

University of Texas Rio Grande Valley

ScholarWorks @ UTRGV

Information Systems Faculty Publications and
Presentations

Robert C. Vackar College of Business &
Entrepreneurship

2022

Gender Differences in Virtual Community Knowledge Sharing

Xuan Wang

The University of Texas Rio Grande Valley

Yaojie Li

Thomas Stafford

Hanieh Javadi Khasraghi

Follow this and additional works at: https://scholarworks.utrgv.edu/is_fac


Recommended Citation

Wang, Xuan, et al. "Gender Differences in Virtual Community Knowledge Sharing." IJKM vol.18, no.1 2022: pp.1-23. <http://doi.org/10.4018/IJKM.297610>

This Article is brought to you for free and open access by the Robert C. Vackar College of Business & Entrepreneurship at ScholarWorks @ UTRGV. It has been accepted for inclusion in Information Systems Faculty Publications and Presentations by an authorized administrator of ScholarWorks @ UTRGV. For more information, please contact justin.white@utrgv.edu, william.flores01@utrgv.edu.

Gender Differences in Virtual Community Knowledge Sharing

Xuan Wang, University of Texas Rio Grande Valley, USA

 <https://orcid.org/0000-0001-9183-3080>

Yaojie Li, Columbus State University, USA*

Thomas Stafford, Louisiana Tech University, USA

Hanieh Javadi Khasraghi, University of Delaware, USA

ABSTRACT

Over the years, Web 2.0 and Web 3.0 have promoted and prospered user-generated content, ease of use, interoperability, and virtual communities. Indeed, a growing number of online platforms and virtual communities contribute to our society and economy by maximally sharing knowledge among numerous participants. Hence, it is necessary to understand the participation-motivation of knowledge sharing in various virtual communities. Using a sample of American virtual communities of interest, this study examines a model of knowledge sharing based on social capital theory and social cognitive theory. This research echoes prior studies with similar and even stronger evidence. Also, the results suggest a significant moderating effect of gender difference on knowledge sharing in virtual communities when participants share a common language and vision.

KEYWORDS

Gender Differences, Knowledge Sharing, Social Capital, Virtual Community

INTRODUCTION

Riding the innovative wave of device interconnectivity in Web 2.0 (Hendler, 2009) and the further network-as-platform semantic web advancements of Web 3.0 (O'Reilly, 2009), modern Internet capabilities are heralding an interconnected Web of devices and capabilities, enabling fast information access spanning broad geographical areas and time zones. As part of this emerging information access revolution, one can acquire knowledge beyond traditional communication channels (such as schools, work, and social venues) through the use of virtual communities (Bagozzi & Dholakia, 2003; Teo et al., 2003). Chiu and colleagues (2006) observe that virtual communities provide numerous social interactions that can facilitate knowledge sharing, particularly for individuals who share common goals, interests, or practices. Virtual communities also facilitate organizational knowledge sharing and learning (Kankanhalli et al., 2005; Wasko & Faraj, 2000). For example, Enterprise 2.0, strategic

DOI: 10.4018/IJKM.297610

*Corresponding Author

This article published as an Open Access article distributed under the terms of the Creative Commons Attribution License (<http://creativecommons.org/licenses/by/4.0/>) which permits unrestricted use, distribution, and production in any medium, provided the author of the original work and original publication source are properly credited.

integration of Web 2.0 into company networks and business processes, provides collaboration and knowledge sharing in this manner (McAfee, 2006; 2009).

Online community activities can be oriented toward marketing, commerce, and education (Teo et al., 2003), but regardless of the thematic focus or patterns of practice in virtual communities, their viability and proliferation depend on sustained individual participation and knowledge sharing (Nov et al., 2009). It is strictly a matter of community member buy-in; without sufficient knowledge exchange arising from such buy-in motivations, communities are likely to decline (Chiu et al., 2006). For that reason, it becomes important to understand community members' motivations for sharing knowledge in their chosen virtual communities.

Transactional Virtual Communities are one prominent sort of grouping (Sun et al., 2012). In transactional communities, an exchange process takes place wherein one member compensates another with information in exchange for answers to a posted question. Other sorts of virtual communities operate for the public good, not seeking exchanges or financial incentives; these are "non-transactional" communities. One subset of non-transactional communities, Virtual Communities of Practice (Ardichvili et al., 2003), has received plentiful attention in the prior literature (see Table 7 in the Appendix). Communities of practice are groups of participants who share a concern for a specific set of problems and seek solutions to the problems through information exchange (Line et al., 2006).

There is yet another non-transactional community type that has received little attention in the literature - Virtual Community of Interest. Communities of interest are found in online social media such as Curiosity, Facebook Groups, Reddit, Yahoo! Answers, Twitter Hashtags. Virtual Communities of Interest are built on knowledge sharing related to specific topics of interest prized by significant numbers of their membership (De Valck et al., 2007), and are driven more by learning that problem solving, as in the case of communities of practice. Even so, the information search and acquisition processes are so similar across the two community types that they could be considered functionally equivalent at an anecdotal level for knowledge management purposes. Yet, the presumption that the two types of communities are largely commensurable deserves examination, hence the primary research purpose of this study is to examine the motivational factors of knowledge sharing in Virtual Communities of Interest, in order to see what differences may be there.

Knowledge Sharing in Virtual Communities

The question of why people would like to share their knowledge in virtual communities has been discussed in numerous studies (e.g., Burke et al., 2009; Butler, 2001; Chiu et al., 2006). A myriad of social and behavioral theories have been applied, and these include social capital theory (Chen & Hung, 2010; Han et al., 2020; Lin et al., 2009; Wasko & Faraj, 2005; Yoon & Wang, 2011), social exchange theory (Wasko & Faraj, 2005; Park & Gabbard, 2018; Yan et al., 2016) social cognitive theory (Hsu et al., 2007; Wang & Wei, 2011; Zhou et al, 2014), trust theory (Chang et al., 2015) and the theory of planned behavior (Hung et al., 2015; Lai et al., 2014).

These various theories have been applied to investigate the effect of motivations on knowledge sharing in virtual communities, but the disjoint nature of these theoretical approaches implies a need for integration. This study provides such an integration, while also exploring the different meanings of knowledge sharing within Virtual Communities of Interest. Through a comprehensive literature review (see Table 7 in the Appendix), we discern that a number of prior studies on this topic were largely conducted in Asian virtual communities. Aiming to increase the external validity of current models, we collect and analyze the data from American virtual communities of interest.

Intervening Factors for Investigation: Gender Differences

Gender differences have often been neglected in virtual community knowledge sharing studies. Perhaps arising from a more single-minded focus on social and behavioral frameworks, the lack of distinction between the genders in prior studies leaves several questions as yet unanswered. It could be argued, for example, that females could behave differently from males in terms of cognition, emotion, and,

subsequently, motivations for sharing knowledge, and that such differences could influence the use of virtual communities.

There is enough research in the psychology literature to support the question of the cognitive difference between the genders (Montagne et al., 2005), with some indication as regards differences in mathematical versus verbal processing between men and women (Henley, 1985; Weiss et al., 2003). Indications that a difference in spatial perception between the genders exists arising from physiological differences in brain hemispheric lateralization, related to mathematical capabilities (Putrevu, 2001; Weiss et al., 2003). The generality arising from that is that men are more responsive to message themes, while women are more engaged in detailed message elaboration. It is also noted that women engage in more ruminative thought than do men (Garnefski et al., 2003). At the same time, there are indications that strong sex-role orientations in individuals serve to actually reduce cognitive flexibility (Carter, 1985), likely arising from sex-role based generalities to which individuals might stereotypically subscribe.

There are also indications of emotional differences between the genders (Montagne et al., 2005). While the evidence is equivocal, it is acknowledged that women are significantly more likely than men to suffer from depression (Garnefski et al., 2003), while being entirely better equipped, cognitively, to deal with the effects of depression. Much of what is known about or suspected concerning gender role differences evolves from Sandra Bem's landmark set of studies on gender role perceptions (e.g., Bem 1974; 1975; 1977). As Carter (1985) notes in the context of Bem's gender perception work, it may well be a matter of institutionalized society generalizations as to what we *think* we should be doing as a member of our gender that drives our behavior as much as any aspect of the inherent difference between the sexes.

In as much as differences between men and women in terms of their usage of virtual communities might then be expected, for one reason or another, another research purpose of this paper is to analyze the intervening effect of gender differences on knowledge sharing in Virtual Communities of Interest. To that end, we consider whether gender differences could serve as statistical moderators in theoretically specified causal paths derived from social capital and social cognitive theoretical positions in terms of specific outcomes related to knowledge sharing in Virtual Communities of Practice.

The rest of this paper is organized as follows. First, the literature on motivation theories and knowledge sharing in virtual communities are reviewed. The research model and hypotheses are then developed, followed by a discussion of methodology and data analysis. The paper concludes with research limitations and implications.

THEORETICAL PERSPECTIVES

In considering aspects of motivation and self-determination for virtual community involvement, the most useful theories are those which distinguish between intrinsic and extrinsic motivations (Ryan & Deci, 2000). Intrinsic motivation is characterized here as "doing something because it is inherently interesting or enjoyable," whereas extrinsic motivation means "doing something because it leads to a separable outcome" (Ryan & Deci, 2000). Intrinsic motivation, per Lindenberg (2001), involves two essential components: enjoyment (i.e., fun) and obligation (caring for a community, for example). Extrinsic motivation can be understood from three perspectives: immediate payoffs such as earning money and delayed payoffs which might arise from skill-building activities and social motivations that typically arise from the social network process (Kaufmann et al., 2001). These motivation mechanisms have been applied in studies of virtual communities (e.g., Lakhani & Wolf, 2003), and a range of theories have been applied to model the process. These include social cognitive theory, social exchange theory, social capital theory, and expectancy theory.

Social cognitive theory has been a popular lens through which to examine individuals' knowledge sharing behaviors (Compeau & Higgins, 1995a). In social cognitive theory, contextual and personal factors are considered to interact with information acquisition and individual behaviors (Wood &

Bandura, 1989). In this view, people share when they feel enabled to share, related to the popular self-efficacy construct.

Social exchange theory stresses that interaction is essential to knowledge sharing and acquisition (Anderson et al., 1999) via a mechanism that is driven by an exchange-like reciprocity effect whereby individuals share with those who share with them (Hall, 2001). By contrast, social capital theory considers the beneficial effects of social resources found in a relational network (Nahapiet & Ghoshal, 1998). Chiu and colleagues model knowledge sharing based on structural, relational, and cognitive dimensions of social capital (Chiu et al., 2006), while the Chen et al. model (Chen et al., 2010) and Hun developed explores knowledge sharing from contextual and personal perspectives. A fundamental proposition of social capital theory is that network ties provide access to resources (Nahapiet & Ghoshal, 1998), and of the resources that can be leveraged, the resources involved with knowledge sharing in organizations are exemplary (Chiu et al., 2006; Tsai & Gholshal, 1998).

Other researchers have used expectancy-value theory to explain individuals' knowledge-sharing behavior (Sun et al., 2012). Expectancy-value theory suggests that an individual's actions are related to his/her expectation of achieving specific outcomes related to the target behavior (Sun et al., 2012).

For the theoretical perspective of this paper, we examine knowledge sharing from two groups of constructs derived from social capital and social cognitive theories: 1) contextual factors – trust, reciprocity, identification, shared language, and shared vision; 2) expectancy factors – personal and community-relevant outcomes to understand individuals' knowledge sharing behavior in Virtual Communities of Interest. These factors and their related hypotheses are discussed below.

Trust

There are numerous definitions of trust in organizational and IS studies, but Mayer's work is emblematic. Mayer and David (1995) define Trust as:

The willingness of a party to be vulnerable to the actions of another party based on the expectation that the other will perform a particular action important to the trustor, irrespective of the ability to monitor or control that other party.

The salient role of trust in knowledge sharing is well articulated in the literature. Pertinent focal contexts include IS group performance (e.g., Nelson & Cooprider, 1996), marketing (e.g., Geyskens et al., 1998), organizational value creation (e.g., Uslander, 2000), online transactions (e.g., Chang et al., 2005), and information technology artefacts (Vance et al., 2008). In organizational studies, trust has been identified in two dimensions: 1) a business view based on confidence or risk in the predictability of one's expectations, and 2) a personal view based on confidence in another's goodwill (Smeltzer, 1997). Nahapiet and Ghoshal (1998) suggest that trust can significantly impact one's willingness to engage in cooperative interactions such as knowledge sharing, whereas Chiu et al. (2006) found that trust has a positive influence on individual knowledge sharing in professional virtual communities.

To that end, trust is essential for effective knowledge sharing (Chen & Hung, 2010; Nonaka, 1994). At the center, trust connotes a belief that other parties will not take advantage of one during an exchange transaction (Gefen et al., 2015). In the absence of formal rules or policies to govern exchange, trust becomes an efficient and informal alternative. Many studies have examined the beneficial effects of trust on knowledge sharing in virtual communities (Butler & Cantrell, 1994; Ridings et al., 2002). Given this, we expect that:

H1a-b: Trust is positively associated with a) quality of knowledge sharing and b) quantity of knowledge sharing in Virtual Communities of Interest.

Reciprocity

A critical motivation for knowledge-sharing in virtual communities is the norm of reciprocity; this aspect of social influence speaks to people sharing their knowledge on the expectation that they will receive similar benefits from others (Chen & Hung, 2010). Researchers believe that balanced reciprocity is likely to transpire within a community as a whole, which is considered a generalized exchange (Ekeh, 1974), and that the trust-based reciprocity that arises from such is likely to lead to knowledge sharing (Davenport & Prusak, 1998).

In a sample of three Usenet newsgroups, Wasko and Faraj (2000) found that people share their knowledge in an online community because of the felt moral obligation of the individual member to the group. In a study of tourism virtual communities, Wang and Fesenmaier (2004) found that the reciprocity effect was an essential driver of individual contributions to the community. Lin (2007) also found a significant association between reciprocal benefits and employee attitudes about and intentions to engage in the sharing of knowledge. Fehr and Gächter (2000) found a similar effect with reciprocity, which they differentiated from altruism. Taken together, the findings in the literature indicative of reciprocity encouraging knowledge sharing in virtual communities suggest:

H2a-b: Reciprocity is positively associated with a) quality of knowledge sharing and b) quantity of knowledge sharing in Virtual Communities of Interest.

Identification

Identification is a concept that refers to self-image. Bagozzi and Dholakia (2002) found that identification with the group has a significant effect on individual participation in virtual communities, whereas Hogg and Abrams (1988) also found that identification with the group can be a motivational factor for engagement in virtual communities. This suggests that:

H3a-b: Identification with the group is positively associated with a) quality of knowledge sharing and b) quantity of knowledge sharing in the group.

Shared Language and Shared Vision

Shared language addresses the use of in-group acronyms, linguistic subtleties shared among members, and underlying assumptions about terminology and definitions that are staples of day-to-day in-group interactions (Lesser & Storck, 2001). Shared terms and codes promote the buy-in of individual group members to the larger group to which they belong, leading to a clearer understanding of shared goals within the group (Tsai & Ghoshal, 1998). Shared Vision in the group, in like manner, has to do with the understanding of and dedication to collective goals and aspirations of a group's membership (Tsai & Ghoshal, 1998); when visions are shared, knowledge is as well. In that sense:

H4a-b: Shared language is positively associated with a) quality of knowledge sharing and b) quantity of knowledge sharing in Virtual Communities of Interest.

H5a-b: Shared vision is positively associated with a) quality of knowledge sharing and b) quantity of knowledge sharing in Virtual Communities of Interest.

Personal and Community Outcome Expectations

According to social capital theory, outcome expectations relate to the expected consequences of behaviors (Bandura, 1997), with positive outcome expectations leading to participation incentives. Contribution to knowledge sharing in communities have been found in previous research (Bock &

Kim, 2001), and it is known that members of virtual communities share knowledge for a variety of reasons (Wasko & Faraj, 2000) such as personal interests (outcome expectations of joy, fun or satisfaction), or even for the generalized benefit of the community of membership (virtual community growth and prosperity). The enjoyment found in helping others in the workplace has also been found to be associated with employee intentions to share knowledge (Lin, 2007). In that sense, community member outcome expectations can be represented in two broad aspects: personal outcome expectations and community outcome expectations (Hsu et al., 2007).

Career opportunities are another personal outcome expectation that has been discussed as a motivational factor for participation and knowledge sharing in virtual communities; the LinkedIn social media experience is exemplary, and a frequently cited reasons for participation in virtual communities is the likelihood of career enhancement (Lakhani & von Hippel, 2003). Social capital research also suggests that collective action, such as those that might be found in virtual groups, can be fostered by instrumental motivations of which career advancement is exemplary (Lin et al., 1981). For these reasons, we expect that:

H6a-b: Personal outcome expectations are positively associated with a) quality of knowledge sharing and b) quantity of knowledge sharing in Virtual Communities of Interest.

Community outcome expectations could be illustrated in two aspects. One aspect reflects the value of sharing knowledge in virtual communities. For example, one may consider the benefits they could gain from the community. Another aspect is perceived compatibility. Gerrard and Cunningham (2003) defined compatibility in a knowledge-sharing context as the degree to which an innovation is perceived as consistent with existing group values, previous experiences, and existing values. Perceived compatibility as a general concept indicates whether a virtual community can provide benefits that also fit individual needs. Studies on virtual communities have demonstrated a significant effect of perceived compatibility on individuals' motivation for knowledge sharing (e.g., Bock & Kim, 2001; Chiu et al., 2006; Hsu et al., 2007; Wasko & Faraj, 2000). Hence, we suggest that:

H7a-b: Community outcome expectations are positively associated with a) quality of knowledge sharing and b) quantity of knowledge sharing in Virtual Communities of Interest.

Moderating Effects of Gender Differences

The factors which can influence the strength or direction of key motivational effects on knowledge sharing outcomes have attracted the attention of researchers who investigate online communities (Nov et al., 2009, Sun et al. 2012). Results of such studies suggest that motivation models would be improved with the addition of key moderators. In view of the fact, prior studies on knowledge sharing in virtual community contexts suggest that trust and reciprocity effects in knowledge sharing models vary by gender (Chai et al., 2011; Porter et al., 2012). We notice that gender differences can affect member perceptions of the quality of virtual communities as well as their subsequent knowledge-sharing tendencies within the community (Gefen & Ridings, 2005; Liu et al., 2006). Adopting a holistic view, we investigate how gender differences moderate the paths between motivational factors and knowledge sharing in Virtual Communities of Practice:

H8a-b: Gender differences moderate the relationship between trust, reciprocity, identification, shared language, shared vision, personal-outcome expectations, community-outcome expectations, and knowledge sharing in Virtual Communities of Interest, respectively, in the cases of a) quality of knowledge sharing, and b) quantity of knowledge sharing. Based on the theoretical background and the hypotheses discussed above, this study formulates a research model that suggests seven primary links and seven moderating links for gender differences, aiming at an in-depth

understanding of the motivational mechanism of sharing knowledge in Virtual Communities of Interest (see Figure 1).

RESEARCH METHODOLOGY

Setting and Participants

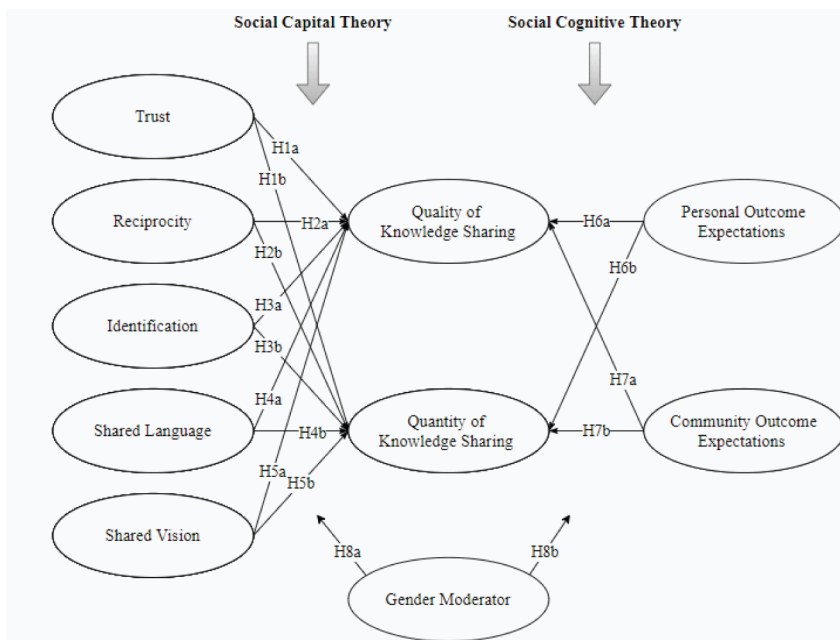
Data were collected through a field survey from three large public universities in the U.S. Since virtual community use is quite prevalent among college students (Wachter et al., 2000), this sample fits our goal to examine the motivations of knowledge sharing in Virtual Communities of Interest. Moreover, it is well established that the homogeneity of variance benefits from using student samples are quite beneficial in an early test of theoretical models (Calder et al., 1981). The participants were a mixture of undergraduate and graduate students (64% male, 36% female) who participated in exchange for extra course credit. We received a total of 330 responses, of which 292 valid responses remained after data cleaning.

Measurement Development

The measurement items were adapted from key studies in our literature review (see Table 6 in the Appendix for a map of measures to studies). Preliminary analysis was undertaken to assess basic psychometric properties and the most reliable measures were then retained for fitting the hypothesized model. In this study, the dependent variable – knowledge sharing – is measured in terms of quantity and quality.

The quality of knowledge sharing was indicated by three measures, whereas the quantity of knowledge sharing was measured by an assessment of the frequency of participation in the knowledge sharing process (operationalized as the number of times knowledge was shared by a participant in a virtual community, per month). The average level of knowledge-sharing was assessed with a five-point ordinal scale: 1) no participation (no sharing in a week), 2) not often (once a week), 3) somewhat

Figure 1. Proposed research model



often (twice or three times in a week), 4) often (four to six times in a week) and 5) very often (thirty times or more in a month). As shown in Table 1, the correlation between variables is presented.

Exploratory Factor Analysis

An exploratory factor analysis was conducted to explore the factor structure of constructs to reduce cross-loading items. Principal component analysis with varimax rotation was used to identify variables highly associated with the constructs in the model. Through the exploratory factor analysis, we identified 37 items characterized by factor loadings above a threshold of 0.6. In the process, it was decided that the construct *personal outcome expectations* should be converted into a second-order construct with two dimensions – *enjoyment* and *achievement* (with 3 items for each first-order construct).

Table 2 illustrates an excessive degree of consistency among the items under each factor with their respective factor loadings. After exploratory analysis and revision, 30 measurement items remained for use in the study, and factor scores from the analysis were retained for hypothesis testing models. The exogenous constructs include Trust, Reciprocity, Identification, Shared Language, Shared Vision, Personal Outcome Expectations, and Community-Outcome Expectations. Endogenous constructs include Quantity of Knowledge Sharing and Quality of Knowledge Sharing.

DATA ANALYSIS

Partial least squares (PLS) structural equation modeling was used to test a path model of hypothesized effects related to metric measurement items indicating Quality of Knowledge Sharing and Quantity of Knowledge Sharing. PLS is considered to be an appropriate method when prediction and theory development are primary research objectives and when the model is relatively complex (Hair et al., 2016). Following Hair et al’s (2016) and Ringle and Sarstedt’s (2015) guidance, a standard bootstrap resampling procedure was conducted to examine the path significances, using a two-tailed t-test.

Table 1. Correlation matrix

	ENJ	ACH	TR	REC	ID	SV	SL	POE	COE
Enjoyment (ENJ)	1.000								
Achievement (ACH)	0.000	1.000							
Trust (TR)	- 0.080	0.243	1.000						
Reciprocity (REC)	0.019	0.093	0.000	1.000					
Identification (ID)	0.426	0.244	0.000	0.000	1.000				
Shared vision (SV)	0.067	0.310	0.000	0.000	0.000	1.000			
Shared language (SL)	0.149	0.049	0.000	0.000	0.000	0.000	1.000		
Personal Outcome (POE)	-0.666	0.646	0.000	0.000	0.000	0.000	0.000	1.000	
Community Outcome (COE)	0.457	0.489	0.000	0.000	0.000	0.000	0.000	0.000	1.000

Table 2. Finalized indicator loadings

	Component				
	1	2	3	4	5
Enjoyment	0.818	0.926	0.917		
Achievement	0.699	0.862	0.867		
Trust	0.758	0.761	0.826	0.853	0.801
Reciprocity	0.659	0.659			
Identification	0.767	0.789	0.724	0.714	
Personal Outcome	-0.660	0.651			
Community Outcome	0.821	0.843	0.805	0.807	
Shared Language	0.775	0.707	0.597		
Shared Vision	0.573	0.639	0.599		
Knowledge Quality	0.723	0.712	0.734		

Reliability and Validity

Reliability and validity are a primary focus in any study employing structural equation modeling (Hair et al., 2013). According to Nunnally (1967), 0.6 is used as a threshold to ensure that results are reasonably free of measurement error and thus reliable. To that end, construct reliability scores across the study exceed 0.7. We also assessed reliability as part of investigating the trait validity features of convergence and discrimination in our construct validation process (Boudreau et al., 2001). Table 3 shows that the model fits the data, with construct composite reliability scores as well as Cronbach alphas scores for scales all greater than 0.8. The average variances extracted values are also higher than the square of correlations among constructs.

RESULTS

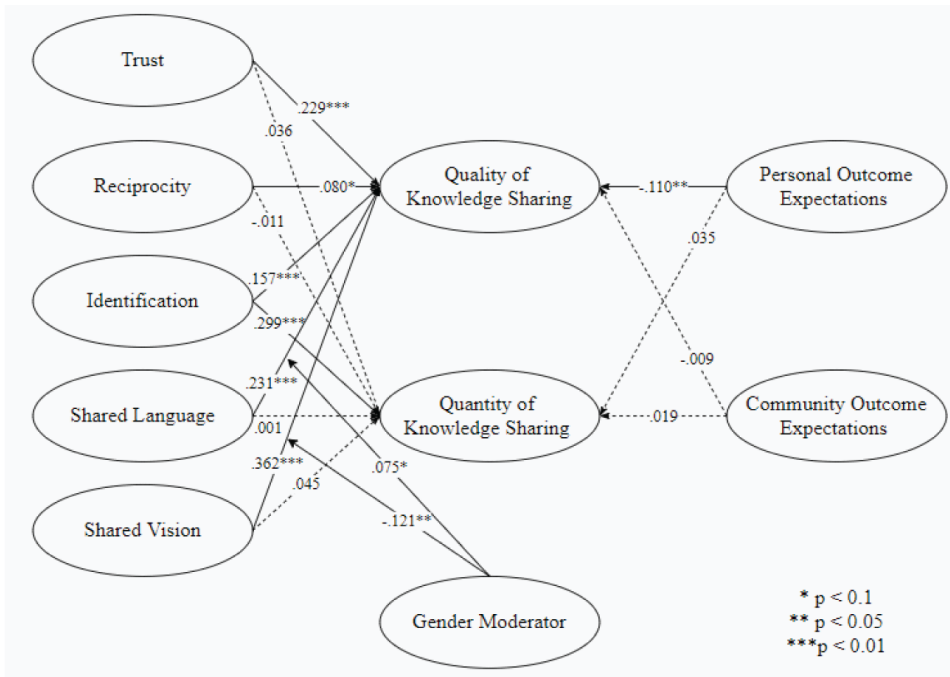
Hypothesis testing results for key variables are demonstrated in Figure 2, the final PLS model with all significant (unbroken path line) and non-significant paths (dashed path lines) indicated.

In regard to hypotheses predicting Quality of Knowledge Sharing, significant effects, supportive of hypothesized expectations, are found for Trust (H1a), Norm of Reciprocity

Table 3. Reliability and validity for constructs

Component	Composite Reliability	Cronbach's Alpha	AVE
Trust	0.947	0.930	0.782
Reciprocity	0.949	0.893	0.903
Identification	0.953	0.934	0.834
Shared Language	0.915	0.859	0.781
Shared Vision	0.947	0.916	0.856
Community Outcome	0.932	0.903	0.774
Knowledge Quality	0.960	0.937	0.888

Figure 2. Model as tested



(H2a), Identification (H3a), Shared Language (H4a), Shared Vision (H5a), and Personal Outcome Expectations (H6a), as regards their significant positive relationship with Quality of Knowledge Sharing engaged in by respondents. In contrast, significant effects were not found for Community Outcome (H7a) only.

Significant effects, supportive of the hypothesized expectations, are found for Identification (H3b), as regards their significant relationship with the quantity of knowledge sharing undertaken by respondents. Nonsignificant effects were found for Trust (H1b), Reciprocity (H2b), Shared Language (H4b), Shared Vision (H5b) in their impact upon Quantity of Knowledge Sharing. Likewise, a nonsignificant effect was found for Community Outcome (H8b), while a partially significant effect appeared for Personal Outcome (H7b) in the model without the gender moderator (see Table 4).

Table 4. Results of the model testing without the gender moderator

	Quality of Knowledge Sharing		Quantity of Knowledge Sharing	
	Coefficient	P-value	Coefficient	P-value
Trust	0.220	<0.001	-0.015	0.400
Reciprocity	0.090	0.060	-0.056	0.165
Identification	0.114	0.024	0.255	< 0.001
Shared Language	0.204	<0.001	-0.007	0.453
Shared Vision	0.436	<0.001	-0.052	0.185
Personal Outcome	0.112	0.026	0.075	0.099
Community Outcome	-0.018	0.380	0.005	0.465

The proposed moderating effects of gender differences (H8a-b) were explored with their likely moderation effects in all variable relationships with a) Quality of Knowledge Sharing and b) Quantity of Knowledge Sharing. As shown in Table 5, the results of the moderator testing are limited but illuminating.

As for moderator effects for the Quality of Knowledge Sharing outcome, two significant interactions presented themselves: Gender by Shared Language and Gender by Shared Vision. Our interpretation is that men are more likely to tend to share high-quality knowledge if they have aspects of shared language with others in the community. This might well be taken to mean a similarity effect, in terms of expressiveness. Women are more inclined to share high-quality knowledge with those whom they see as similar in values, as indicated by the shared vision interaction, when they perceived the same value, vision, and goals with other members. To generalize, men tend to want to share with someone who speaks their language, while women share with people who see things the same way that they do.

DISCUSSION AND IMPLICATIONS

Key Findings

There are a couple of interesting findings in this study. First, individuals' knowledge sharing behavior is positively associated with their perception of virtual communities. This study supports that relational and cognitive social capital has a significant positive effect on individuals' quality of knowledge sharing. Also, personal outcome expectations are positively associated with the quality of knowledge sharing. In terms of quantity of knowledge sharing, we find the significant influence of identification and personal outcome expectations. The research results further support the moderating

Table 5. Results of hypothesis test with the gender moderator

Construct	Quality of Knowledge Sharing		Quantity of Knowledge Sharing	
	Coefficient	P-value	Coefficient	P-value
Trust	0.229	< 0.001	0.036	0.270
Reciprocity	0.080	0.082	-0.011	0.427
Identification	0.157	0.003	0.299	< 0.001
Shared Language	0.231	< 0.001	0.001	0.494
Shared Vision	0.362	< 0.001	0.045	0.220
Personal Outcome	0.110	0.028	0.035	0.271
Community Outcome	- 0.009	0.438	0.019	0.371
Gender * Trust	0.038	0.254	-0.033	0.284
Gender * Reciprocity	0.018	0.377	0.061	0.146
Gender * Identification	-0.015	0.401	-0.007	0.451
Gender * Shared Language	0.075	0.098	-0.022	0.353
Gender * Shared Vision	-0.121	0.018	-0.108	0.030
Gender * Personal Outcome	0.016	0.394	-0.075	0.099
Gender * Community Outcome	0.031	0.300	0.008	0.445

effects of gender differences on the quality of knowledge sharing when members perceive shared language and vision.

The story of the cognitive dimension of social capital (i.e., shared language and shared vision) seems different from that of the relational dimension discussed above. We notice that shared language and shared vision have a significant positive effect on quality rather than quantity of knowledge sharing. In that sense, members tend to focus more on knowledge quality than knowledge quantity. It occurs when their sharing motivations rely more on “thinking about” sharing a common language, narratives, and values with others than perceived relationships with others, such as trust, reciprocity, and identification. To illustrate, one would share his or her knowledge (even low quality) with community members because he or she feels a sense of belonging toward the community (identification), believe other members in the community (trust), or just feel it is fair to share something with others who used to help him or her (reciprocity). In contrast, “thinking” people would deliberate and share “meaningful” knowledge with others whom they believe can understand them. In other words, one would share his or her knowledge (i.e., quality) with another who can understand it, due to shared language and shared vision. Still, one would talk (i.e., quantity) to another who cannot understand his or her content, due to social relationships.

It is worthwhile to note that community outcome expectations have an insignificant effect on both the quality and quantity of knowledge sharing. The results are contrary to previous findings (e.g., Chiu et al., 2006) that community outcome expectations have a significant positive impact on both the quantity and quality of knowledge sharing. It makes sense that Chiu and his colleagues used a sample of participants from a professional community, i.e., VCoP, while our sample came from a virtual community of interest, i.e., VCoI. It can be further confirmed that they did not find significant relationships between personal outcome expectations and knowledge sharing, but we did, in both quality and quantity of knowledge sharing. Without a distinction between VCoP and VCoI (i.e., including subjects from VCoI and VCoP), Hsu et al. (2007) obtained similar results to ours – personal outcome expectations promote knowledge sharing, while community outcome expectations do not.

Indeed, for VCoI members, personal enjoyment and achievement are often weighted more critical than community development. Professional community members would be concerned more with their communities because there is a limited number of VCoP serving professional groups, compared with a large number of VCoI serving general users. Norm of Reciprocity indicates that members believe they can receive benefits from others if they contribute to virtual communities. It shows that in our study, reciprocity can promote the quality of knowledge sharing, not the quantity in VCoI. One can assume that, compared with lurkers, these grateful users would place a higher priority on quality over quantity. In terms of identification, again, we find its significant relationship with both quantity and quality of knowledge sharing. Apparently, members feel a sense of belonging toward the virtual community would like to share his or her knowledge with others.

Limitations

First, the study’s sample is limited to 292 students whose age ranges from 19 to 27, which could constitute a concern of the current research. The findings may not be generalizable to various members of virtual communities. For instance, senior citizens or teenagers can behave differently from adults. It can be argued, however, the student sample that we used can better represent the population of VCoI than VCoP. Millennials and Zoomers were “born and raised” in the Internet age, actively and ardently participating in various virtual community activities.

Implications

The implications of this study can be two-dimensional. First, there is a lack of research distinction between virtual communities of practice (i.e., professional virtual communities) and virtual communities of interest, while we stress the equal importance of virtual communities of interest and cast doubts if prior applied theories could extend in the communities constituted by general knowledge

users and contributors. In the lens of social capital theory and social cognitive theory, indeed we find a distinct difference between VCoP and VCoI. Following the social cognitive theory, Chiu and colleagues (2006) found community-related expectations are positively related to both quantity and quality of knowledge sharing in VCoP, whereas we obtained the reversed results in VCoI – personal outcome expectations positively associate with quantity and quality of knowledge sharing. Another example, structural social capital – social interaction has been excluded in our early EFA due to the multicollinearity issue. The divergent results appeared in prior studies as well: Chiu and colleagues (2006) found social interaction ties are associated with the quantity of knowledge sharing, whereas Chang and Chung (2011) found social interaction tiers are related to the quality of knowledge sharing.

In addition to the subject distinction (VCoP vs. VCoI members), we propose an impact of gender differences on knowledge sharing motivation-process. Contrary to common expectations, our results imply that females could assume more visionary roles and responsibilities in virtual communities as they are more willing to share knowledge with others with the same goals, values, and vision. Our study also reveals that males become language-sensitive in virtual communities since their knowledge quality is high when they perceive that other members share common terms, jargon, and narratives.

The practical implications of this study are evident in promoting the quality and quantity of knowledge sharing in VCoI. Like in VCoP, building relational and cognitive social capital is essential to promoting the quantity and quality of knowledge sharing. To ensure the quality of knowledge, shared vision, and shared language could be more efficient than relational social capital (i.e., higher coefficients). To illustrate, “managers” of VCoI may consider leveraging common culture, value, goal, language, and narratives while restricting and removing irrelevant or “incompatible” users and posts. However, the downside of exaggerating “culture, value, and goal” may curtail the quantity of knowledge sharing. In a sense, relational social capital should be accumulated to maintain individuals’ motivation to contribute to knowledge sharing, continually. Since personal outcome expectations outperform community outcome expectations in promoting sharing knowledge in VCoI, personal enjoyment and achievement should be maintained and developed. Website and forum design, user ranking system, “incentive” system, for instance, could help increase individuals’ outcome expectations and willingness to contribute to communities.

CONCLUSION

Prior studies proposed various factors driving participants to share knowledge with others in virtual communities. A variety of theoretical constructs have thus been developed to measure individuals’ motivations for knowledge sharing. Following social capital and social cognitive theories, we adapted items from a significant number of prior studies, while designing questionnaires that oriented toward virtual communities of interest. The results show that relational and cognitive social capital, personal outcome expectations have a significant positive effect on the quantity or quality of knowledge sharing. Also, gender differences moderate the impact of “shared language” and “shared vision” on knowledge sharing in virtual communities of interest. It shows that females would like to share knowledge when they perceive shared goals, values, and vision with other members, whereas males are more willing to share knowledge when they perceive shared language with others.

FUNDING AGENCY

Publisher has waived the Open Access publishing fee.

REFERENCES

- Abrams, D., & Hogg, M. A. (2006). *Social identifications: A social psychology of intergroup relations and group processes*. Routledge. doi:10.4324/9780203135457
- Anderson, J. C., & Gerbing, D. W. (1988). Structural equation modeling in practice: A review and recommended two-step approach. *Psychological Bulletin*, 103(3), 411–423. doi:10.1037/0033-2909.103.3.411
- Anderson, W. T., Challagalla, G. N., & McFarland, R. G. (1999). Anatomy of exchange. *Journal of Marketing Theory and Practice*, 7(4), 8–19. doi:10.1080/10696679.1999.11501847
- Ardichvili, A., Page, V., & Wentling, T. (2003). Motivation and barriers to participation in virtual knowledge-sharing communities of practice. *Journal of Knowledge Management*, 7(1), 64–77. doi:10.1108/13673270310463626
- Bagozzi, R. P., & Dholakia, U. M. (2002). Intentional social action in virtual communities. *Journal of Interactive Marketing*, 16(2), 2–10. doi:10.1002/dir.10006
- Bandura, A. (1995). *Self-efficacy in changing societies*. Cambridge University Press. doi:10.1017/CBO9780511527692
- Beach, L. R., & Mitchell, T. R. (1990). Image theory—a behavioral-theory of decision-making in organizations. *Research in Organizational Behavior*, 12, 1–41.
- Bem, S. L. (1974). The measurement of psychological androgyny. *Journal of Consulting and Clinical Psychology*, 42(2), 155–162. doi:10.1037/h0036215 PMID:4823550
- Bem, S. L. (1977). On the utility of alternative procedures for assessing psychological androgyny. *Journal of Personality and Social Psychology*, 35, 196–205. PMID:850004
- Bem, S. L., & Lewis, S. A. (1975). Sex-role adaptability: One consequence of psychological androgyny. *Journal of Personality and Social Psychology*, 31(4), 634–643. doi:10.1037/h0077098
- Bock, G. W., & Kim, Y. G. (2002). Breaking the myths of rewards: An exploratory study of attitudes about knowledge sharing. *Information Resources Management Journal*, 15(2), 14–21. doi:10.4018/irmj.2002040102
- Boudreau, M. C., Gefen, D., & Straub, D. W. (2001). Validation in information systems research: A state-of-the-art assessment. *Management Information Systems Quarterly*, 25(1), 1–16. doi:10.2307/3250956
- Bouffard-Bouchard, T. (1990). Influence of self-efficacy on performance in a cognitive task. *The Journal of Social Psychology*, 130(3), 353–363. doi:10.1080/00224545.1990.9924591
- Burke, M., Marlow, C., & Lento, T. (2009). Feed me: Motivating newcomer contribution in social network sites. In *Proceedings of the SIGCHI Conference on Human Factors in Computing Systems*. New York: ACM. doi:10.1145/1518701.1518847
- Butler, B. S. (2001). Membership size, communication activity, and sustainability: A resource-based model of online social structures. *Information Systems Research*, 12(4), 346–362. doi:10.1287/isre.12.4.346.9703
- Butler, J. K. Jr., & Cantrell, R. S. (1994). Communication factors and trust: An exploratory study. *Psychological Reports*, 74(1), 33–40. doi:10.2466/pr0.1994.74.1.33
- Calder, B. J., Phillips, L. W., & Tybout, A. M. (1981). Designing research for application. *The Journal of Consumer Research*, 8(2), 197–207. doi:10.1086/208856
- Carter, D. B. (1985). Relationships between cognitive flexibility and sex-role orientation in young adults. *Psychological Reports*, 57(3), 763–766. doi:10.2466/pr0.1985.57.3.763
- Chai, S., Das, S., & Rao, H. R. (2011). Factors affecting bloggers' knowledge sharing: An investigation across gender. *Journal of Management Information Systems*, 28(3), 309–342. doi:10.2753/MIS0742-1222280309
- Chang, C. M., Hsu, M. H., & Lee, Y. J. (2015). Factors influencing knowledge-sharing behavior in virtual communities: A longitudinal investigation. *Information Systems Management*, 32(4), 331–340. doi:10.1080/10580530.2015.1080002

- Chang, M. K., Cheung, W., & Lai, V. S. (2005). Literature derived reference models for the adoption of online shopping. *Information & Management*, 42(4), 543–559. doi:10.1016/S0378-7206(04)00051-5
- Chen, C. J., & Hung, S. W. (2010). To give or to receive? Factors influencing members' knowledge sharing and community promotion in professional virtual communities. *Information & Management*, 47(4), 226–236. doi:10.1016/j.im.2010.03.001
- Chiu, C. M., Hsu, M. H., & Wang, E. T. (2006). Understanding knowledge sharing in virtual communities: An integration of social capital and social cognitive theories. *Decision Support Systems*, 42(3), 1872–1888. doi:10.1016/j.dss.2006.04.001
- Compeau, D. R., & Higgins, C. A. (1995). Application of social cognitive theory to training for computer skills. *Information Systems Research*, 6(2), 118–143. doi:10.1287/isre.6.2.118
- Compeau, D. R., & Higgins, C. A. (1995). Computer self-efficacy: Development of a measure and initial test. *Management Information Systems Quarterly*, 19(2), 189–211. doi:10.2307/249688
- Davenport, T. H., & Prusak, L. (1998). *Working knowledge: How organizations manage what they know*. Harvard Business Press.
- De Valck, K., Langerak, F., Verhoef, P. C., & Verlegh, P. W. (2007). Satisfaction with virtual communities of interest: Effect on members' visit frequency. *British Journal of Management*, 18(3), 241–256. doi:10.1111/j.1467-8551.2006.00499.x
- Dube, L., Bourhis, A., & Jacob, R. (2006). Towards a typology of virtual communities of practice. *Interdisciplinary Journal of Information, Knowledge and Management*, 1, 69–93.
- Easley, R. F., Devaraj, S., & Crant, J. M. (2003). Relating collaborative technology use to teamwork quality and performance: An empirical analysis. *Journal of Management Information Systems*, 19(4), 247–265. doi:10.1080/07421222.2003.11045747
- Ekeh, P. (1974). *Social exchange theory. The two traditions*. Harvard University Press.
- Fehr, E., & Gächter, S. (2000). Fairness and retaliation: The economics of reciprocity. *The Journal of Economic Perspectives*, 14(3), 159–181. doi:10.1257/jep.14.3.159
- Garnefski, N., Teerds, J., Kraaij, V., Legerstee, J., & van den Kommer, T. (2003). Cognitive emotion regulation strategies and depressive symptoms: Differences between males and females. *Personality and Individual Differences*, 36(2), 267–276. doi:10.1016/S0191-8869(03)00083-7
- Gefen, D., Karahanna, E., & Straub, D. W. (2003). Trust and TAM in online shopping: An integrated model. *Management Information Systems Quarterly*, 27(1), 51–90. doi:10.2307/30036519
- Gefen, D., & Ridings, C. M. (2005). If you spoke as she does, sir, instead of the way you do: A sociolinguistics perspective of gender differences in virtual communities. *The Data Base for Advances in Information Systems*, 36(2), 78–92. doi:10.1145/1066149.1066156
- Gerrard, P., & Cunningham, J. B. (2003). The diffusion of internet banking among Singapore consumers. *International Journal of Bank Marketing*, 21(1), 16–28. doi:10.1108/02652320310457776
- Geyskens, I., Steenkamp, J. B., & Kumar, N. (1998). Generalizations about trust in marketing channel relationships using meta-analysis. *International Journal of Research in Marketing*, 15(3), 223–248. doi:10.1016/S0167-8116(98)00002-0
- Gmür, M. (2006). The gendered stereotype of the 'good manager' sex-role expectations towards male and female managers. *Management Review*, 17(2), 104–121.
- Hair, J. F., Black, W. C., Babin, B. J., & Anderson, R. E. (2013). *Multivariate data analysis* (7th ed.). Pearson.
- Hair, J. F. Jr, Hult, G. T. M., Ringle, C., & Sarstedt, M. (2016). *A primer on partial least squares structural equation modeling (PLS-SEM)*. Sage Publications.
- Hall, H. (2001). *Social exchange for knowledge exchange. Managing Knowledge: Conversations and Critiques*. University of Leicester Management Centre.

- Han, S. H., Yoon, S. W., & Chae, C. (2020). Building social capital and learning relationships through knowledge sharing: A social network approach of management students' cases. *Journal of Knowledge Management*, 24(4), 921–939. doi:10.1108/JKM-11-2019-0641
- Hendler, J. (2009). Web 3.0 emerging. *Computer*, 42(1), 111–113. doi:10.1109/MC.2009.30
- Henley, H. (1985). Psychology and gender. *Signs (Chicago, Ill.)*, 11(1), 101–119. doi:10.1086/494202
- Hsu, M. H., & Chiu, C. M. (2004). Internet self-efficacy and electronic service acceptance. *Decision Support Systems*, 38(3), 369–381. doi:10.1016/j.dss.2003.08.001
- Hsu, M. H., Ju, T. L., Yen, C. H., & Chang, C. M. (2007). Knowledge sharing behavior in virtual communities: The relationship between trust, self-efficacy, and outcome expectations. *International Journal of Human-Computer Studies*, 65(2), 153–169. doi:10.1016/j.ijhcs.2006.09.003
- Hung, S. Y., Lai, H. M., & Chou, Y. C. (2015). Knowledge sharing intention in professional virtual communities: A comparison between posters and lurkers. *Journal of the Association for Information Science and Technology*, 66(12), 2494–2510. doi:10.1002/asi.23339
- Hyde, J. S., & Linn, M. C. (1988). Gender differences in verbal ability: A meta-analysis. *Psychological Bulletin*, 104(1), 53–69. doi:10.1037/0033-2909.104.1.53
- Ibarra, H., & Obodaru, O. (2009). Women and the vision thing. *Harvard Business Review*, 87(1), 62–70. PMID:19227409
- Johnson, R. D., & Marakas, G. M. (2000). The role of behavioral modeling in computer skills acquisition: Toward refinement of the model. *Information Systems Research*, 11(4), 402–417. doi:10.1287/isre.11.4.402.11869
- Kankanhalli, A., Tan, B. C., & Wei, K. K. (2005). Contributing knowledge to electronic knowledge repositories: An empirical investigation. *Management Information Systems Quarterly*, 29(1), 113–143. doi:10.2307/25148670
- Kaufmann, N., Schulze, & Veit, D. (2011). More than fun and money. Worker Motivation in Crowdsourcing-A Study on Mechanical Turk. *Proceedings of the 2011 Americas Conference for Information Systems*, 1-11.
- Kim, M., Sharman, R., Cook-Cottone, C. P., Rao, H. R., & Upadhyaya, S. J. (2012). Assessing roles of people, technology, and structure in emergency management systems: A public sector perspective. *Behaviour & Information Technology*, 31(12), 1147–1160. doi:10.1080/0144929X.2010.510209
- Lai, H. M., Chen, C. P., & Chang, Y. F. (2014). Determinants of knowledge seeking in professional virtual communities. *Behaviour & Information Technology*, 33(5), 522–535. doi:10.1080/0144929X.2013.864709
- Lakhani, K. R., & Wolf, R. G. (2003). *Why hackers do what they do: Understanding motivation and effort in free/open source software projects*. MIT Sloan Working Paper No. 4425-03. Massachusetts Institute of Technology.
- Lesser, E. L., & Storck, J. (2001). Communities of practice and organizational performance. *IBM Systems Journal*, 40(4), 831–841. doi:10.1147/sj.404.0831
- Lin, H. F. (2007). Effects of extrinsic and intrinsic motivation on employee knowledge sharing intentions. *Journal of Information Science*, 33(2), 135–149. doi:10.1177/0165551506068174
- Lin, M. J. J., Hung, S. W., & Chen, C. J. (2009). Fostering the determinants of knowledge sharing in professional virtual communities. *Computers in Human Behavior*, 25(4), 929–939. doi:10.1016/j.chb.2009.03.008
- Lin, N., Ensel, W. M., & Vaughn, J. C. (1981). Social resources and strength of ties: Structural factors in occupational status attainment. *American Sociological Review*, 46(4), 393–405. doi:10.2307/2095260
- Lindenberg, S. (2001). Intrinsic motivation in a new light. *Kyklos*, 54(2-3), 317–342. doi:10.1111/1467-6435.00156
- Liu, Y., Li, Y., Zhang, H., & Huang, W. W. (2017). Gender differences in information quality of virtual communities: A study from an expectation-perception perspective. *Personality and Individual Differences*, 104, 224–229. doi:10.1016/j.paid.2016.08.011
- Locke, E. A., & Latham, G. P. (2002). Building a practically useful theory of goal setting and task motivation: A 35-year odyssey. *The American Psychologist*, 57(9), 705–717. doi:10.1037/0003-066X.57.9.705 PMID:12237980

- Mayer, R. C., Davis, J. H., & Schoorman, F. D. (1995). An integrative model of organizational trust. *Academy of Management Review*, 20(3), 709–734. doi:10.2307/258792
- McAfee, A. (2009). *Enterprise 2.0: New collaborative tools for your organization's toughest challenges*. Harvard Business Press.
- McAfee, A. P. (2006). Enterprise 2.0: The dawn of emergent collaboration. *Enterprise*, 2(3), 15–26. doi:10.1109/EMR.2006.261380
- McKinney, V., Yoon, K., & Zahedi, F. M. (2002). The measurement of web-customer satisfaction: An expectation and disconfirmation approach. *Information Systems Research*, 13(3), 296–315. doi:10.1287/isre.13.3.296.76
- Montagne, B., Kessels, R., Frigerio, E., de Haan, E., & Perrett, D. (2005). Sex differences in the perception of affective facial expressions: Do men really lack emotional sensitivity? *Cognitive Processing*, 6(2), 136–141. doi:10.1007/s10339-005-0050-6 PMID:18219511
- Nahapiet, J., & Ghoshal, S. (1998). Social capital, intellectual capital, and the organizational advantage. *Academy of Management Review*, 23(2), 242–266. doi:10.5465/amr.1998.533225
- Nelson, K. M., & Coopridge, J. G. (1996). The contribution of shared knowledge to IS group performance. *Management Information Systems Quarterly*, 20(4), 409–432. doi:10.2307/249562
- Nonaka, I., & Takeuchi, H. (2007). The knowledge-creating company. *Harvard Business Review*, 85(7/8), 162–171.
- Nov, O., Naaman, M., & Ye, C. (2010). Analysis of participation in an online photo-sharing community: A multidimensional perspective. *Journal of the American Society for Information Science and Technology*, 61(3), 555–566.
- O'Reilly, T. (2009). *What is Web 2.0? Design patterns and business models for the next generation of software*. O'Reilly Media, Inc.
- Park, J., & Gabbard, J. L. (2018). Factors that affect scientists' knowledge sharing behavior in health and life sciences research communities: Differences between explicit and implicit knowledge. *Computers in Human Behavior*, 78, 326–335. doi:10.1016/j.chb.2017.09.017
- Pi, S. M., Chou, C. H., & Liao, H. L. (2013). A study of Facebook Groups members' knowledge sharing. *Computers in Human Behavior*, 29(5), 1971–1979. doi:10.1016/j.chb.2013.04.019
- Porter, C. E., Donthu, N., & Baker, A. (2012). Gender differences in trust formation in virtual communities. *Journal of Marketing Theory and Practice*, 20(1), 39–58. doi:10.2753/MTP1069-6679200103
- Putrevu, S. (2001). Exploring the origins and information processing differences between men and women: Implications for advertisers. *Academy of Marketing Science Review*, 10, 1–14.
- Ridings, C. M., Gefen, D., & Arinze, B. (2002). Some antecedents and effects of trust in virtual communities. *The Journal of Strategic Information Systems*, 11(3-4), 271–295. doi:10.1016/S0963-8687(02)00021-5
- Ringle, C. M., Wende, S., & Becker, J. M. (2015). *SmartPLS 3*. SmartPLS GmbH.
- Ryan, R. M., & Deci, E. L. (2000). Intrinsic and extrinsic motivations: Classic definitions and new directions. *Contemporary Educational Psychology*, 25(1), 54–67. doi:10.1006/ceps.1999.1020 PMID:10620381
- Smeltzer, L. R. (1997). The meaning and origin of trust in buyer-supplier relationships. *International Journal of Purchasing and Materials Management*, 33(4), 40–48. doi:10.1111/j.1745-493X.1997.tb00024.x
- Sun, Y., Fang, Y., & Lim, K. H. (2012). Understanding sustained participation in transactional virtual communities. *Decision Support Systems*, 53(1), 12–22. doi:10.1016/j.dss.2011.10.006
- Tamjidyamcholo, A., Baba, M. S., Tamjid, H., & Gholipour, R. (2013). Information security—Professional perceptions of knowledge-sharing intention under self-efficacy, trust, reciprocity, and shared-language. *Computers & Education*, 68, 223–232. doi:10.1016/j.compedu.2013.05.010
- Teo, H. H., Chan, H. C., Wei, K. K., & Zhang, Z. (2003). Evaluating information accessibility and community adaptivity features for sustaining virtual learning communities. *International Journal of Human-Computer Studies*, 59(5), 671–697. doi:10.1016/S1071-5819(03)00087-9

Tsai, W., & Ghoshal, S. (1998). Social capital and value creation: The role of intrafirm networks. *Academy of Management Journal*, 41(4), 464–476.

Uslaner, E. M. (2000). Social capital and the net. *Communications of the ACM*, 43(12), 60–64. doi:10.1145/355112.355125

Vance, A., Elie-Dit-Cosaque, C., & Straub, D. W. (2008). Examining trust in information technology artifacts: The effects of system quality and culture. *Journal of Management Information Systems*, 24(4), 73–100. doi:10.2753/MIS0742-1222240403

Venkatesh, V., Morris, M. G., Davis, G. B., & Davis, F. D. (2003). User acceptance of information technology: Toward a unified view. *Management Information Systems Quarterly*, 27(3), 425–478. doi:10.2307/30036540

Wachter, R., Gupta, J., & Quaddus, M. A. (2000). IT takes a village: Virtual communities in support of education. *International Journal of Information Management*, 20(6), 473–489. doi:10.1016/S0268-4012(00)00039-6

Wallentin, M. (2009). Putative sex differences in verbal abilities and language cortex: A critical review. *Brain and Language*, 108(3), 175–183. doi:10.1016/j.bandl.2008.07.001 PMID:18722007

Wang, W. T., & Wei, Z. H. (2011). Knowledge sharing in wiki communities: An empirical study. *Online Information Review*, 35(5), 799–820. doi:10.1108/14684521111176516

Wang, Y., & Fesenmaier, D. R. (2004). Towards understanding members' general participation in and active contribution to an online travel community. *Tourism Management*, 25(6), 709–722. doi:10.1016/j.tourman.2003.09.011

Wasko, M. M., & Faraj, S. (2000). "It is what one does": Why people participate and help others in electronic communities of practice. *The Journal of Strategic Information Systems*, 9(2-3), 155–173. doi:10.1016/S0963-8687(00)00045-7

Weiss, E., Kemmler, G., Deisnhammer, E., Fleischhacker, W., & Delazer, M. (2003). Sex differences in cognitive functions. *Personality and Individual Differences*, 35(4), 863–875. doi:10.1016/S0191-8869(02)00288-X

Wood, R., & Bandura, A. (1989). Social cognitive theory of organizational management. *Academy of Management Review*, 14(3), 361–384. doi:10.2307/258173

Yan, Z., Wang, T., Chen, Y., & Zhang, H. (2016). Knowledge sharing in online health communities: A social exchange theory perspective. *Information & Management*, 53(5), 643–653. doi:10.1016/j.im.2016.02.001

Yi, M. Y., & Davis, F. D. (2003). Developing and validating an observational learning model of computer software training and skill acquisition. *Information Systems Research*, 14(2), 146–169. doi:10.1287/isre.14.2.146.16016

Yoon, C., & Wang, Z. W. (2011). The role of citizenship behaviors and social capital in virtual communities. *Journal of Computer Information Systems*, 52(1), 106–115.

Yu, T. K., Lu, L. C., & Liu, T. F. (2010). Exploring factors that influence knowledge sharing behavior via weblogs. *Computers in Human Behavior*, 26(1), 32–41. doi:10.1016/j.chb.2009.08.002

Zhou, J., Zuo, M., Yu, Y., & Chai, W. (2014). How fundamental and supplemental interactions affect users' knowledge sharing in virtual communities? A social cognitive perspective. *Internet Research*, 24(5), 566–586. doi:10.1108/IntR-07-2013-0143

APPENDIX

Table 6. Measurement items

Construct	Measurement items	References
Trust	Members of this virtual community will not take advantage of others, even when the opportunity arises. Members of this virtual community will always keep the promises they make for one another. Members of this virtual community would not knowingly do anything to disrupt the conversation. Members of this virtual community behave consistently. Members of this virtual community are truthful in dealing with one another.	Adapted from Chen & Hung (2010), Chiu et al. (2006)
Reciprocity	I know that other members of this virtual community will help me, so it is only fair to help other members in this virtual community. When I share knowledge with other members, I believe that members of this virtual community will help me if I need it.	Adapted from Kankanhalli et al. (2005)
Identification	I feel a sense of belonging towards this virtual community. I have the feeling of togetherness or closeness in this virtual community. I have a strong positive feeling toward this virtual community. I am proud to be a member of this virtual community.	Adapted from Bagozzi & Dholakia (2002)
Shared language	The members of this virtual community use common terms or jargon. Members of this virtual community use understandable communication patterns during the discussion. Members of this virtual community use understandable narrative forms to post messages or articles.	Adapted from Chiu et al. (2006)
Shared vision	Members of this virtual community share the vision of helping others solve their problems. Members of this virtual community share the same goal of learning from each other. Members in this virtual community share the same value that helping others is pleasant.	Adapted from Chiu et al. (2006)
Quantity of knowledge sharing	How many times do you usually share knowledge in this virtual community per month?	Adapted from Chen & Hung (2010) Chiu et al. (2006)
Quality of knowledge sharing	The knowledge shared by members in this virtual community is accurate. The knowledge shared by members in this virtual community is complete. The knowledge shared by members in this virtual community is reliable.	Adapted from McKinney et al. (2002)
Personal outcome expectations - Enjoyment	Sharing my knowledge in this virtual community will give me a feeling of happiness. Sharing my knowledge in this virtual community is fun. Sharing my knowledge in this virtual community is enjoyable and pleasant.	Adapted from Chiu et al. (2006)
Personal outcome expectations – Achievement	Sharing knowledge with members of this virtual community will increase my problem-solving capabilities and skills. Sharing knowledge with members of this virtual community will allow me to learn new things. Sharing knowledge in this virtual community will help me to improve my status as a member of the virtual community.	Adapted from Chiu et al. (2006)
Community outcome expectations	Sharing my knowledge in this virtual community will be helpful to the successful functioning of the virtual community. Sharing my knowledge in this virtual community would help the virtual community continue its operation in the future. Sharing my knowledge in this virtual community would help the community accumulate or enrich the knowledge. Sharing my knowledge in this virtual community would help the virtual community grow.	Adapted from Chiu et al. (2006)

Table 7. Ancillary literature review

Study	Motivation Construct(s)	Dependent Variable(s)	Theory Applied	Sample Characteristics	Summary of Main Findings
Kankanhalli et al. (2005)	Costs, extrinsic benefits, intrinsic benefits	EKR usage by knowledge contributors	Social capital theory, social exchange theory	150 respondents from 10 organizations in Singapore	Organizational reward, organizational reward*identification, knowledge self-efficacy, enjoyment in helping others were positively associated with EKR usage, whereas codification effort*generalized trust, reciprocity*pro-sharing norms were negatively associated with EKR usage.
Wasko & Faraj (2005)	Individual motivations, structural capital, cognitive capital, relational capital	Knowledge contribution	Social capital theory, social exchange theory	173 members from an electronic network operated by a U.S. national legal professional association	Reputation and centrality were positively associated with helpfulness and volume of knowledge contribution; tenure was positively associated with the volume of contribution; commitment was negatively associated with helpfulness of contribution; reciprocity was negatively associated with the volume of contribution.
Chiu et al. (2006)	Social interaction, trust, reciprocity, identification, shared vision, and shared language; community-related outcome expectations and personal outcome expectations	Quality of knowledge sharing, quantity of knowledge sharing	Social capital theory, social cognitive theory	310 members from a Taiwan-based IT-oriented virtual community	Community-related outcome expectations were positively associated with the quantity and quality of knowledge sharing, whereas personal outcome expectations were not. Social interaction, reciprocity, identification, and shared vision were positively associated with quantity of knowledge sharing, while trust and shared vision were positively associated with knowledge quality, and shared language was negatively associated with knowledge quality.
Hsu et al. (2007)	Trust, knowledge sharing self-efficacy, personal outcome expectations, community-related outcome expectations	Knowledge sharing	Social cognitive theory	274 members from multiple virtual communities in Taiwan	Economy-based trust has a positive effect on information-based trust, then information-based trust had a positive effect on identification-based trust. Identification-based trust was positively associated with knowledge-sharing self-efficacy and knowledge sharing. Personal outcome expectations were positively associated with knowledge sharing.
Lin et al. (2009)	Trust, reciprocity, knowledge sharing self-efficacy, perceived relative advantage, perceived compatibility	Knowledge sharing, community loyalty	Social capital theory	350 members from three Taiwan-based professional virtual communities	Trust was positively associated with knowledge sharing behavior; knowledge sharing self-efficacy, perceived relative advantage and perceived compatibility mediates the relationship between trust and knowledge sharing, respectively. Knowledge sharing is positively associated with community loyalty.
Phang et al. (2009)	Perceived usability, perceived sociability	Knowledge seeking, knowledge contribution	Value theory, social exchange theory	235 students from a large computing course	Perceived usability and perceived sociability were positively associated with knowledge seeking and knowledge contribution, respectively.

continued on following page

Table 7. Continued

Study	Motivation Construct(s)	Dependent Variable(s)	Theory Applied	Sample Characteristics	Summary of Main Findings
Chen & Hung (2010)	Trust, reciprocity, knowledge sharing self-efficacy, perceived relative advantage, perceived compatibility	Knowledge contributing, knowledge collecting, knowledge utilization, community promotion	Social capital theory	323 members from two Taiwan-based IT-oriented virtual communities	Trust, knowledge sharing self-efficacy, perceived relative advantage were positively associated with knowledge contributing; trust, knowledge sharing self-efficacy, and perceived relative advantage were positively associated with knowledge collecting, whereas reciprocity was negatively associated with knowledge collecting. Knowledge contributing and knowledge collecting behaviors were positively related to knowledge utilization, while only knowledge contributing had a significant effect on community promotion.
Yu et al. (2010)	Enjoy helping, sharing culture, usefulness/relevancy	Knowledge sharing behavior	Social exchange theory	442 respondents from three of Taiwan's professional virtual communities	Enjoy helping, sharing culture, usefulness/relevancy were positively associated with knowledge sharing behavior.
Chang & Chuang (2011)	Social interaction, trust, identification, reciprocity, shared language; individual motivations; participant involvement	Quality of knowledge sharing, quantity of knowledge sharing	Social capital theory, individual motivation theory	282 virtual community members recruited from a Taiwan-based telecom website	Social interaction, trust, identification, reciprocity, shared language, reputation, and altruism were positively associated with knowledge quality; identification, reciprocity, shared language, and altruism were positively associated with quantity of knowledge sharing; participant involvement moderates the relationship between altruism and quantity of knowledge sharing.
Wang & Wei (2011)	Member interactions, participation, promotion, trust, identification	Knowledge sharing intention	Social cognitive theory	232 wiki community members in Taiwan who had experience in writing or editing wiki website content.	Member interactions were associated with community participation, promotion, trust, and identification. However, only participation significantly mediated the relationship between member interactions and knowledge sharing intention.
Papadopoulos et al. (2012)	Social influence factors, technology acceptance factors, social cognitive factors	Attitude toward knowledge sharing, intention of knowledge sharing	Social influence theory, TAM, social cognitive theory	175 users of Weblogs in Thailand	Self-efficacy, enjoyment, certain personal outcome expectations, and attitudes towards knowledge sharing were positively related to the intention of knowledge sharing in employee weblogs
Liao et al. (2013)	Self-efficacy, attitude, sharing culture	Knowledge-sharing continuance intention	Social exchange theory, the theory of reasoned action	473 virtual community members	Self-efficacy, attitude, sharing culture were positively associated with continuance intention to share knowledge.

continued on following page

Table 7. Continued

Study	Motivation Construct(s)	Dependent Variable(s)	Theory Applied	Sample Characteristics	Summary of Main Findings
Pi et al. (2013)	Attitude, subjective norm, social networking sharing culture	Knowledge-sharing intention	Social exchange theory, the theory of planned behavior	271 users who have had knowledge sharing experience in Facebook Groups	Attitude, subjective norm, social networking sharing culture was positively associated with intention to share knowledge.
Tamjidyamcholo et al. (2014)	Affect, social factors, facilitating conditions, perceived consequences	Knowledge sharing behavior	Theory of interpersonal behavior, expectancy theory, social capital theory, the theory of reasoned action	142 responses from 10 online information security groups (professional virtual community)	Affect, facilitating conditions, and perceived consequences were positively associated with knowledge sharing behavior. Further, knowledge sharing behavior was positively associated with information security risk-reduction expectation.
Zhou et al. (2014)	Fundamental interaction, supplementary interaction, self-efficacy, outcome expectation	Knowledge acquisition, knowledge contribution	Social cognitive theory	479 responses from China's online discussion forum for economic and managerial knowledge sharing	Fundamental interactions positively impacted knowledge acquisition and contribution directly and indirectly, through the users' self-efficacy and outcome expectation. Supplemental interactions were negatively associated with knowledge acquisition while positively associated with knowledge contribution.
Chang et al. (2015)	Trust, commitment, self-efficacy	Knowledge-sharing intention, knowledge-sharing behavior	Social cognitive theory, commitment-trust theory	150 members from a virtual technical community	Trust and self-efficacy influenced knowledge-sharing intention at two points of measurement, while commitment positively affected knowledge-sharing intention at the second point of measurement. The relationship between trust and knowledge-sharing intention decreases over time, whereas the relationship between commitment and intention increases with time.
Liou et al. (2016)	Anticipated reciprocal relationship, norm of reciprocity, anticipated extrinsic rewards, knowledge-sharing self-efficacy	Knowledge sharing behavior	Social cognitive theory	394 members of the Yambol online test community	Anticipated reciprocal relationship, norm of reciprocity, anticipated extrinsic rewards, and knowledge sharing self-efficacy had a significant and positive effect on knowledge sharing behavior, respectively; knowledge sharing behavior had a significant and positive effect on community participation.
Yan et al. (2016)	Benefit (sense of self-worth, face concern, reputation, social support), cost (cognitive costs, executional costs)	General knowledge sharing behavior, specific knowledge sharing behavior	Social exchange theory	323 members from two major online health communities in China.	Benefit (sense of self-worth, face concern, reputation, social support) was positively associated with general and specific knowledge sharing behavior, respectively; while cognitive costs were only negatively associated with specific knowledge sharing behavior and executional costs were only negatively associated with general knowledge sharing behavior.

Xuan Wang g is an assistant professor of Information Systems at Robert C. Vackar College of Business & Entrepreneurship, The University of Texas Rio Grande Valley. She received her Ph.D. in Information Systems and Decision Science from E. J. Ourso College of Business, Louisiana State University. Her interests include causal inference, big data analytics, and virtual communities. Her research has been published in the communication of Association Information Systems, Information System Frontiers, Journal of organizational and end-user computing, Information Systems Management and have been presented in the conferences such as Decision Science Institute (DSI), Americas Conference on Information Systems (AMCIS) and Hawaii International Conference on System Sciences (HICSS).

Yaojie Li received the D.B.A. degree in Computer Information Systems, Master's degrees in Computer Science and Accounting from Louisiana Tech University. He is currently an assistant professor of Management Information Systems at Turner College of Business, Columbus State University. His research interests include information security, IT education, and accounting information systems.

Tom Stafford is J.E. Barnes Professor of Computer Information Systems. He has earned the Ph.D. in Marketing from the University of Georgia and the Ph.D. in Management Information Systems from the University of Texas -Arlington. Stafford previously served as Editor-in-Chief of Decision Sciences journal and is Editor-in-Chief of The DATA BASE for Advances in Information Systems. Stafford co-chaired the 2018 Americas Conference for Information Systems and is a regular member of the Louisiana State Distance Education Consortium.

Hanieh Javadi Khasraghi is an assistant professor of Management Information Systems at Lerner College of Business, University of Delaware. She received her Ph.D. in Information Systems and Decision Sciences from E. J. Ourso College of Business, Louisiana State University. Her research interests include crowdsourcing, social media, and virtual communities. Her research has appeared in Behavior and Information Technology and has been presented in conferences such as the Americas Conference on Information Systems (AMCIS) and Hawaii International Conference on System Sciences (HICSS).