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Gender Differences in Virtual Community Knowledge Sharing

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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

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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 & Coopridner, 1996), marketing (e.g., Geyskens et al., 1998), organizational value creation (e.g., Uslaner, 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

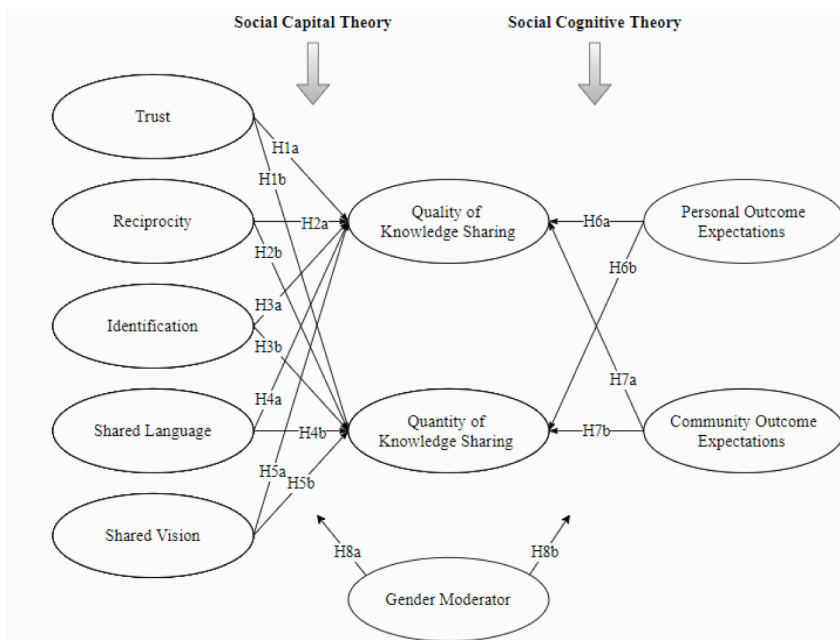
Data were collected through a field survey from three large public universities in the U.S. Since virtual community use is quite prevalent among college students (Wachter et al., 2000), this sample fits our goal to examine the motivations of knowledge sharing in Virtual Communities of Interest. Moreover, 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

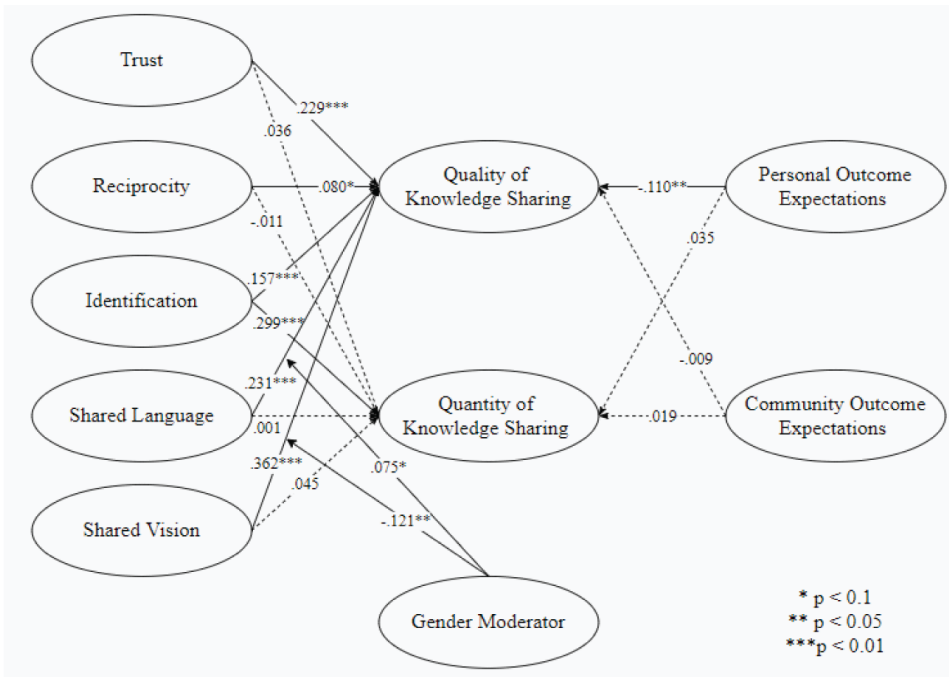
Hypothesis testing results for key variables are demonstrated in Figure 2, the final PLS model with all significant (unbroken path line) and non-significant paths (dashed path lines) indicated.

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.

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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. |

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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. |

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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. |

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