obtain expert recommendation and knowledge recommendation, and increases the opportunities for users' social learning and social communication.

7. CONCLUSION

In recent years, the rapid development of the social Q&A communities have attracted the attention of scholars. Users can freely ask and answer questions to exchange information continuously, promoting knowledge sharing within the community. This study uses social capital theory, focusing on the relationship between relational capital and knowledge contribution, and includes virtual community sense as an intermediary variable in the model. The empirical results show that relational capital (community identity and reciprocity) can have a positive effect on

knowledge contribution behavior, and the virtual community sense also plays a part of the intermediary role.

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