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Exploring the Moderating Effects of Commitment and Perceived Value of Knowledge in Explaining Knowledge Contribution in Virtual Communities

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Abstract

Motivating people to contribute knowledge to others has become a major challenge in knowledge management. To help understand knowledge contribution in virtual communities (VCs)—a popular area for knowledge sharing, this study investigates individuals' motivations to contribute knowledge based on the nature of knowledge contribution behavior. In particular, the influences of two key moderating variables which have been neglected in most previous studies are examined. The theoretical model is empirically tested using data collected from 363 VC members. We find that reciprocity, reputation, knowledge self-efficacy, enjoyment in helping others and commitment are key factors of four kinds (egoism, altruism, collectivism and principlism) that significantly and directly influence individuals' knowledge contribution intention in VCs. Perceived value of knowledge (PVK) is found to be an important moderator of the relationships between reciprocity, enjoyment in helping others and knowledge contribution intention. We confirm that commitment reduces the impact of reputation on knowledge contribution intention. Implications for both researchers and practitioners are discussed.

Keywords: Commitment, Perceived Value of Knowledge, Knowledge Contribution, Virtual Community, Moderating Effect

1. Introduction

Along with the advancement in Internet and computer-mediated communication technologies, there has been a rapid growth of virtual communities (VCs) which are defined as “groups of people with common interests and practices that communicate regularly and for some duration in an organized way over the Internet through a common location or mechanism” (Ridings et al. 2002, p. 273). VCs overcome time and space limitations and open up new opportunities for individuals to discuss ideas, share knowledge and extend social networks (Wellman and Gulia 1999). Organizations run in-house VCs to facilitate knowledge flow between geographically dispersed coworkers (Constant et al. 1996). Organizations also sponsor VCs that are maintained by a third party to mine external knowledge resources (e.g., customers' opinions on products and services) from member contributions (Hagel and Armstrong 1997; Tedjamulia et al. 2005). However, because participation in VCs is open and participants are typically unfamiliar with each other, there is no guarantee that the contributor will receive returns from the seeker (Wasko and Faraj 2005). Therefore, VC members may be unwilling to voluntarily spend their valuable time and efforts on contributing knowledge. Despite the

implementation of VCs in various forms (e.g., email listservs and bulletin boards) and accompanying surge in interest by researchers, there is little empirical research about how participation in VCs relates to knowledge sharing (Wasko and Faraj 2005). In this study, we focus on extra-organizational VCs (VCs that reside outside organizations, either created by individuals or sponsored by organizations) and attempt to investigate individual motivations for sharing knowledge in these networks.

Moderators are important to the development of theory (Chin et al. 2003). Nevertheless, prior studies that have been conducted on knowledge sharing in VCs mostly focused on direct factors and their influences on knowledge contribution behavior or behavioral intention, overlooking the role of moderating variables. To fill this gap, we adopt a contingency approach including commitment and perceived value of knowledge as moderators of the relationships between independent variables and the dependent variable.

In the next section, we first discuss the nature of knowledge contribution behavior in VCs and then propose a theoretical model based on the discussion. Next, we describe the methodology and research design, followed by the data analysis and discussions of empirical results. Finally, we present the key findings and implications for both research and practice.

2. The Nature of Knowledge Contribution Behavior in VCs

Several researchers have recognized knowledge sharing through electronic knowledge repositories in organizations or VCs as a form of generalized social exchange and used social exchange theory to investigate what motivates users to contribute knowledge (Hall 2001; Bock and Kim 2002; Kankanhalli et al. 2005). Social exchange theory posits that people are rational human beings who seek to maximize their benefits and minimize their costs when exchanging resources with others (Molm 2001). From this perspective, individuals contribute knowledge out of egoism, looking for benefits returned (e.g., reputation, obligation of reciprocity, and self-efficacy) to maximize self-interest (Wasko and Faraj 2000).

According to social cognitive theory, individuals want to express their personal values and concepts of self (Bandura 1986). Altruism, defined as helping without expecting direct rewards, has been identified as an important motivator for volunteering (Clary et al. 1998). It is valued by individuals and knowledge contribution provides a means to express such a value (Subramani and Peddibhotla 2004). People may share expertise due to self-expressive needs (Constant et al. 1994). It may sometimes be the case that an individual contributes knowledge merely because others have a need for it (Kollock 1999). Therefore, knowledge contribution in VCs may be an altruistic action.

Knowledge contribution behavior in VCs has also been viewed as an outcome of collectivism (Wasko and Faraj 2005). Knowledge shared is considered as a public good embedded in the community that can be accessed by all members (Wasko and Faraj 2000). Thus, knowledge sharing can be conceptualized as a social dilemma in which individual rationality—intention to maximize individual payoff by free-riding without

contribution—will lead to collective damage (Cabrera and Cabrera 2002). VCs exist and sustain because individuals choose to collectively provide knowledge rather than free-ride (Wasko and Faraj 2005). In this case, knowledge contribution in VCs is not motivated by self-interest, but by the welfare of the whole community (von Krogh 1998).

Four reasons why people act for a public good are identified by Batson (1994) and employed by Cheung et al. (2004) to conceptually explain knowledge contribution behavior in virtual community of consumers. In their view, in addition to egoism, altruism and collectivism, principlism is another important motive for contributing to a public good. Principlism is the prosocial acts that follow moral principles (Batson 1994). It has been found that individuals may contribute knowledge due to a moral obligation to the organization and a sense of duty to pay back helpers or the whole community (Constant et al. 1996; Wasko and Faraj 2000). Hence, knowledge contribution may be a principlistic behavior. Since different individuals have different motives, we contend that knowledge contribution behavior is a combination of egoism, altruism, collectivism and principlism and seek to explore potential key motivators for knowledge contribution in VCs.

3. Theoretical Model Development

Knowledge contribution in VCs primarily occurs when individuals are motivated to take their valuable time and efforts to share their knowledge (Wasko and Faraj 2005). Considering that different natures of knowledge contribution behavior involve different motivators, we will examine key individual motivations from four perspectives: egoistic knowledge contribution, altruistic knowledge contribution, collectivistic knowledge contribution and principlistic knowledge contribution. Furthermore, in pursuit of better understanding knowledge contribution in VCs, we incorporate two key factors that prior research indicates may act as moderators of the relationships between motivators and knowledge contribution intention: commitment and perceived value of knowledge (PVK). Figure 1 describes the research model.

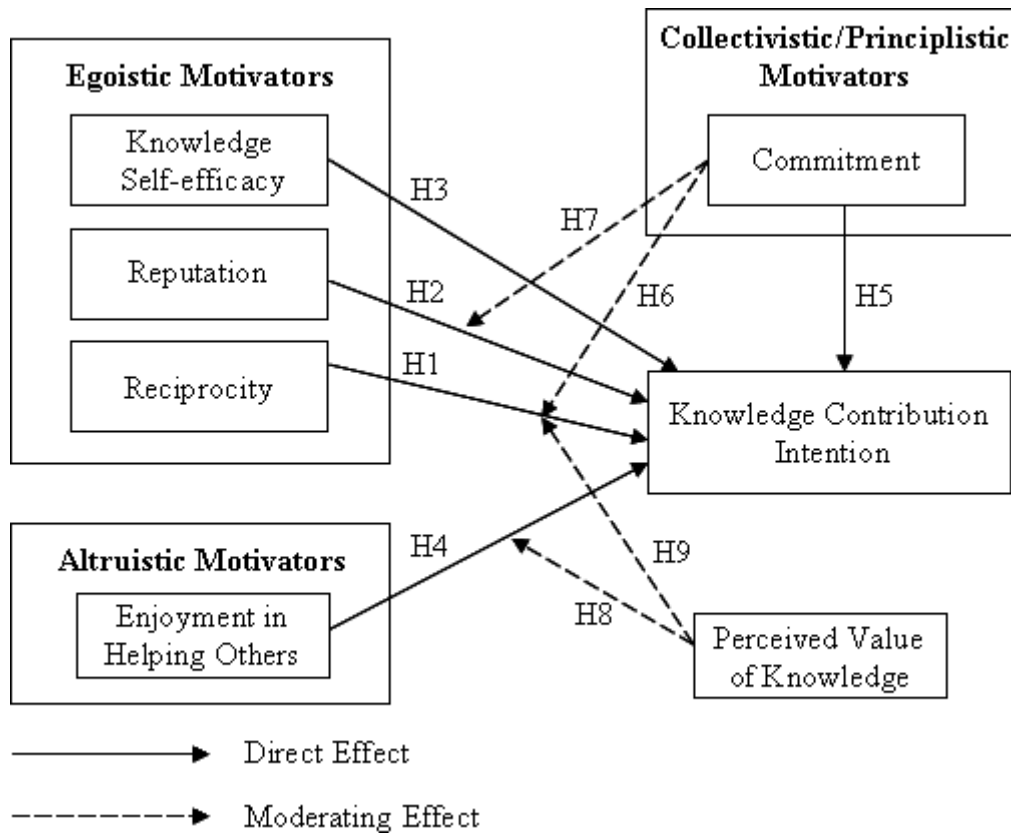


Figure 1. The Research Model

3.1 Egoistic Knowledge Contribution

Egoistic individuals contribute knowledge in VCs out of self-interest. They hope that their shared knowledge will result in returns, whether tangible or intangible (Kollock 1999; Wasko and Faraj 2000). One obvious egoistic motivator for knowledge sharing is anticipated reciprocity. In VCs, when individuals feel that what is given will be paid back, they will be more willing to contribute their knowledge (Wasko and Faraj 2005). Knowledge sharing is facilitated when there is a norm of generalized reciprocity or mutual indebtedness in VCs (Constant et al. 1996). It has also been observed that VC members got useful information and help they needed more quickly if they had regularly helped others before (Rheingold 2000). All these findings suggest the existence of reciprocity in VCs and a positive relationship between reciprocity and knowledge contribution intention.

H1: *The perception of reciprocity is positively associated with an individual's knowledge contribution intention in VCs.*

Prior studies provide evidence that knowledge contributors earn respect from others by their sharing behavior (Constant et al. 1994; Constant et al. 1996). VC users perceive that they gain status by answering frequently and intelligently (Lakhani and von Hippel 2003). It has been noted that the need to gain an informal recognition and the need to establish themselves as experts motivate individuals to contribute knowledge (Ardichvili

et al. 2003). Therefore in VCs, perceived enhancement of reputation can serve as an important motivator for users' offering knowledge to others (Constant et al. 1996; Kollock 1999). When individuals have the perception that their behavior of contributing knowledge to others will improve their status and reputation in VCs, they may be attracted to share their knowledge (Wasko and Faraj 2005). This leads to the following hypothesis:

H2: The perception of enhanced reputation is positively associated with an individual's knowledge contribution intention in VCs.

Another important egoistic motivator for knowledge sharing is knowledge self-efficacy. Social cognitive theory posits that self-efficacy, which means an individual's judgment of his/her capability to execute actions required for designated types of performances, has a great impact on people's behavior and behavioral intention (Bandura 1986). Knowledge self-efficacy refers to the confidence in one's ability to provide knowledge that is valuable to others (Kankanhalli et al. 2005). In the organizational context, people gain confidence in their abilities through contributing knowledge to the organization (Constant et al. 1994). This perception of increased self-efficacy and competency can motivate employees to contribute their knowledge (Bock and Kim 2002; Kankanhalli et al. 2005). Similarly in VCs, sharing knowledge with other people helps users enhance their learning and self-efficacy (Kollock 1999; Wasko and Faraj 2000). Therefore, we postulate that perceived enhanced knowledge self-efficacy has a positive effect on knowledge contribution intention.

H3: The perception of enhanced knowledge self-efficacy is positively associated with an individual's knowledge contribution intention in VCs.

3.2 Altruistic Knowledge Contribution

VC users perform altruistic knowledge contribution for the good of others without expecting self-benefits. Although absolute altruism rarely exists, relative altruism where self-interest plays only a minor role in motivating an act is prevalent (Smith 1981). Researchers have found that individuals may contribute knowledge to others due to their enjoyment in helping others solve challenging problems (Wasko and Faraj 2000). VC members help others because answering questions provide them with feelings of pleasure (Lakhani and von Hippel 2003). In VCs, people gain intrinsic enjoyment and satisfaction from demonstrating their altruistic behavior by helping others at their own expense (knowledge, time, effort etc.) without apparent compensation (Kollock 1999; Wasko and Faraj 2000). Accordingly, enjoyment in helping others is an important altruistic motivator for knowledge contribution in VCs.

H4: Enjoyment in helping others is positively associated with an individual's knowledge contribution intention in VCs.

3.3 Collectivistic Knowledge Contribution

Individuals contributing knowledge out of collectivism aim at adding to the welfare of the community. Commitment represents a strong belief in and acceptance of a group's

goals, a willingness to exert considerable effort to facilitate the goals, and a strong desire to maintain membership in the group (Mowday et al. 1979). In intra-organizational VCs, committed people are concerned with how they can be useful to the organization and they are more likely to assist help seekers with organization related problems (Constant et al. 1996). In extra-organizational VCs, individuals who have a strong sense of community membership are more willing to contribute knowledge for the benefits of the community (Hars and Ou 2002). It has also been argued that committed VC members contribute knowledge because they think such behavior is best for the community (Kollock 1999). Based on these findings, we propose that commitment to VCs can act as an important collectivistic motivator for knowledge contribution in VCs.

H5: Commitment is positively associated with an individual's knowledge contribution intention in VCs.

3.4 Principiistic Knowledge Contribution

Principiistic knowledge contribution is performed when individuals seek to act in accordance with some moral principles or obligations. Commitment to VCs conveys a sense of duty or obligation to help others on the basis of shared membership (Wasko and Faraj 2005). Previous research suggests that VC members' knowledge contribution behavior may be driven by a moral obligation to the community as a whole (Ardichvili et al. 2003). They contribute knowledge because they consider contributing as a part of being a member in the community (Wasko and Faraj 2000). In VCs, individuals who have a strong sense of commitment to the community are more likely to feel obliged to help others by contributing knowledge (Wasko and Faraj 2005). Therefore, apart from being a collectivistic motivator, commitment is also a principiistic motivator for knowledge sharing, further supporting hypothesis H5.

3.5 Moderating Influences of Commitment and Perceived Value of Knowledge

Commitment has been widely used as a moderator in studying employee behavior and consumer behavior (Leong et al. 1996; Ahluwalia et al. 2001). With respect to VC user behavior, commitment may also be an important moderating variable. Commitment represents a regard for collective or communal outcomes, not merely individual outcomes (Kollock 1999). Previous findings suggest that the need for self-interests may not be salient for knowledge contributors when they are motivated by a communal orientation (Constant et al. 1996; Jarvenpaa and Staples 2000). Since commitment is a collectivistic and principiistic motivator as discussed above, people contributing knowledge because of commitment care more for the whole community or their moral obligations and thereby pay less attention to self-benefits, especially extrinsic benefits such as reciprocity and reputation. Therefore, we postulate the following two hypotheses:

H6: Commitment negatively moderates the relationship between reciprocity and knowledge contribution intention in VCs.

H7: Commitment negatively moderates the relationship between reputation and knowledge contribution intention in VCs.

Prior literature suggests that knowledge contributors may feel that their knowledge sharing behavior will result in a loss of value and power related with the shared knowledge (Gray 2001). Such a perception acts as an obstacle to knowledge sharing (Orlikowski 1993). These studies allude to the impact of knowledge value on knowledge contribution. In a recent study, Ford and Staples (2005) found that perceived value of knowledge (the value a knowledge contributor places on his/her knowledge, abbreviated as PVK) could influence employees' reasons for knowledge sharing. They suggested that the impact of PVK on underlying enablers and barriers to knowledge sharing warranted further examination and empirical test. Indeed, PVK may play a moderating role on the relationship between enjoyment in helping others and knowledge contribution intention in VCs. For individuals whose knowledge contribution behavior is mainly motivated by enjoyment in helping others, a higher PVK means more perceived helpfulness of the knowledge to be shared and consequently greater perceived enjoyment, eventually resulting in a stronger willingness to share the knowledge. In other words, PVK has a positive moderating effect on the relationship between enjoyment in helping others and knowledge contribution intention. Thus, we hypothesize:

H8: Perceived value of knowledge positively moderates the relationship between enjoyment in helping others and knowledge contribution intention in VCs.

In addition, PVK may moderate the relationship between reciprocity and knowledge contribution intention in two ways. First, knowledge exchange in VCs may be generalized rather than dyadic and there is no expectation of direct reciprocity (Wasko and Faraj 2005). Prior studies suggest that people may be unwilling to give assistance to physically and socially distant others as they are less likely to receive support in return (Thorn and Connolly 1987). Therefore in VCs, when PVK is high, individuals may perceive that a great loss will occur if the shared knowledge is not reciprocated, leading to little likelihood that the knowledge will be shared. Second, given a high perceived value of the knowledge to be shared, the perception that reciprocity received in future may not compensate the giving could deter egoistic VC members from contributing. Hence, we hypothesize a negative moderating effect of PVK on the link between reciprocity and knowledge contribution intention.

H9: Perceived value of knowledge negatively moderates the relationship between reciprocity and knowledge contribution intention in VCs.

4. Research Design

4.1 Data Collection

To test the research model, we conducted a cross-sectional survey of VC members. A self-administered questionnaire was designed and delivered in a local university and its affiliated school. We recruited student subjects because 87.8% of the web users and 79% of the VC users had at least some college experience as indicated by the results of GVVU WWW Survey (1998) and PEW Survey (2001). Plus, students are generally extra-organizational VC participants. Since the study was not targeting a specific VC, each student was asked to choose one VC he/she was familiar with and then answer all the

questions. 500 questionnaires were distributed and a total of 363 students completed the survey. The educational profile of these respondents is fairly similar to the results of the aforementioned two surveys (see Table 1). More than 50% of them visited their chosen VCs at least every 2 days. On average, the respondents spent over an hour on each visit.

Table 1. Demographics of Respondents

Characteristics		Number	Percentage
Gender	Male	228	62.8%
	Female	135	37.2%
Age	<21	139	38.3%
	21-25	206	56.7%
	>25	18	5.0%
Education Level	High school or less	51	14.0%
	Undergraduate	238	65.6%
	Postgraduate or higher	74	20.4%

4.2 Measurement Development

In order to ensure measurement reliability in the operationalization of the constructs, all the items were adapted from previous studies, with minor modifications to fit the specific context. Prior to formal data collection, 35 VC members were invited to participate in the pilot test of the survey. Poorly worded, ambiguous questions were reworded. Questions that did not demonstrate construct validity, content validity or reliability were eliminated. All the question items were measured on a 7 point Likert type scale from strongly disagree (1) to strongly agree (7). Table 2 presents the constructs and sources.

Table 2. Constructs and Sources

Construct(Abbreviation)	Number of Items	Source
Reciprocity(RCP)	4	Kankanhalli et al. (2005)
Reputation(RPT)	2	Kankanhalli et al. (2005)
Knowledge Self-efficacy(KSE)	2	Wasko and Faraj (2005)
Enjoyment in Helping Others(EHO)	4	Kankanhalli et al. (2005)
Commitment(CMT)	5	Mowday et al. (1979)
Perceived Value of Knowledge(PVK)	5	Ford and Staples (2005)
Knowledge Contribution Intention(KCI)	3	Bock et al. (2005)

5. Data Analysis and Results

Partial Least Squares (PLS), a structural equation modeling technique regularly used in recent years, was used to examine the psychometric properties of constructs and test the hypotheses in the proposed research model. We chose PLS for two reasons. First, PLS can simultaneously assess the measurement model and the structural model. It allows researchers to analyze both how well the measures relate to each construct and how the independent variables influence the dependent variable. Second, PLS makes no a priori assumptions about the normality of the data and has a lower demand for sample size compared with covariance-based approaches like LISREL (Chin 1998).

5.1 Assessment of the Measurement Model

Convergent validity was verified by three criteria: 1) the internal consistency reliability (ICR) must exceed 0.7; 2) all items should be statistically significant with loadings of 0.7 or higher; 3) average variance extracted (AVE) should exceed the generally recognized 0.50 cut-off (Fornell and Larcker 1981). As Table 3 shows, all ICR and AVE values met the recommended threshold. All items loaded significantly on their respective constructs at the 1% level. With the exception of one item for commitment whose loading was 0.69, all indicator loadings were higher than the 0.7 benchmark.

Discriminant validity was assessed by one criterion: the square root of AVE represented as the diagonal elements in the constructs correlation matrix should be greater than the off-diagonal elements in corresponding rows and columns (Fornell and Larcker 1981). An inspection of Table 3 demonstrates that this condition was met. Overall, our measurement model exhibited sufficient convergent and discriminant validity.

Table 3. Correlation Matrix and Psychometric Properties of Key Constructs

	ICR	AVE	1	2	3	4	5	6	7
RCP	0.88	0.65	0.81						
RPT	0.93	0.88	0.44	0.94					
KSE	0.87	0.77	0.44	0.54	0.88				
EHO	0.92	0.74	0.72	0.44	0.41	0.86			
CMT	0.87	0.57	0.40	0.34	0.42	0.42	0.75		
PVK	0.87	0.58	0.24	0.18	0.32	0.37	0.46	0.76	
KCI	0.93	0.81	0.54	0.51	0.60	0.57	0.48	0.32	0.90
Notes: Bold diagonal elements are the square root of AVE for each construct Off-diagonal elements are the correlations between constructs									

5.2 Assessment of the Structural Model

Four models were tested to assess the effects of moderating variables: model 1 exclusive of interaction effects; model 2 and model 3 with the moderating effect of commitment and PVK respectively; and model 4 with all interaction effects included. In formulating and testing interaction effects, we applied a procedure described by Chin et al. (2003). We compared R^2 for model 1 and R^2 for model 2, R^2 for model 1 and R^2 for model 3, and R^2 for model 1 and R^2 for model 4 to assess the moderating effect strength of commitment, PVK, and commitment and PVK in total respectively. The overall effect sizes f^2 s for interactions were calculated from the differences in R^2 s. Small, moderate and large effects require an f^2 of 0.02, 0.15, and 0.35 respectively (Cohen 1988). Table 4 summarizes the PLS results of the four models and Figure 2 shows the results of the full model—model 4 including the moderating effects of commitment and PVK simultaneously.

Table 4. PLS Results of the Four Models

	Model 1		Model 2		Model 3		Model 4	
	β	t-value	β	t-value	β	t-value	β	t-value

H1	RCP	0.11*	2.09	0.11*	2.03	0.11*	2.00	0.12*	2.24
H2	RPT	0.13*	2.43	0.11*	2.09	0.13*	2.27	0.10*	1.98
H3	KSE	0.32***	6.15	0.33***	6.37	0.31***	6.07	0.32***	6.62
H4	EHO	0.24***	4.47	0.25***	4.58	0.26***	4.26	0.28***	4.77
H5	CMT	0.16**	3.10	0.18***	3.44	0.16**	3.10	0.18***	3.72
H6	CMT*RCP			0.10 ^{ns}	1.10			0.13 ^{ns}	1.47
H7	CMT*RPT			-0.15*	1.98			-0.18 ⁺	1.94
H8	PVK*EHO					0.17*	1.96	0.21*	2.38
H9	PVK*RCP					-0.15*	1.97	-0.18*	2.14
R ²		0.527		0.540		0.537		0.556	
f ²				0.03		0.02		0.06	

Notes: ⁺ p<0.10, * p<0.05, ** p<0.01, *** p<0.001 ^{ns} non-significant

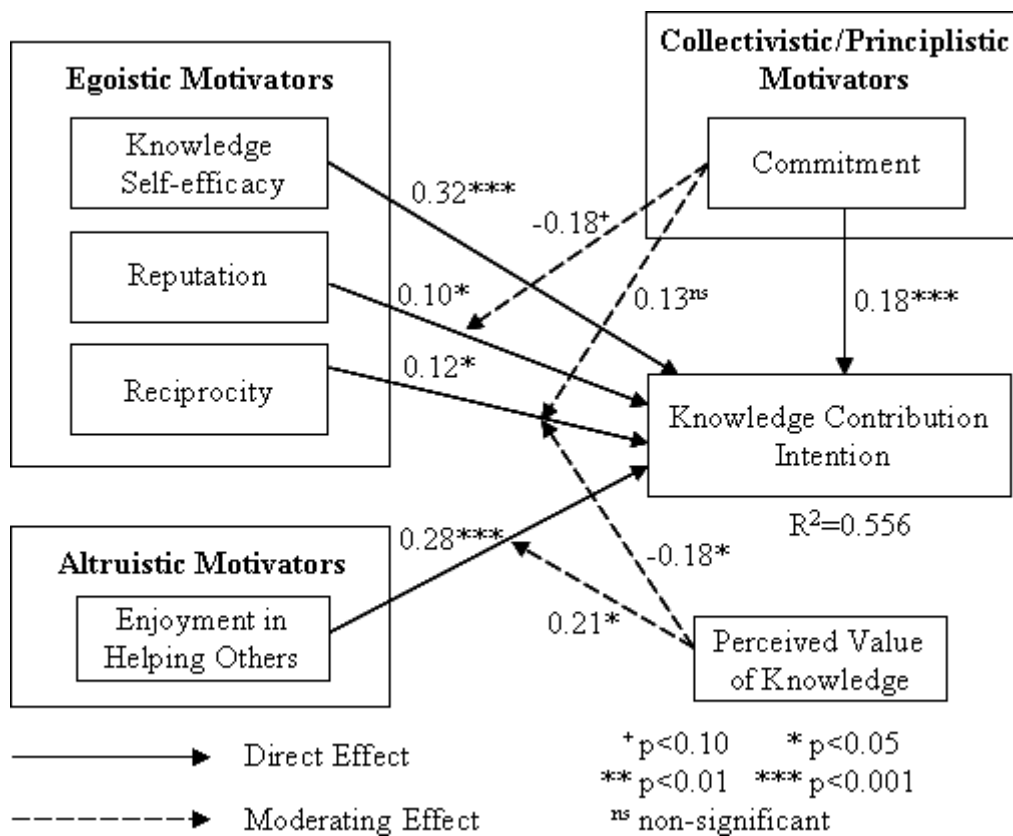


Figure 2. PLS Results of the Full Model

As shown in Table 4, all path coefficients regarding direct effects (H1, H2, H3, H4, and H5) were significant at the 1% level in all the four models. For model 1, the explained variance R² was 0.527, indicating that antecedents of knowledge contribution intention explained 52.7% of the variance. With the introduction of commitment as a moderator—model 2, R² increased to 0.540. The results were split, with support for H7 while no significant moderating effect of commitment on the relationship between reciprocity and knowledge contribution intention was found. The moderating effect of commitment had

an effect size f^2 of 0.03, a little larger than the 0.02 threshold for small effect. Model 3 including the moderating effect of PVK explained 53.7% of the variance for knowledge contribution intention, with an overall effect size f^2 of 0.02, which represents a small effect. It is important to understand that a small f^2 does not necessarily imply an unimportant effect. The moderating effect of PVK was verified, as indicated by significant path coefficients of 0.17 and -0.15 respectively. When the moderating effects of commitment and PVK were both taken into consideration—model 4, R^2 increased to 0.556 and the overall effect size f^2 was 0.06, indicating a small to moderate effect. All hypothesized interaction effects were supported except H6.

5.3 Control Variables

The three demographic characteristics (gender, age, and education level) were included as control variables in the full model and further analyzed. The results showed that none of the control variables had a significant impact on knowledge contribution intention. Neither the effects of direct and moderating factors nor the variance explained (R^2) changed significantly. Therefore, the effects of the control variables were negligible and the results of hypotheses tests (see Table 4) were innocent of covariations with control variables.

6. Discussion and Implications

The results provide qualified support for the theoretical model and most of the hypothesized relationships. Consistent with previous studies, the results indicate that reciprocity, reputation, knowledge self-efficacy, enjoyment in helping others and commitment are important motivators for users' intention to contribute knowledge in VCs. Moreover, the results suggest that VC users' knowledge contribution is motivated by a mixture of egoism, altruism, collectivism and principlism.

With respect to moderating influences, the results provide strong support for the claim that PVK plays a vital moderating role on the relationships between enjoyment in helping others, reciprocity and knowledge contribution intention in VCs. The results imply that when individuals in VCs have different estimates of the knowledge they intend to share, reasons for contributing may vary in strength. This finding confirms Ford and Staples' (2005) conjecture. Our results also provide some evidence that individuals with a strong sense of commitment have a lower demand for reputation when contributing knowledge. The expected moderating effect of commitment on the association between reciprocity and knowledge contribution intention was in the opposite direction and nonsignificant. One possible explanation is that it is often people who are receiving knowledge, rather than contributing knowledge, that are more committed to VCs (Wasko and Faraj 2005). Thus, an interesting area of future research would be examining how commitment develops in VCs to further investigate its moderating influence. These results and findings have noteworthy implications for both researchers and practitioners.

6.1 Implications for Research

To the best of our knowledge, this study is one among very few that have attempted to examine possible interaction effects in explaining knowledge contribution intention in VCs. Most previous studies on knowledge contribution in VCs focused on direct effects

and ignored moderating effects. Taking into account the moderating roles of commitment and PVK, we develop and empirically test a better conceptual model for understanding user intention to contribute knowledge in VCs. Other potential moderating variables and possible interaction effects are worthy of future research.

Another key contribution of this study is that it provides important insights into antecedents of VC users' knowledge contribution intention. More accurately, our findings indicate that in VCs, knowledge contribution intention is a synthesized consideration of egoism, altruism, collectivism and principlism. Further exploration could be conducted on the four aspects to have a holistic view of them and build a more comprehensive research model.

In addition, this study sheds some light on how possible factors may influence the quality of knowledge contribution. Our results indicate that PVK weakens the impact of reputation on knowledge contribution intention. Therefore, high-quality contribution (from the perspective of knowledge contributors) may not be motivated by pursuit of enhanced reputation. In this sense, the study would be beneficial to researchers who are trying to identify key factors underlying knowledge contribution quality.

6.2 Implications for Practice

The results of this study have several tactical implications for practitioners. First, our findings identify five salient drivers of knowledge contribution intention. Correspondingly, VC managers and designers could make the following manipulations to promote knowledge contribution:

- Develop a norm of reciprocity in the community. Managerially, it is plausible to periodically highlight cases where reciprocal help occurs in a conspicuous place such as the "reciprocity column". Technically, implementing features that support trust helps. These features include avatars, thumb-nail pictures, graphical representations, and links to personal homepages (Preece and Krichmar 2003).
- Use reputation tracking mechanisms to recognize knowledge contributors. To support this, publicly visible cues such as number of contributions, length of membership and membership status can be incorporated into the system design of VCs (Tiwana and Bush 2005).
- Notify knowledge contributors of how they have contributed to the whole community to boost their perceptions of enhanced knowledge self-efficacy. A practical example is Amazon.com which utilizes an active feedback system wherein each reviewer's comments can be rated by other readers and the top 10/100/1000 reviewers are regularly and publicly recognized (Tiwana and Bush 2001).
- Increase the level of enjoyment knowledge contributors experience when helping others by encouraging knowledge recipients to express gratitude to knowledge sharers through a person-to-person messaging/chat mechanism.
- Increase the sense of shared membership among users. This can be done by providing a clear statement of the community's purpose and encouraging

participants to check that they have a common ground (Preece 2000). Staging events (e.g., competitions) also helps reinforce VC members' sense of shared membership (Kim 2000).

Second, ways of fostering commitment and creating a critical mass of committed knowledge contributors that helps the community survive and succeed in the long run should be a major concern for VC managers. To generate a critical mass, VCs should use technologies that keep track of users' activities to identify active members. Other measures, including providing financial rewards to active contributors and establishing an identification and recognition mechanism, may also be useful.

7. Conclusion

The goal of this study is to better understand why people are willing to contribute knowledge in VCs. In addition to identifying key factors affecting knowledge contribution intention from the nature of knowledge sharing behavior, the study explores the moderating effects of commitment and PVK which have been neglected in most previous studies. The results achieved on the basis of an empirical test support most of the hypotheses and exhibit a satisfactory explanatory power. Reciprocity, reputation, knowledge self-efficacy, enjoyment in helping others and commitment are demonstrated as five motivators of four kinds (egoism, altruism, collectivism and principlism) for knowledge contribution intention in VCs and the moderating roles of commitment and PVK are substantiated. The findings provide important implications for both researchers and practitioners.

Nevertheless, at least three limitations should be noted. First, the response rate was high but the sample size (363) was relatively small. A larger sample would bring more statistical power. Second, the generalizability of our results may be limited since a majority of the respondents were university students who usually participate in extra-organizational VCs. The replication of this study in organizational contexts is necessary before the results can be generalized to other types of VCs. Third, due to resource limitations, the research was cross-sectional, attempting to predict knowledge contribution intention. In future research, this study should be extended to examine actual knowledge contribution behavior using longitudinal data. This may provide more insights into knowledge contribution in VCs as well as the relationship between behavioral intention and behavior.

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