AN EMPIRICAL INVESTIGATION OF KNOWLEDGE WITHHOLDING IN VIRTUAL COMMUNITY

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Abstract

Virtual community has greatly enriched people's learning resources, stimulated their learning activities, and provided an online learning platform for people geographically-dispersed to communicate and collaborate. In the past decade, we have witnessed a growing research interest in virtual community, but most studies focused on why community members are willing to participate and contribute. It is necessary and important to notice that lurkers basically represent a large portion of users in most virtual communities, and therefore, a deep understanding of why people are unwilling to contribute, or withholding the knowledge they may provide will offer us some additional insights. In this study, we investigate the different types of psychological factors which are hypothesized to affect knowledge withholding in virtual community. Our study is also expected to initiate a new research angle to explore and understand users' passive behavior in virtual community, and provide some useful insights for both research and practice.

Keywords: *knowledge withholding, virtual community, behavioral inappropriateness, situational constraint, knowledge sharing self-inefficacy.*

1 INTRODUCTION

Virtual communities (VCs) are viewed as groups of people who interact together socially on a technical platform (Leimeister et al. 2006), such as Bulletin Board System (BBS), Q&A platform, social network site and online trading platform. With the rapid growth of virtual communities (VCs) in the last ten years, the way we communicate, seek information and share knowledge has been dramatically changed, and more and more Internet users participate in VCs to fulfill their information exchange, entertainment or collaboration needs. For example，Baidu Know (the largest Chinese Q&A platform) has generated more than 500 million questions, and owing to the effect of 50 million users who are willing to contribute, average question has gotten two users' help at least (TechWeb.com.cn 2013). Facebook has attracted up to 2.2 billion users with executing more than 1 billion times search queries every day. Meanwhile, multitudinous firms can't wait to establish their own online brand communities in view of the immense commercial potential of VC and its easy access to consumers and consumer data (Spaulding 2010).

However, even in vibrant VCs, the knowledge contributors usually make up the small proportion of members (Preece et al. 2004). The study on Wikipedia showed that over 50% of all the edits were done by only 0.7% of the users (Swartz 2006). In a recent research of Chinese Microblog Space, the results pointed out that about 4.8% of the 12,774 users contributed more than 80% of the original posts (Fu & Chau 2013). Actually, individuals are widely proved to be apt to withhold effort in group tasks (Lin & Huang 2010). Analogously, the VC members equally have a propensity to withhold effort in knowledge contribution when most of them consider knowledge contribution requirement in VCs as a collective task which can be voluntarily met by any members. Since the prosperity of VCs requires members' proactive participation to provide fresh content and timely interaction (Sun et al. 2014), this ubiquity of knowledge sharing deficiency probably damage VC adoption and its commercial value. Thus, it is of important significance to investigate members' knowledge withholding.

Nevertheless, the focus of prior IS researches on VCs are overmuch attracted by the positive actions of members, such as, proactive participation, knowledge sharing and continuing use. These behaviors are counted as the accelerator to the development of VCs, and its antecedents have been extensively probed, basing different research models on theories of trust, social capital, social cognitive, social exchange, outcome expectation, or IT adoption (Bagozzi & Dholakia 2002; Dholakia et al. 2004; Wang & Fesenmaier 2004; Algesheimer et al. 2005; Chiu et al. 2006; Hsu et al. 2007; Cheung & Lee 2009; Chen & Hung 2010; Fang & Chiu 2010; Wang & Wei 2011; Liao & Chou 2012; Tsai & Pai 2013).As a result, there is scarcely any study exploring users' knowledge withholding in VC context.

Based on the theory of hygiene-motivational factors, the factors provoking members' proactive behaviors are the motivators the presence of which can't eliminate the effort withholding behaviors of members. In other word, the antecedents of members' knowledge withholding behavior is the hygiene factors which should be different from the motivators, although it seems that knowledge withholding is just the opposite of knowledge sharing.

Therefore, it's necessary to investigate members' knowledge contribution behavior from the effort withholding viewpoint and we should adopt disparate research framework to explore.

To address this issue, we developed a conceptual model based on the psychological framework from Hill (Hill 1989) and prior IS researches to investigate users' withholding effort in community. This model identified three important categories which may impede users' contribution in Q&A community. Prior psychological studies noted that behavioral inappropriateness and situational constraint were the obstacles for social behavior (Price & Bouffard 1974; Snyder & Monson 1975; Wolk & Teleen 1975; Wolk 1976; Hill 1989). Behavioral inappropriateness is the most direct perception to the behavior itself, and has been validated as the important factor to hinder the implementation of behaviors (Price & Bouffard 1974; Hill 1989). Whereas, the appropriate actions may also not be taken for the restrictions of circumstances, such as, the limit of time and energy. Accordingly, we believe that these foregoing factors have an impact on the knowledge withholding of VCs members, and include behavioral inappropriateness and situational constraint in our research model. Otherwise, self-inefficacy, defined as the lack of confidence in ability, was also proved to serve as the obstructions of executing behavior (Bandura 1986). Consequently, this paper recognized behavioral inappropriateness, situational constraint and knowledge sharing self-inefficacy as the antecedents of VC users' knowledge withholding, which is also consensus with the psychological framework from Hill (1989).

The remainder of this paper was organized as follows. We provided operational definitions of the variables in our research model, as well as the causal relationships and hypothesis in section 2. In section 3 and 4, we presented the research method and depicted the analytical results. We concluded the study with the discussion and conclusions in section 5.

2 THEORETICAL BACKGROUND AND HYPOTHESES

As mentioned before, knowledge withholding practices are widespread, and will impede the development and success of VCs. Despite the importance of understanding users' knowledge withholding behavior in VCs, rare empirical investigation has been made in this regard. In this research, we attempt to explore this issue by identifying factors that affect knowledge withholding. As shown in Figure 1, behavioral inappropriateness, situational constraint and knowledge sharing self-inefficacy are regarded as the antecedents of knowledge withholding.
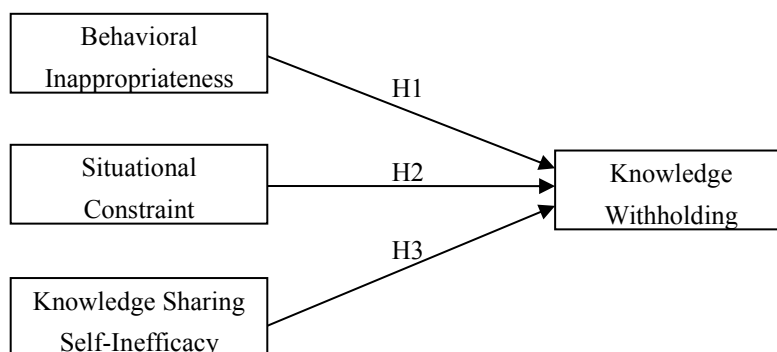

Figure 1. The research model

2.1 Knowledge Withholding

Knowledge withholding is defined as the likelihood that "an individual will give less than full effort to contribute knowledge" (Lin & Huang 2010), is regarded as a specific form of withholding effort (Tsay et al. 2014).Prior studies have indicated that withholding effort referred to employee's restraining effort on purpose was related to "social dilemma" and widespread in various organizations (Bazerman et al. 1987). Furthermore, withholding effort was deemed to be the common character of employees' duty shirking, social loafing, and free riding, which had a negative effect on group performance，cohesiveness and satisfaction(Duffy & Shaw 2000).Therefore, for the sake of weakening its bad influence on organizations, a number of researchers have tried to structure different models to predict individuals' withholding effort behavior. For example, based on Knoke's synthesized motivation model, Kidwell and Bennett (1993) have established a systematic framework that recognized "rational choice, normative conformity, and affective bonding" as the three incentives for employees' propensity to withhold effort (Lin & Huang 2010; Roland E. Kidwell & Bennett 1993), what's more, this framework has been widely applied and empirically validated in the research stream of effort withholding (Tsay et al. 2014). Otherwise, the social exchange relationships individuals form in the workplace, personality traits, leadership style and person–job fit, perceived organizational support, organizational forms and so on have also been certified to be bound up with effort withholding(Murphy et al. 2003; Mount et al. 2006; Mulki et al. 2006; Eder & Eisenberger 2008; Kidwell 2010).

In regard to knowledge withholding, few studies have paid attention to this specific form of withholding effort. Lin and Huang (2010) have firstly put forward the notion of knowledge withholding related to group members' withholding effort in knowledge contribution, and spotted the personal and contextual antecedents of knowledge withholding on the basis of social exchange theory and social cognition theory. Another paper on knowledge withholding was from Tsay et al. (2014). Different from the previous research, they introduced perceived organizational support and social exchange relationship as the mediation variables which transfer the effect of justice on knowledge withholding (Tsay et al. 2014).

However，the antecedents of knowledge withholding behavior identified in the above studies are based on real group context, which may not be effective in different context. In VC context, members generally communicates via virtual identities and usually don't know each other; the social interaction relations that they generate is more weak than it in real group, and therefore VC members tend to exhibit different behavior pattern(Slater et al. 2000).Otherwise, the contributory behaviors in VCs are visible and can obtain appropriate reward. This behaviors can hardly give rise to the consciousness of justice that is significant influence factor of workers' withholding effort behavior. Thus, it seems not reasonable to follow the prior research framework on effort withholding to elaborate members' knowledge withholding in VCs.

Unlike the visual angle of the tradition research framework of withholding effort in organization, this article attempts to elaborate VC members' knowledge withholding from person's cognitive perspective based on the psychological framework, which is expected to fill the research gap that is the deficiency of opinion about individuals' knowledge

withholding in VCs.

2.2 Behavioral Inappropriateness, Situational Constraint and Self-Inefficacy

2.2.1 Behavioral Inappropriateness

Behavioral inappropriateness refers to the degree to which the knowledge sharing behavior is perceived to be inconsistent with the potential users' existing values, past experiences, and current needs. It originates in the psychological studies, and the related concept has been adopted to predict the behavior intentions of individuals (Price & Bouffard 1974; Hill 1989).The psychological study on role behavior indicated that every behavior could be regarded as either appropriate, inappropriate, or neutral towards a given role, and one's personality was able to influence his evaluation of the appropriateness of relevant behaviors which in turn affected his actual role behaviors (Yang 1970). This causal relationship was considered to suggest the direct effect of behavioral inappropriateness on behavior intention, as well as revealed the subjectivity of behavioral inappropriateness. Besides, behavioral inappropriateness was also verified to be related to individuals' unwillingness to act social behavior (Hill 1989). However, regardless of its remarkable connection with behavior intentions, IS studies have scarcely adopted behavioral inappropriateness to explain individuals' behaviors, due to the absence of definition. Therefore, we try to tap into its essence in IS research perspective.

Behavioral inappropriateness is one of the most intuitive perception toward a behavior, which everyone can recognize it without exactly know why. Moreover, previous studies argued that it's the result of the comparison with a given criteria (such as experience, custom) (Folger et al. 2013); this criteria derives from the established empirical knowledge known as schema. According to the schema theory, only if there is schemata which can assimilate the stimuli will individual give a response, I.e., individual will perceive inappropriateness when the awareness of behavior is not in consensus with his schemata and thus avoid performing behavior. Thereby, we presume that the connotation of behavioral appropriateness is the extent to which the cognitive of behaviors fit the schemata.

In the other hand, previous IS empirical studies have illustrated that the inconsistent with individuals' existing values, previous experiences, and needs can influence their innovation/IT adoption, participation and knowledge sharing in VCs (Tornatzky & Klein 1982; Chin & Gopal 1995; Rogers 1995; Parthasarathy & Bhattacherjee 1998; Verhoef & Langerak 2001; Vollink et al. 2002; Premkumar 2003; Lin et al. 2009; Ryu et al. 2009; Chen & Hung 2010; Schierz et al. 2010; Hung & Cheng 2013; Kim & Ammeter 2014).Theoretical researches has suggested that the effect of incompatibility on behavior may result from the stereotype related to a generalization of schema. People present more unwillingness to process information that is inconsistent with the previous cognition structure, because of the fluency of interpreting consistent information (Bodenhausen & Lichtenstein 1987; Fiske & Neuberg 1990; Macrae et al. 1994).

Drawing on the aforementioned, we posit that the springhead of incompatibility effect and behavioral inappropriateness are in accordance with schema, videlicet, behavioral

inappropriateness in VC is equivalent to the perceived incompatibility of behavior. Thus, we define that behavioral inappropriateness is the degree to which the knowledge sharing behavior is perceived to be inconsistent with the potential users' existing values, past experiences, and current needs.

Besides, prior studies on knowledge sharing have not only noted that people are ready to behave in congruity with their value systems, but also repeatedly validated that the perceived compatibility facilitate members' knowledge sharing behavior (Lin,Hung et al. 2009; Chen & Hung 2010; Hung & Cheng 2013). Based on the relation between compatibility and knowledge sharing behavior confirmed in these researches, this paper argue that behavioral inappropriateness has a positive effect on members' knowledge withholding in Q&A community. The following hypothesis is:

H1. Behavioral inappropriateness is positive related to knowledge withholding.

2.2.2 Situational Constraint

In this paper, situational constraint refers to the extent to which users perceived time cost and mental effort in knowledge sharing in virtual community. It's one manifestation of situational strength, and supposed to be an essential factor of behavior (Chatman 1989; Endler 1993; Mischel 1999).

Discussion on situational constraint was launched by psychologists. They normally applied experiment method to probe into the impact of situational constraint on individuals' behavior, attitude or cognition, and various outcomes were found, such as, satisfaction, locus of control-adjustment relationship and self-efficacy (Wolk & Teleen 1975; Wolk 1976; Mathieu et al. 1993). However, these studies failed to offer the formal definition which is crucial for both researchers and practitioners. To apply this intuitively appealing concept, many management researchers have tried to conceptualize it in work context. For example, Spector et.al. (1999) preferred to recognize situational constraints as job stressors which impacted job performance, job dissatisfaction, and intention to quit (Villanova 1996; Fox & Spector 1999). The definition regarded situational constraint as the degree to which one's decision is constrained by factors outside his/her control (Meyer et al. 2010). Nevertheless, these ideas of situational constraint all held that the constraint could not been controlled by individuals, which the situation in VC is totally different from.

In VCs, individuals are almost free to participate, sharing knowledge and quit use, which hardly suffers the shortage of resource and the pressure from others like in real-world. In other words, the constraints of behavior in VC are expected to root in the cognition of behavior rather than the outside pressure. Thus, it may be improper to adopt the above definition in our study; we need to redefine VC members' situational constraint in a different angle of view.

IS studies have proposed that the motivation for relevant behavior can be impaired when an individual needs to expend excessive effort on an activity or bears large costs in performing and thus inhibit the occurrence of behavior(Tong et al. 2013). In the other hand, the behavioral decision theory indicated that the cost-benefit analysis is significant to individuals'

behavior decision; people have a propensity to conduct the behavior which can maximum their own anticipatory benefits, and perceived cost is likely to act as the external constraint to impact personal behavior. Follow the above empirical researches and theoretical basis, we suggest that perceived cost of behavior is the dominating situational constraint in virtual space. What's more, it's distinct to notice that the cost of behavior in virtual space rarely refers to transaction cost but the perceived time cost and mental effort.

Therefore, this paper recognizes situational constraint as the extent to which users perceived time cost and mental effort in knowledge sharing in virtual community. As the restriction that work constraint place on workers, we suppose that situational constraint in VC can reduce members' benefit expectation of positive behaviors and thus strengthen their passive behavior incentives (Peters et al., 1985). Thereby, we propose that the situational constraint of knowledge sharing can generate members' knowledge withholding.

H2. Situational constraint is positive related to knowledge withholding.

2.2.3 Knowledge Sharing Self-inefficacy

Knowledge sharing self-inefficacy refers to members' non-confidence in his or her capacity to offer knowledge that is valuable to other members. The concept of knowledge sharing self-inefficacy is the extension definition of self-efficacy, which originates in social cognitive theory. The theory has conceived self-efficacy as one's evaluation of his or her ability to organize and execute particular behaviors, and argued that it's a considerable expectation belief which acts as cognitive force to drive behaviors (Bandura 1977). Attracted by its theoretical key role of individuals' behaviors, numerous IS literature have applied self-efficacy to illustrate individuals' computer training performance and IT usage (Hsu et al. 2007). For instance, Johnson and Marakas (2000) demonstrated that computer self-efficacy could promote the training effectiveness of computer skill (Johnson & Marakas 2000). Lin and Huang (2008) found that knowledge management systems (KMS) self-efficacy was related to task-technology fit, outcome expectations, and KMS usage (Lin & Huang 2008). In addition, many similar empirical studies have also indicated the high self-efficacy will lead to related behavior (Compeau & Higgins 1995; Easley et al. 2003).

This causality may be on account of the influence of self-efficacy on behavior choice and outcome expectancies. Social cognitive theory maintains that people have a propensity to avoid undertaking the actions which they believe exceed their capacity, whereas they tend to perform the behaviors perceived high self-efficacy and get involved in it. On the other hand, people deem that they will gain a higher outcomes of behavior when they believe in their capability to perform. Moreover, this outcomes expectation can affect the amount of effort and persistence that individuals will put forth once behaviors are initiated (Bandura 1997). I.e., not only will people conduct the actions, but also people will pay more efforts on and continue to perform it, when they feel high self-efficacy. In view of this idea, a large number of researches on VC can't wait to employed self-efficacy to explicate members' participation, knowledge sharing and continuous use behavior(Wang & Fesenmaier 2004; Chiu,Hsu et al. 2006; Cheung & Lee 2007; Hsu,Ju et al. 2007; Chen et al. 2009; Chen & Hung 2010; Kim et al. 2012; Lin & Huang 2013; Pellas 2014). Among these literalness, self-efficacy has been

more broadly and successfully used to predict members' knowledge sharing behavior. We suppose it due to the higher requirement of competence for knowledge sharing behavior, which hence gives rise to prominent effect of self-efficacy.

With regard to knowledge sharing self-inefficacy, it relates to members' non-confidence in their capacity to share knowledge. In contrast to situational constraint, what knowledge sharing self-inefficacy cares about is one's self-evaluation of his or her ability rather than the perceived cost of behavior. When facing behavior decisions, people usually consider whether he or she possesses the capacity to perform the behavior first, and then take the cost of behavior into account. The two factors play a role in the different stage of behavior decision and can't be replace by each other.

In the other hand, as the foregoing discussion, members prefer to act the behaviors in their sphere of perceived competence. Even if they have to execute the action over their ability, the cognition of self-inefficacy is likely to reduce members' outcome expectation and make them withhold effort in conducting the behaviors. Thus, we suppose that VC members may tend to choose to conduct the knowledge withholding behavior within their competence when they get the feeling of knowledge sharing self-inefficacy. In other words, knowledge sharing self-inefficacy may well cause members to withhold knowledge. The following hypothesis is:

H3. Knowledge sharing self-inefficacy is positive related to knowledge withholding.

3 RESEARCH METHOD

3.1 Data Collection

To test the proposed research model, we conducted an online survey to collect data. Before the formal survey, a pilot test was carried out. The feedback was taken into account to modify the questionnaire to ensure items clarity and accuracy.

Table 1 Demographic characteristics of respondents (N=480)

Demographic variable	Items	Frequency	Percentage
Gender	Male	246	51.3%
	Female	234	48.7%
Age	<18	8	1.7%
	18-22	181	37.7%
	23-25	85	17.7%
	26-30	140	29.2%
	>30	66	13.8%
Education	High school or below	26	5.4%
	College(3 years)	94	19.6%
	University	336	70%
	Master or above	24	5.0%
Occupation	Administrative agency	14	2.9%
	Public institution	39	8.1%

	Enterprise	189	39.4%
	Individual household	26	5.4%
	Student	186	38.8%
	Others	26	5.4%
Member history	<3 months	66	13.8%
	3-6 months	95	19.8%
	6 months-1 year	106	22.1%
	1 year-2 years	137	28.5%
	>2 years	76	15.8%
Number of posts per week	0	70	14.6%
	1-5	241	50.2%
	6-10	85	17.7%
	11-20	42	8.8%
	>20	42	8.8%

We have used an online survey for data collection. The target respondents of this study are members of an online brand community. This community was operated by a large Chinese mobile Internet company, and its products had lots of fans. Overall, we have collected 480 valid questionnaires. Table 1 presents the demographic profile of the respondents.

3.2 Instrument Development

In the questionnaire, all the items adopted 7-point Likert scale with anchors ranging from strongly disagree (1) to strongly agree (7). To guarantee the validity of scale, our survey items are stemmed from the previous verified survey questions, and some words were revised to fit our investigation context. In this study, we employed the measure items from Lin and Huang (Lin & Huang 2010) to investigate members' knowledge withholding. The items for knowledge sharing self-inefficacy and behavioral inappropriateness were adapted from the measurement used in Chen and Hung's study (Chen & Hung 2010). Additionally, situational constraint, recognized as the perceived time cost and mental effort in knowledge sharing behavior, was assessed by the items of perceived cost modified from Tong et al. (2013). Due to the page limits, we have not included the measures, which can be obtained upon inquiry.

4 DATA ANALYSIS AND RESULTS

We used AMOS 22 to assess the research hypotheses. The SEM method precedes traditional hierarchical regression because it allows researchers to simultaneously examine multiple correlative relationships among variables and to take random measurement error into account (Tabri & Elliott 2012). In this study, we conducted both the assessment of measurement model and structural model to analyze the survey data.

4.1 Analysis of the Measurement Model

We employed confirmatory factor analysis (CFA) to assess the measurement model, and the results showed that the main indicators assessing model fit were better than the normal

common acceptance levels (Chi-square/df= 2.140, GFI=0.957, AGFI=0.936, NFI=0.972, CFI=0.985, and RMSEA=0.049). Table 2 demonstrated the summary of these indices as well as the recommended value. Therefore, we concluded that all items loaded significantly on the latent constructs that they were designed to measure.

Table 2 Model fit results for measurement model

Model fit indices	Measurement model	Recommended value
Chi-square/df	2.140	≤3.0
GFI	0.957	≥0.90
AGFI	0.936	≥0.90
NFI	0.972	≥0.90
CFI	0.985	≥0.95
RMSEA	0.049	≤0.08

In addition to the model fit indices, we further examined convergent validity and discriminant validity. Convergent validity indicates the degree to which the items of a given construct are correlated in actual data. The results of convergent validity test were listed in Table 3. As showed in Table 3, composite reliability values ranged from 0.88 to 0.93 and were above the benchmark value of 0.70. The AVE values ranged from 0.73 to 0.78, which all exceeded the threshold of 0.5. Besides, Cronbach's Alpha values ranged from 0.88 to 0.93 and were above the acceptable threshold of 0.70. Thus, convergent validity of the scales was satisfied.

Table 3 Convergent validity

Construct	Item	Factor loading	Composite Reliability (**CR**)	Average Variance Extracted (**AVE**)	Cronbach's alpha
Behavioral inappropriateness			0.9159	0.7840	0.916
	BI_1	0.872***			
	BI_2	0.906***			
	BI_3	0.878***			
Situational constraint			0.8869	0.7235	0.886
	SC_1	0.829***			
	SC_2	0.843***			
	SC_3	0.879***			
Knowledge sharing self-inefficacy			0.908	0.7672	0.908
	KSSI_1	0.879***			
	KSSI_2	0.911***			
	KSSI_3	0.836***			
Knowledge withholding			0.9313	0.7313	0.929
	KW_1	0.874***			
	KW_2	0.893***			
	KW_3	0.768***			
	KW_4	0.919***			
	KW_5	0.813***			

*Note: *** p < 0.001.*

Finally, we examined the discriminant validity of the scales. Discriminant validity indicates the extent to which constructs are significantly different from each other (Zheng et al. 2013). The correlation coefficients between the constructs and the square root of AVE were presented in Table 4. The result showed that the square roots of the AVEs for all constructs were greater than the correlations between constructs, indicating the measure has adequate discriminant validity. In addition, the collinearity diagnostics was conducted to eliminate the interference of multicollinearity. The result showed that VIF for all independent variables were less than 10, which manifested multicollinearity is not a serious problem in this study.

Table 4 Discriminant validity

Construct	Mean	S.D.	VIF	AVE	BI	SC	KSSI	KW
BI	3.506	1.454	1.640	0.784	**0.885**			
SC	4.391	1.372	1.345	0.724	0.535	**0.851**		
KSSI	3.899	1.443	1.457	0.767	0.601	0.420	**0.876**	
KW	3.458	1.442		0.731	0.660	0.395	0.624	**0.859**

Note: Diagonal elements are the square root of the average variance extracted (AVE). Off-diagonal elements are the correlations among constructs.

4.2 Analysis of the Structural Model

The results of path coefficients and their significance values were shown in Figure 2. The proposed model also provides an acceptable fit to the observed data, for Chi-square/df=2.140, GFI=0.957, AGFI=0.936, NFI=0.972, CFI=0.985, and RMSEA=0.049, which all surpassed their each common benchmarks.
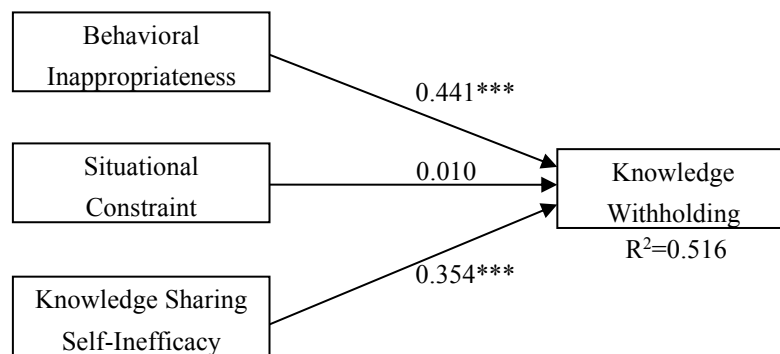

Figure 2. Results of the hypothesis testing for the research model.

As shown in Figure 2, both behavioral inappropriateness (path coefficient=0.441, p<0.001) and knowledge sharing self-inefficacy (path coefficient=0.354, p<0.001) exhibited strong positive and significant effect on knowledge withholding, supporting H1 and H3 respectively. The path coefficient from situational constraint to knowledge withholding was positive but not significant (path coefficient=0.010, p=0.822). The squared multiple correlations (R^2) of knowledge withholding indicated that behavioral inappropriateness, situational constraint and knowledge sharing self-inefficacy together explained 51.6% of its variance.

5 DISCUSSION

5.1 Discussion of Findings

This research aimed at discerning the antecedents of individuals' knowledge withholding in virtual community. The result of data analysis above generally supported our theoretical model, indicating that the inappropriateness and self-inefficacy of knowledge sharing behavior trigger members' knowledge withholding in VC. However, situational constraint didn't demonstrated a significant relation with knowledge withholding in the result, which should be positively impact knowledge withholding in the hypothesis.

We argued that this may result in the strong effect of behavioral inappropriateness and knowledge sharing self-inefficacy on knowledge withholding which conceal the real relationship between situational constraint and knowledge withholding. The evidence is that path coefficient for situational constraint (0.031) was far smaller than it for behavioral inappropriateness (0.446) and knowledge sharing self-inefficacy (0.302). In addition, from the point of behavior decision processes, people commonly realize behavioral inappropriateness self-inefficacy first; then they are very likely to conduct the withholding behavior immediately before taking situational constraint into consideration. Thereof, members are probably neglect the effect of situational constraint. For this reason, the respondents for survey may not be able to exactly assess the situational constraint in virtual community in line with their experience. Thus, situational constraint appeared to have little influence on knowledge withholding underlying the survey in our study.

5.2 Theoretical and Practical Implication

Despite of the rifeness of knowledge withholding in VCs, prior studies scarcely paid attention to it. As mentioned in introduction, the factors of knowledge sharing behavior are motivators which may well show no influence on members' passive behavior. Namely, our study on knowledge withholding behavior is not only different from the prior studies on knowledge sharing behavior but also necessary, and it's supposed to give a new perspective to investigate members' knowledge sharing behavior. Moreover, the findings should provide implication for both researches and practitioners.

Previous IS researches on VC showed great interested in members' behaviors that were supposed to be crucial to the success of VC, such as, proactive participation, knowledge sharing and continuing use. However, these studies have generally lost sight of the knowledge withholding behavior of VC members. Although knowledge withholding appears to be the opposite of knowledge sharing, the studies on knowledge sharing still can't replace the exploration of knowledge withholding. This is because the distinction for hygiene factors and motivators. Thus, our study that probed into knowledge withholding offered a disparate viewing angle to understand members' knowledge sharing behavior. Besides, based on the psychological studies, we recognized three antecedents of knowledge withholding including behavioral inappropriateness, situational constraint and knowledge sharing self-inefficacy with the first two factors verified, which the basis of theory model was different from that of

the traditional studies on knowledge withholding in organizations. In other words, our findings may also provide a new framework to investigate individuals' withholding effort for management researchers.

For practical applications, we suggested that the administrator of virtual communities should care more about members' knowledge withholding behavior and try to reduce it. This study identified behavioral inappropriateness and knowledge sharing self-inefficacy as the significant factors causing knowledge withholding, which could give insight in how to reduce the knowledge withholding behavior in VC. Based on the interpretation of behavioral inappropriateness, we suggest that VCs should provide humanized mechanism to meet members' various needs for knowledge sharing. For instant, some members may withhold effort in knowledge contribution due to the onefold and unengaging reward, thus the personalized and customizable reward for sharing knowledge can satisfy their needs and therefore transform their negative behavior.

5.3 Limitations and Directions for Further Research

Although our findings presented conspicuous significance for theoretical research and practice, there were several limitations to our study. Firstly, the survey sample was from a user-driven online brand community, which the attitude toward the brand not included in research model may affect members' behavior in community. Consequently, the external validity of results may need to be further demonstrated. Secondly, the most respondents were undergraduates as showed in the demographic in accordance with the common member composition of VC, but the relationships that we found basing on the sample may be different with that in other types of communities which　most of the members are not students.

Based on these limitations in our study, we suggested that the additional studies should be conducted in various types of virtual communities that comprise different occupation across multiple age groups, which may give different insights into knowledge withholding behavior. Additionally, the combination of communities' traits and our findings may be a good way to explore knowledge withholding in other communities.

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