

# Exploring the Impacts of Virtual Role Identification on Knowledge Sharing in Virtual Communities: A Perspective of Structural Symbolic Interactionism

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## Abstract

*Knowledge sharing is crucial to the operation and sustainability of virtual communities. Against this background, this study aims to investigate whether and how users' virtual role identification influences their knowledge sharing behavior. Theoretical insights from structural symbolic interactionism and identity economics are synthesized and used as a basis for proposing the mechanism by which virtual role identification influences knowledge sharing behavior. We collected data to test the research model from 250 community users via an online survey. The results suggest that virtual role identification can facilitate users' knowledge sharing behavior by increasing role utility and perceived role expectations. The theoretical contributions and practical implications of this study are also discussed.*

**Keywords:** Virtual role identification, Virtual communities, Knowledge sharing, Structural symbolic interactionism, Identity economics

## 1. Introduction

Since the long-term growth of virtual communities depends on the active exchange of knowledge, understanding the drivers of knowledge sharing behavior is essential for the sustainable development of virtual communities. Considering that knowledge sharing is an individual behavior that occurs within a group, previous studies have extensively used social identity theory (SIT)—a key theory describing the affiliation and behavior of individuals and groups (Tajfel, 1978) to explain the significant effects of social identification on knowledge sharing in virtual communities (Ho, 2015; Kumi & Sabherwal, 2019; Yen, 2016). Their fruitful findings also offer compelling evidence for the validity and applicability of this theory.

However, it is worth noting that these studies have been limited to examining the identification of users from social groups or the community they are in (Rosendaal & Bijlsma-Frankema, 2015; Wu, 2021). We

assume that in addition to considering the impacts of use-to-user and user-to-community identification (Prentice et al., 2019), the significant influence of an individual's role identity should also be highlighted because individuals' behaviors are closely linked to the role they play and the behavioral expectations associated with the role (Anglin et al., 2022). Emphasis on the mediation role of role identities on individual behaviors rather than intergroup relations and group behavior on that (Hogg et al., 1995) facilitates a micro-oriented understanding of the influence of roles on behavior at an individual level (Anglin et al., 2022). In the field of information dissemination, it has been demonstrated that identifying the user role identification based on social behavior facilitates the dissemination of information in a social networking environment (Zhou et al., 2019).

And, more importantly, this research focuses on the effects of virtual role identities that users create and maintain in virtual communities. People tend to express themselves by combining virtual and real-world identities as their own alter egos in virtual spaces, which are neither entirely separate nor identical (Wang & Evans, 2008). Most current role identification research focuses on the many roles that people play in real life, such as volunteers (Behnia, 2021; Xu et al., 2020a), employees (Wrzesniewski et al., 1997), and family/work roles (Erdogan et al., 2021; Gao & Zhao, 2014; Yang & Su, 2022), while ignoring the virtual roles people create in the online environment. Considering that virtual roles may differ from actual identities and be more directly tied to users' behavior in the virtual community, this paper is dedicated to exploring the mechanisms by which virtual role recognition influences knowledge sharing behavior in virtual communities.

This paper intends to address this research question from the structural symbolic interactionism (SSI) perspective. It is a social psychological framework that focuses on linking social interaction to roles (Stryker, 2007). With role identity, identity salience, and commitment as its core, SSI explains the impact of role

identity on social behavior in terms of both identity salience and identity commitment. SSI emphasizes the relatively stable structure of social networks constructed at the level of role interaction and uses role identity to link the dual characteristics of social structure and individual self-concept. Thus, this paper employs SSI as a theoretical foundation to construct a model of virtual role identification's influence on knowledge sharing behavior. Furthermore, our research draws on identity economics to supplement the model. Identity economics examines the effect of identity on individual preferences by incorporating identity into the utility function (Akerlof & Kranton, 2010). In light of this, we add to the portrayal of identity salience from the standpoint of utility.

To summarize, we noticed that many earlier studies concentrated on the influence of social identification on virtual community users rather than role identification, and that academics have given less attention to virtual roles in network environments than real-life roles. As a result, this study uses SSI and identity economics as the theoretical foundation for further investigation into the process by which virtual role identification encourages knowledge sharing behavior. In the next section, we first review role identification, SSI, and identity economics, then give the study model and hypotheses, followed by the methodology and data collection process. Following that, we present the data analysis results. Finally, the key findings, theoretical and practical implications, and limitations of the study are discussed.

## **2. Literature review**

### **2.1. Role identification**

Roles are broadly defined as a set of behavioral expectations imposed on people according to their position in a social structure (Anglin et al., 2022). Individuals play various roles in daily life (Biddle, 1986), which affect how they behave and see themselves. Role identity refers to the meaning prescribed to a role by oneself (Burke & Tully, 1977). Thus role identification is the internalization or self-definition of the role expectation that individuals possess (Stryker & Burke, 2000).

The level of role identification may influence people's behavior. For instance, employees who identify their role as a 'job' focus on rewards and necessity. Those who identify it as a 'career' focus on advancement and achievement, and those who describe a 'calling' focus on socially useful work (Wrzesniewski et al., 1997). Volunteers with high role identification commit to their volunteer organizations more rapidly when they have low levels of psychological capital (Xu

et al., 2020b). Strong identification with the family role drives the acquisition and transfer of valuable resources from the family role to the work role (Dumas & Stanko, 2017).

Current research on the influence of role identification on behavior largely focuses on typical roles in daily life that have behavioral paradigms widely accepted in society, for example, family (Yang & Su, 2022), volunteers (Xu et al., 2020b), and police officers (Grawitch et al., 2010). Studies have proved that people can create their own set of behaviors in the virtual world by using virtual roles. For example, players adopt the virtual world for their new social identities and develop distinctive lifestyles, a strong criterion for explaining their behavior patterns in the virtual world (Whang & Chang, 2004). Therefore, the virtual role that people play in the online environment should be considered when talking about how people behave online.

Taking into account that an individual's virtual role in the online world may differ from their real-life identity (Huang et al., 2018) and that an individual's online behavior takes place virtually, this paper investigates the impact of virtual role identification on the knowledge sharing behavior of online community users. To address this research question, the paper draws on SSI, the basis of identity theory.

### **2.2. Structural symbolic interactionism**

Structural symbolic interactionism (SSI) is a social psychological framework developed by Stryker (1980). Different from the "traditional" symbolic interactionist framework (Abel et al., 1934; Blumer, 1988), SSI emphasizes the importance of social structure, which is defined by the patterned regularities in human interactions (Stryker, 2007). SSI suggests that social structure influences, but does not determine, what humans do. The theory suggests that individual behavior is dependent on a "classified" world. The symbols used to describe "social positions" within these categories develop into comparatively stable components of the social structure, and these positions carry the role expectations. People who act within the framework of the social structure identify and refer to one another as occupants of particular social positions in the same way. They also define themselves in terms of the roles they play. However, these structural criteria do not define how people behave. Rather, the development – and even reshaping of behavior – occurs during experimental, nuanced, and negotiated processes of interaction during the role-making process.

The core concepts of SSI include self, role identity, identity salience, and commitment. Self is conceptualized as composed of a set of discrete identities, with persons having, potentially, as many

identities as there are organized systems of role relationships in which they participate. Greater identity salience is indicated by the increased likelihood that a particular identity will be invoked or played out in a variety of situations (Stryker, 2007). Commitment refers to the “degree to which the individual’s relationships to particular others are dependent on being a given kind of person (Stryker & Staham, 1985, p. 345)”, and reflects the extent to which important others are judged to want the person to occupy a particular role position (Hogg et al., 1995). SSI uses identity salience and commitment to account for the impact of role identities on social behavior (Anglin et al., 2022).

This research makes the case that virtual role identification influences online community users’ knowledge sharing behavior through identity salience and commitment using SSI as a foundation. The study measures commitment in terms of the degree to which the individual perceives that other community members expect the individual to fulfill the behavioral pattern of the role (knowledge sharing) because other community members in a virtual community are most intimately associated with an individual and constitute the most important social relationships the individual has in the community. That is, the higher the perceived role expectations, the higher the individual’s commitment to that virtual role. The concept of role salience defined in role theory refers to the importance people attach to roles (Greer & Egan, 2012), and is used to quantify identity salience because, according to SSI, a person’s identity corresponds to the role they play.

### 2.3. Identity economics

Akerlof and Kranton (2010) brought identity into the analytical framework of neoclassical economics to study how identity influences decision-making. They created a utility function that comprises three elements: social categories, norms, and utility. Each person has a particular identity that corresponds to their behavior and serves as a paradigm. Identity utility refers to the change in utility that results from the adaptation of individual behavior to identity norms, and utility maximization is a general and fundamental process that determines the subject’s survival (Ferrari-Toniolo et al., 2021). In light of this, we proposed to measure identity salience from the perspective of utility, suggesting that the more utility a role brings to an individual, the higher its salience. We introduced the variable of role utility into our research model, combining it with role salience to measure identity salience. In summary, this paper constructs a multiple mediating effects model in which virtual identification influences knowledge sharing behavior through three mediating variables: role salience, role utility, and perceived role expectations.

## 3. Research model and hypothesis development

Using SSI, this study proposes the mechanism through which virtual role identification impacts users’ knowledge sharing behavior in the online community. Specifically, we propose that virtual role identification affects knowledge sharing through identity salience and commitment, where identity salience is measured by role salience and role utility, and commitment is measured by perceived role expectations. Furthermore, community identification was included as a control variable because it has been shown to play a significant role in affecting knowledge sharing in many studies (Lee et al., 2014; Lin et al., 2022; Usman & Yennita, 2018). Figure 1 presents the research model.

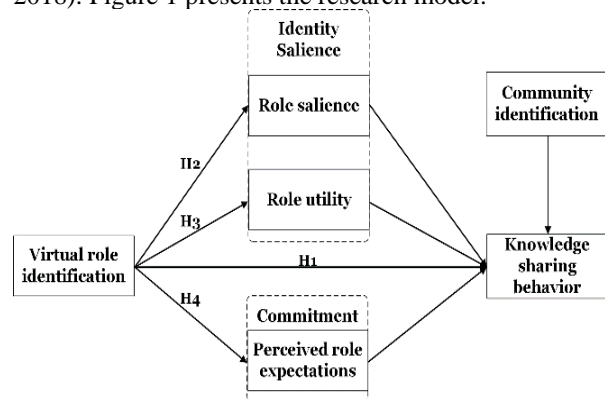


Figure 1. Research model.

### 3.1. Virtual role identification and knowledge sharing

A person’s role identities dictate what they should do based on the roles they play in society (Stryker, 1987). Identity theorists conceptualize a role identity as a set of behavioral tendencies (White et al., 2008), and engaging in behaviors that are consistent with role identity helps to confirm and validate one’s status as a member (Hogg et al., 1995). Thus, this paper argues that greater individual role identification means a greater likelihood of knowledge sharing – a behavioral norm associated with the role of a virtual community member.

H1: Virtual role identification positively affects knowledge sharing behavior.

### 3.2. The mediating effects of role salience, role utility, and perceived role expectations

Role salience is a reflection of the importance and value that people attribute to the roles central to their lives and identities. One pivotal aspect of role salience is an individual’s responsibilities to organizational roles

(Greer & Egan, 2012). It refers to the likelihood that a person will play a specific role in a variety of contexts, with the order of probability indicating the salience level. Stronger role salience means that individuals are more likely to integrate that identity into their self-concept, perceive a specific situation as an opportunity for role performance, and find opportunities to display that role's behavioral patterns (Stryker, 1968). For example, women entrepreneurs who have a high work salience place more emphasis on work and are more willing to adjust their responses to family demands to accommodate their work requirements (Neneh, 2021). As a result, this study contends that the more important the virtual role of the online community user is to the individual, the more likely the individual will view the community interaction scenario as an opportunity to exhibit the behavioral patterns of the role, and to share knowledge to solidify the role.

H2: Role salience mediates the relationship between virtual role identification and knowledge sharing behavior.

Economists define personal motivation using the utility function, and utility maximization is a key element of many theoretical approaches explaining human behavior (Howes et al., 2014). Drawing directly on the social identity approach and self-categorization theory, Akerlof and Kranton (2010) introduced the concept of identity into the neoclassical utility-maximizing framework to create the economics of identity. They described the gain when a person's acts follow the norm – and the loss when they do not – as identity utility. Based on identity economics and utility maximization, this research applies role utility to define the benefits achieved when individual behavior corresponds to the standards of the virtual role of online community user (knowledge sharing). We argue that the more individuals identify with the virtual role of online community user, the more likely they are to perceive the benefits of this virtual role for them and to perform the role better to continue to benefit from the role.

H3: Role utility mediates the relationship between virtual role identification and knowledge sharing behavior.

In this study, the concept of perceived role expectations was used to describe the expectations that other community members have of individuals who have taken on the role of community members to share their knowledge. Identification is a person's understanding of who they are and the group to which they belong, and it influences how they interpret their role and the expectations that accompany it (Sluss & Ashforth, 2007). Role expectations refer to people's shared understanding of the behavioral expectations connected to roles (Stryker, 1968), and significantly affect people's intents and behavior (Du et al., 2017).

This study argues that users with a stronger sense of role identification better understand the behavioral norms of the role (knowledge sharing) and have higher perceived role expectations, making them more motivated to act.

H4: Perceived role expectations mediate the relationship between virtual role identification and knowledge sharing behavior.

## **4. Methods**

### **4.1. Measurement**

A survey was conducted to validate the proposed hypotheses, and the measures for the constructs were adapted from well-established scales in prior studies. Specifically, we assessed virtual role identification using items from Lewis et al. (2008). Perceived role expectations were measured with items from Carmeli and Schaubroeck (2007), and we used the scale from Eddleston et al. (2006) to measure role salience. Besides, the sense of identification that community members develop by being a member of a virtual community is known as community identification, which may inspire the members of virtual communities to engage in constructive behaviors that help the community grow (Pei et al., 2022). Therefore, community identification was introduced into the research model as a control variable. We adapted the scale from Kalliath et al. (2019) to gauge role utility, and selected items to measure community identification from Gusar et al. (2021). Adapted items from Radaelli et al. (2014) were used to measure knowledge sharing behavior. All items involved a 5-point Likert scale ranging from 1=strongly disagree to 5=strongly agree.

### **4.2. Data collection**

The Naodao platform ([www.naodao.com](http://www.naodao.com)) was used to administer and collect the data for this study. The platform is a dedicated psychological research platform for conducting online experiments, with a large participant base and a wide distribution in terms of region, age, and education level, which met all the needs of the study. A pre-test of five undergraduate students was conducted before the formal survey. The pre-test participants were invited to evaluate the readability and clarity of the questionnaire, and the wording and format were adjusted based on their feedback.

After ensuring that the questionnaire was understandable and unambiguous, we posted it online. The survey was aimed at people with experience in virtual communities where users share information and knowledge (e.g., Facebook, Twitter, or YouTube), although the type of community was not limited.

Participants were asked to select the virtual community that they use most often and then to answer questions focusing on that community as an example. Each subject was paid 2 yuan for completing the questionnaire. We excluded invalid cases with incomplete answers or incorrect answers for the attention-checking questions, and finally obtained a total of 250 valid responses, with a recovery rate of 95.4%.

Of the 250 respondents, almost 23% were male and 77% were female. The majority of respondents were aged between 18 and 25 years (82.0%). Approximately 75% had a bachelor's degree. A total of 97.2% of respondents (n=243) reported experience using online communities.

### 4.3. Data analysis

This study used partial least squares (PLS) for data analysis and model validation. PLS does not require the same normal distribution assumptions to be used for the data and is suitable for small to medium-sized samples (Chang, 2013). Specifically, this study used smartPLS to validate the research model in two steps (Hair et al., 2022; Hair et al., 2013). First, the measurement model was tested to check the reliability and validity of the model. Second, the structural model was evaluated to verify the hypotheses in the research model.

### 4.4. Measurement model

Cronbach's alpha, Composite Reliability (CR), and Average Variance Extracted (AVE) are three widely accepted indicators of reliability that reflect the internal consistency of each latent variable. As shown in Table 1, the Cronbach's alpha values for all constructs ranged from 0.727 to 0.827, above the threshold of 0.7; the CR values ranged from 0.842 to 0.897, above the threshold of 0.7; and the AVE values ranged from 0.62 to 0.744, above the recommended value of 0.5, indicating that the scales have good reliability.

Next, convergent and discriminant validity were tested by assessing item loadings and cross-loadings. Specifically, requirements for convergent validity were satisfied when the loadings of the indicators on the relevant constructs were greater than 0.70, and for discriminant validity when the loadings of the indicators on the relevant constructs were greater than the loadings on other constructs. As shown in Table 2, the loadings of all the indicators on their respective scales were greater than 0.70 and greater than the loadings on other constructs. Therefore, the constructs indicated good convergent and discriminant validity.

In addition, discriminant validity can be assessed by comparing the correlation coefficients of the variables with other variables with the square roots of their AVEs.

The square root of AVE for each variable was greater than its correlations with other variables, indicating good discriminant validity of the constructs. We conducted the Harman single-factor test (Podsakoff et al., 2003) and found that the single component explains 38.1% of the variation, which is less than the 40% criterion, indicating that the common method bias was not a serious issue in the data (Tan, 2022).

### 4.5. Structural model

Figure 2 presents the results of the PLS analysis, including the path coefficients, t-values, and the overall theoretical explanatory power of the model. First, the structural model was assessed using the path structure coefficients and R2 values, where R2 values indicate the amount of variance explained in the dependent variable. Overall, virtual role identification explained 35.4% of the variance in role salience, 23.9% of the variance in role utility, and 13.7% of the variance in perceived role expectation. In turn, the overall model explained 52.5% of the variance in knowledge sharing behavior.

Next, the strength of the relationship in the structural model was explored through the path coefficients. As shown, the path coefficients from virtual role identification to knowledge sharing behavior were not significant ( $\beta=-0.014, t=0.198$ ), indicating that H1 is rejected. Virtual role identification had a positive and significant relationship with role salience ( $\beta=0.595, t=13.096$ ), role utility ( $\beta=0.489, t=9.805$ ), and perceived role expectations ( $\beta=0.370, t=5.490$ ). Role utility ( $\beta=0.216, t=3.534$ ) and perceived role expectations ( $\beta=0.417, t=8.137$ ) had a significant positive effect on knowledge sharing behavior. The path coefficients from role salience to knowledge sharing behavior were not significant ( $\beta=0.084, t=1.108$ ). The results also implied that the controlled variable (community identification) had a significant positive effect on knowledge sharing behavior ( $\beta=0.249, t=3.371$ ).

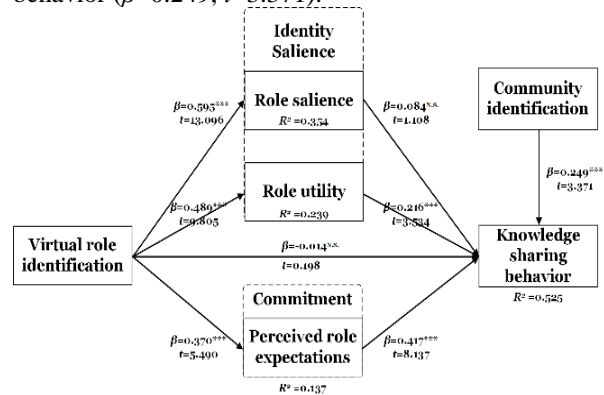


Figure 2. Research model including the results of the analysis.

#### 4.6. Testing the multiple mediation effects

To gain insight into the mechanisms by which virtual role identification influences knowledge sharing of online community users, this study further tested the

mediating effects of role salience, role utility, and perceived role expectations. As the model proposed in this study contains multiple mediating effects, the evaluation method proposed by Preacher and Hayes (2008) was used.

**Table 1. Reliability and validity.**

	Cronbach's alpha	AVE	CR	CI	PRE	KSB	RU	RS	VRI
CI	0.795	0.62	0.867	0.787					
PRE	0.827	0.744	0.897	0.465	0.862				
KSB	0.809	0.724	0.887	0.588	0.604	0.851			
RU	0.802	0.628	0.871	0.578	0.375	0.538	0.792		
RS	0.826	0.657	0.884	0.589	0.485	0.521	0.546	0.81	
VRI	0.727	0.641	0.842	0.578	0.37	0.423	0.489	0.595	0.801

Notes: AVE=average variance extracted, CR=composite reliability, CI=community identification, PRE=perceived role expectations, KSB=knowledge sharing behavior, RU=role utility, RS=role salience, VRI=virtual role identification

**Table 2. Descriptive information, factor loadings, and cross-loadings.**

	Items	Mean(SD)	CI	PRE	KSB	RE	RS	VRI
Community identification	CI1	3.25(0.933)	<b>0.744</b>	0.471	0.462	0.442	0.448	0.489
	CI2	3.94(0.685)	<b>0.777</b>	0.341	0.448	0.473	0.438	0.457
	CI3	3.58(0.834)	<b>0.817</b>	0.343	0.451	0.489	0.533	0.48
	CI4	3.45(0.816)	<b>0.808</b>	0.312	0.488	0.42	0.439	0.397
Perceived role expectations	PRE1	2.85(0.990)	0.404	<b>0.868</b>	0.538	0.31	0.411	0.296
	PRE2	2.96(0.958)	0.418	<b>0.877</b>	0.499	0.338	0.41	0.318
	PRE3	2.36(0.973)	0.383	<b>0.842</b>	0.524	0.32	0.433	0.343
Knowledge sharing behavior	KSB1	2.70(1.072)	0.545	0.569	<b>0.875</b>	0.48	0.491	0.4
	KSB2	3.32(1.015)	0.481	0.529	<b>0.865</b>	0.448	0.439	0.332
	KSB3	3.38(0.929)	0.47	0.433	<b>0.811</b>	0.446	0.393	0.345
Role utility	RU1	3.75(0.747)	0.462	0.26	0.401	<b>0.822</b>	0.451	0.44
	RU2	3.71(0.801)	0.447	0.264	0.419	<b>0.765</b>	0.513	0.378
	RU3	3.78(0.723)	0.475	0.258	0.358	<b>0.815</b>	0.425	0.399
	RU4	4.02(0.694)	0.449	0.396	0.518	<b>0.765</b>	0.346	0.332
Role salience	RS1	3.58(0.809)	0.471	0.438	0.424	0.457	<b>0.817</b>	0.543
	RS2	3.46(0.897)	0.466	0.368	0.361	0.417	<b>0.776</b>	0.438
	RS3	3.24(0.976)	0.511	0.381	0.424	0.475	<b>0.853</b>	0.486
	RS4	3.52(1.072)	0.463	0.381	0.473	0.42	<b>0.794</b>	0.455
Virtual role identification	VRI1	3.62(0.720)	0.358	0.21	0.242	0.284	0.343	<b>0.732</b>
	VRI2	3.63(0.846)	0.507	0.309	0.365	0.377	0.466	<b>0.839</b>
	VRI3	3.46(0.901)	0.5	0.344	0.382	0.477	0.576	<b>0.827</b>

Notes: SD = standard deviation, CI=community identification, PRE=perceived role expectations, KSB=knowledge sharing behavior, RU=role utility, RS=role salience, VRI=virtual role identification

**Table 3. Summary of multiple mediation effects tests.**

Effects	<i>t</i>	<i>p</i>	Bootstrap BC 95% CI	
			LLCI(2.5%)	ULCI(97.5%)
Total indirect effect				
VI->KSB	5.118	0.000	0.193	0.407
Specific indirect effects				
VI->PRE->KSB	4.060	0.000	0.078	0.204
VI->RU->KSB	3.308	0.001	0.043	0.168

According to Preacher and Hayes (2008), the investigation of multiple mediations should involve two parts: the investigation of the total indirect effect, and the testing of hypotheses about individual mediators in the context of multiple mediator models. Furthermore, a significant total indirect effect is not a prerequisite for investigating specific indirect effects. As a result, in our multiple mediator model, we used smartPLS and employed Bootstrapping for assessing total and specific indirect effects. The bootstrap test indicated when the path coefficient of a 95% CI did not include 0, the effect was significant.

As shown in Table 3, the total indirect effect of virtual role identification on knowledge sharing behavior was significant (95% Boot CI [0.193, 0.407]). Further, the first path was significant from virtual role identification support to knowledge sharing behavior through the first mediator, role utility (95% Boot CI [0.043, 0.168]), supporting H3. The second path through the second mediator of perceived role expectations showed significance (95% Boot CI [0.078, 0.204]), supporting H4. However, the mediating effect of role salience (95% Boot CI [-0.038, 0.142]) was not significant, rejecting H2.

## 5. Discussion and implications

To promote the knowledge sharing behavior of users in virtual communities for community development, this study explored the effects of virtual role identification on knowledge sharing behavior in the virtual community context. We also explored the influence mechanism of virtual role identification on knowledge sharing behavior from the perspective of structural symbolic interactionism. Results showed that virtual role identification exerts a significant influence on knowledge sharing by increasing role utility and perceived role expectations.

### 5.1. Theoretical contributions

Our results offer several significant theoretical contributions. First, by examining the influence of online community users' virtual role identification on knowledge sharing behavior, this paper extends the influence of identification on community users' knowledge sharing from the level of group identification to the level of role identification. Much of the literature on identification as an object of study in the context of online community knowledge sharing has focused on whether individuals' identification with the community and other members affects intra-community behavior. However, the effect of individual identification on the role of community users has been overlooked. Registering for an account and logging in is a

prerequisite for using an online community, and through this process, individuals are assigned the role of community user. Our findings suggest that role identification increases role utility and perceived role expectations, in turn promoting knowledge sharing behavior within the community.

Second, most studies about identification are based on social identity theory, introducing group identity (community identity) as one of the influencing factors. However, this paper focuses on role identification, using SSI as a theoretical basis to explore the influential effects of role identification. There is a wealth of research exploring the impact of role identification on behavior and individual perceptions, but few studies have explored the specific mechanisms of influence. This paper builds on SSI to explain the impact of role identification on behavior in terms of both identity salience and commitment. Specifically, from an identity salience perspective, the stronger an individual's identification with a role, the greater the utility to the individual of performing the behavioral paradigm of that role. In turn, that role becomes more important in the individual's mind, which encourages the user to continue to act in accordance with the behavioral paradigm of that role. From a commitment perspective, the more an individual's relationship with significant others depends on a role, the more likely the individual is to remain in that role. In this paper, commitment was represented in terms of the expectations of individuals by other community members. Expectations were found to play a mediating role between role identification and knowledge sharing behavior. Our study extends the application of SSI to the field of information behavior.

In addition, this paper enriches the research model with reference to identity economics, introducing identity into the utility function to explain the effect of identity on individual preferences (Akerlof & Kranton, 2000). In light of this, this paper introduces the variable of role utility to represent the benefits that a role brings to individuals, and presents identity salience from a utility perspective. The results show that role utility mediates between role identity and knowledge sharing behavior.

### 5.2. Practical implications

Our study offers several practical insights for community builders. First, community designers need to be aware of the importance of constructing and improving the role of community members. For example, Zhihu, a high-quality Chinese Internet Q&A community, previously used "Share your knowledge, experience and insights with the world" as its slogan. The slogan directly defined the role of the "Zhihu user" from a behavioral paradigm perspective, based on the

main functions and features of the community. To improve users' role identification, community builders should clearly define the role of the community user and clarify and encourage the behavioral paradigm of the role, for example, by emphasizing it in the brand slogan, and promoting the content produced by quality users in the community.

Second, community builders should take care to emphasize the utility of the role of the community user, thereby increasing the importance of that role in the minds of individuals and encouraging knowledge sharing behavior by users. When community users experience more positive emotions and a greater sense of accomplishment through their roles as individuals, the quality of the content disseminated by the community is likely to improve. Further, the actual utility that the individual perceives from the role is likely to increase, thereby inclining individuals to engage more in the role behaviors, i.e., to share knowledge and continue to benefit from the role. Community builders can increase role utility by providing incentives that give users a continuing sense of accomplishment and positive emotions, and by disseminating high-quality content to solve problems or provide help to users.

It is recommended that community builders improve the ease of interaction within the community, promote an optimal atmosphere for discussion, actively guide users to communicate with each other in depth, and allow users to fully feel the expectations of other community members, ultimately promoting knowledge sharing among members. For example, the convenience and ease of use of questioning, answering, commenting, and retweeting in the community should be optimized, and functions such as private messaging, group chat, adding friends, and following should be further improved, thereby increasing users' willingness to participate in information interaction activities.

### 5.3. Limitations and future research

The study had some limitations. First, we focused only on the mediating effects of role utility and perceived role expectations, although role identification may also influence knowledge sharing behavior through other factors. Future research could build on other theories to determine more mediating effects and further enrich the influence mechanisms of role identification. Second, research on virtual community users' role identification is still developing, and scales for measuring role identification are limited. Future research needs to further develop and validate relevant scales. Third, this study did not restrict the types of communities used by the respondents, thus ignoring the influence of the characteristics of each type of

community itself on the users, and to what extent the culture of a specific online community interacts with user identity and utility. The applicability of the findings needs to be further validated by narrowing the scope of the study in the future. Finally, this study recorded a response rate of 77% female and 23% male, while ignoring any gender disparities. Future research should look into the gender breakdown of online community membership.

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