

Influence on Willingness of Virtual Community's Knowledge Sharing: Based on Social Capital Theory and Habitual Domain

Szu-Yuan Sun, Teresa L. Ju, Hao-Fan Chung, Chang-Yao Wu, and Pei-Ju Chao

Abstract—Despite the fact that Knowledge Sharing (KS) is very important, we found only little discussion about the reasons why people have the willingness to share knowledge at such platform even though there is no immediate benefit to the persons who contribute knowledge in it. The aim of this study is to develop an integrative understanding of the factors that support or inhibit individuals' knowledge sharing intentions in virtual communities and to find whether habit would generate people's willingness to be involved. We apply Social Capital Theory (SCT), and we also add two dimensions for discussion: member incentive and habitual domain (HD). This research assembles the questionnaire from individuals who have experienced knowledge sharing in virtual communities, and applies survey and Structural Equation Model (SEM) to analyze the results from the questionnaires. Finally, results confirm that individuals are willing to share knowledge in virtual communities: (1) if they consider reciprocity, centrality, and have longer tenure in their field, and enjoy helping. (2) if they have the habit of sharing knowledge. This study is useful for the developers of virtual communities to insight into knowledge sharing in cyberspace.

Keywords—Habitual Domains, Knowledge Sharing, Social Capital Theory, Virtual Community.

I. INTRODUCTION

KNOWLEDGE is the foundation of a firm's competition advantage and, ultimately, the primary driver of the firm's value [1, 50]. Organization employees of knowledge-based economy specifically need to share knowledge and experience with each other to improve the development of the organization. Simultaneously, as the Internet revolution has evoked unprecedented extension of virtual communities all over the world, organization employees now exchange views and benefit from virtual communities, which allow them to gain access to the latest information, expertise, and ideas, and to interact informally.

However, the willingness of knowledge sharing may be resisted or restrained due to several factors. According to

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Reimus [4] and Andrews's [9] articles, "Knowledge is power" is the well-known saying to describe situations, where experts with rare knowledge have the highest reputation and monopolies of knowledge causes knowledge hoarding instead of knowledge sharing. To be definite, knowledge hoarding is behavior which people chooses to limit or prohibit other social participants from obtaining such uniquely held assets of knowledge. As a result, knowledge workers, in fear of losing an opportunity of individual lead, would be more cautious to share knowledge with their colleagues. Therefore, the sharing of one's personal knowledge may imply a relative loss of power within an organization [11]. All the above statements indicate that knowledge sharing might jeopardize the power or specialties of a firm or individuals. When knowledge sharing is limited across an organization, the likelihood increases that knowledge gaps will arise, and these gaps are likely to produce less-than-desirable work outcomes [32]. The whys and the wherefores, hoarding knowledge and looking guardedly at the knowledge offer by others are natural human tendencies [59]. Simultaneously, by reviewing prior researches, there are fewer discussions were found about the factors why people desire to share knowledge in virtual communities even though they can not acquire immediate benefit.

We aim to further investigate the factors that increase or lessen people's tendencies to engage in knowledge sharing behavior through virtual communities. Recently, several researchers have become increasingly interested in social capital in organizations [25, 52, 62]. Social capital may facilitate organizational value creation through the process of knowledge dissemination and combination [62]. Individuals may also benefit from social capital embedded in which they are members [45, 60].

In addition, the new feature of mixed economic and social capital causes new questions regarding the access to social capital and use of it. As technology made it possible to actualize the "virtual" reality (e.g., audio-visual, 3-D, touch-sensitive) and to transcend time and space (wireless and inexpensive equipment), people now can exchange new information and ideas through Internet or Intranet even at public domains. Lin [41] says it is possible that cyber-networks might break the dominance of elite classes and differential utility in social capital. Through cyberspace, people's purposes to exchange resources as well as to improve relationships with others are thus being fulfilled [37, 58].

Hence, this research applies Social Capital Theory (SCT), proposed by Nahapiet and Ghoshal [25], using three dimensions to discuss why people share their knowledge in electronic network of practice. These three dimensions of Social Capital Theory include: 1) structural capital: includes

network ties and network configurations, 2) cognitive capital: includes shared codes, languages and narratives, and 3) relational capital: includes trust, norm, obligations and identifications. In addition, we add one dimension for discussion: individual incentives.

II. LITERATURE REVIEW

A. *Social Capital Theory*

Concept of social capital emerged in domain of sociology. In Jacobs' research, he defined social capital as the networks of strong, crosscutting personal relationships developed over time that provide the basis of trust, cooperation, and collective action in such communities [24]. The social capital concepts are comprised of the network and the assets that might be mobilized through that network [14, 52]. People can depend on the network to acquire from each other to change or share their knowledge. Furthermore, social capital concepts have been viewed as explanations for a variety of pro-social behaviors, including collective action, community involvement, and differential social achievements that the concept of individual based capital (such as human and financial capital) is unable to explain [18, 20, 28, 54].

The first time when social capital applied to explain organization learning was in 1998 by Nahapiet and Ghoshal. They defined social capital as the sum of actual and potential resources embedded within and derived from the network of relationships possessed by an individual or social unit. Social capital comprises of both resources within the network and the asset that may be mobilized through that network. Similarly, Burt [52] also conceptualized social capital as a set of social resources embedded in relationship. Social capital encompasses many aspects of a social context, such as social ties, trusting relationship, and value systems that facilitate actions of individuals located within that context. Through a comprehensive review of research on social capital, Nahapiet and Ghoshal [25] have suggested that different aspects of a social context are considered in terms of the relational, cognitive, and structural dimensions of social capital. This three dimensional framework is employed to investigate the relationship between social capital and intra-organizational phenomena [25, 52, 62].

B. *Habitual Domains*

Habitual Domain was initially proposed by Yu [47]. He considered that each person has a unique set of behaviors resulting from his or her ways of thinking, memory, judging, responding, and handling problem, which gradually stabilized within a certain domain over a period of time. Such collection of way of thinking, memory, judging, etc. together with its organization, interaction and dynamics, is called Habitual Domain [46]. He defined that Habitual Domain consist of four elements: 1.Potential Domain (PD): the collection of ideas and actions that can potentially be activated, 2.Actual Domain (AD): the set of ideas and actions that are actually activated, 3.Activation Probabilities (AP): the probabilities that ideas and actions in PD also belong to AD, 4.Reachable Domain (RD): the set of ideas and actions that can be attained from a given set in an HD. Based on the above discussion, we can point out how habitual tendencies would significantly

influence an individual on academic performances as well as human perception management such as behavioral control and decision-making. An HD can stabilize over time in the sense that its potential domain and its activation probability converge to a fixed set and distribution function, respectively [55]. This possibility for an individual may arise from three causes: 1) the more one learns the less the probability that an arriving message or experience is new; 2) as existing memory is utilized to interpret arriving messages and experiences there is a tendency toward consistency; and 3) the environment may tend toward a regular rhythm and thus yield regularity in its input of information and experience. Thus, in the absence of extraordinary events, a person's PD and AP may stabilize and develop habitual ways of thinking, judging, acting, and reacting. Note that the elements of an AD influence judgments and moods, and that an AD is only a small part of a PD. How to control one's AD to influence better decisions, judgments, and emotions is a critical question in controlling one's HD – and one's life [47]. Since an HD can change over time, it is dynamic, as are its four elements: PD, AD, AP and PD. While this fact poses difficulties, it is also possible for an HD to reach a stable state, so that human behavior can be seen as predictable to some degree.

C. *Knowledge Sharing*

Knowledge has played an important role in improving enterprises [31]. Moreover, knowledge sharing now can be exchanged not only in person, but also through the intranet, extranet or Internet. Darr and Kurtzberg [17] consider that knowledge sharing is a process that people acquire knowledge by learning other's experience. Meanwhile, by exchanging knowledge, organizations can continually increase work efficiency. Despite the benefit, it can sometimes be difficult to share knowledge efficiently in companies due to one's conservation of his or her own knowledge [30, 93].

Although the importance of knowledge sharing is identified with organizations, it is not facile to efficiently share knowledge in organizations [21, 30]. Simultaneously, due to knowledge considered as power, it is difficult for employees to share knowledge selflessly. Hence, sharing knowledge has become the most important thing in knowledge management of companies. Furthermore, by reviewing pervious researches, companies will acquire more benefits and enhance production when employees have willingness to share their knowledge with others [56].

As knowledge sharing is considered the essential assets in companies, there are several obstacles to influence employees on sharing knowledge as follows. First, the aspect of knowledge power: the employees in traditional companies regard knowledge as the source of power [27]. In other words, these workers in such companies won't share their knowledge with others because they consider that it will influence their status. Second, the aspect of employees' cognition: Davenport and Prusak [59] identify seven barriers: lack of trust; different cultures, vocabularies, and frames of reference; lack of time and meeting places; status and rewards going to knowledge owners; lack of absorptive capacity in recipients; belief that knowledge is the prerogative of particular groups; the "not-invented-here" syndrome; and intolerance for mistakes or

need for help. Some scholars like Szulanski [21] and O'Dell [8] state employees won't have willingness to share knowledge if they don't trust each other. Simultaneous, by reviewing Ruggles' [52] research, different organizational culture will also influence the efficiency of knowledge sharing.

The basis of organizational knowledge creation is the conversion of tacit knowledge into explicit knowledge and back again. Explicit knowledge is knowledge that "can be expressed in words and numbers, and easily communicated and shared in the form of hard data, scientific formulae, codified procedures, or universal principles" [23]. Examples of explicit knowledge include chemical formulae, market forecasts, operations procedures, product specifications, software code, and technical standards. [23] do not view tacit knowledge and explicit knowledge as mutually exclusive but as complementary entities. Over time, human knowledge shifts between the tacit and the explicit through a process of social interaction between individuals that also produces new knowledge and expands its use.

D. Individual Motivations

Wasko and Faraj [40] state that knowledge sharing primarily occurs when individuals are motivated to access the network, review the questions posted, choose those they are able and willing to answer, and take the time and effort to formulate and post a response. By reviewing previous research about knowledge sharing, individual motivations including reputation, enjoy helping and self-efficacy are discussed more often to measure why people have the willingness to share knowledge [3, 10, 40].

1) Reputation

According to social exchange theory [123], individuals who have the willingness to interact with others are able to acquire more benefit. For instance, people can gain identification, social status and reputation by sharing their knowledge. Jones [58] states reputation is an important asset for individuals because it can improve or maintain individual social status.

Constant [10] also find people will take part in a community action more often if they can gain more reputation.

Simultaneously, by reviewing previous researches, individuals will continuously share their knowledge if they can feel to acquire more reputation [29]. Thus, the perception contribution and status in the profession may motivate individuals to contribute their valuable, personal knowledge to others in the network [40].

2) Enjoy Helping

In addition to enhancing their reputations, Wasko and Faraj[40] state individual may also receive intrinsic benefits from contributing. In Kollock's article [59], he finds individual may contribute their knowledge in communities because they perceive that helping others with challenging problems is interesting, and because it feels good to help other people. Previous research in electronic networks suggests that individuals are motivated intrinsically to contribute knowledge to others because engaging intellectual pursuits and solving problems is challenging or fun, and because they enjoy help others [39]. Therefore, individuals will feel contented with helping other people if they don't expect to gain any reward [14, 15].

III. METHODOLOGY

A. The Conceptual Model

The purpose of this research is to integrate Social Capital Theory with habitual domain and develop a comprehensive research model to identify the interrelationships among relevant research constructs. Then, this study will also empirically test the research model through conducting survey research in the domain of knowledge sharing. According to above literature reviews and integration, we combine Social Capital Theory with habitual domain to develop our model for examining. Fig. 1 depicts our research model. Simultaneously, by integrating prior researches, we conclude and build the operational definitions of the study in Table I.

TABLE I
THE RESEARCH OF THE OPERATIONAL DEFINITIONS

Dimensions	Variables	Sources
Relation Capital	Reciprocity	[3, 10, 25, 40]
Structure Capital	Centrality	[25, 16, 40]
Cognitive Capital	Self-rated Expertise	[25, 40]
	Tenure in the field	
Member Incentive	Reputation	[3, 10, 40]
	Enjoy Helping	
Habitual Domain	Individual Habit	[35, 46, 47]
Knowledge Sharing	Knowledge Sharing's Behavior	[1, 5, 19, 25, 38, 49]

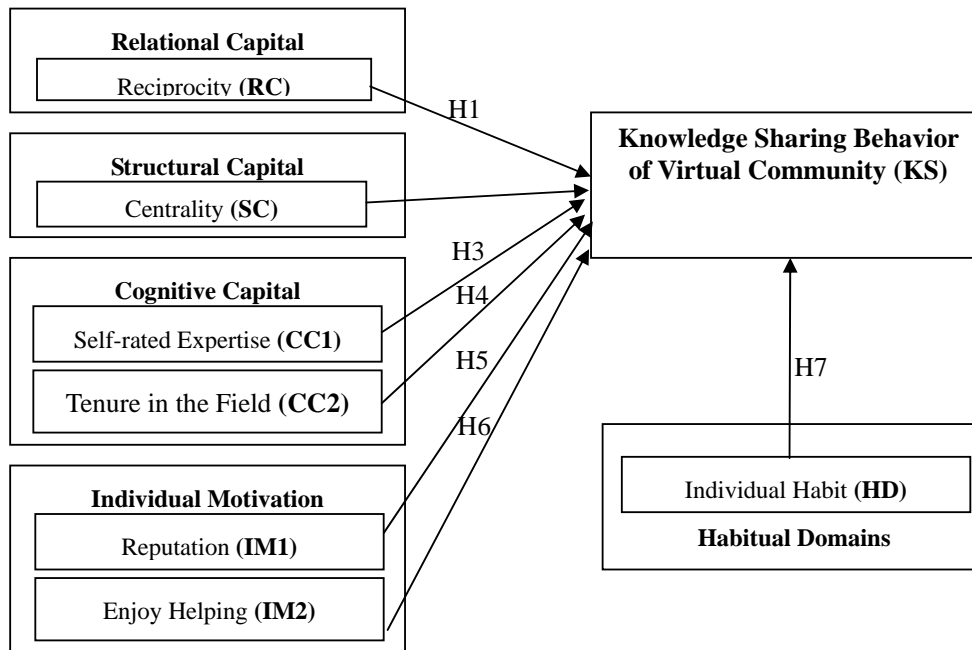


Fig. 1 Research Model

B. Sample and Questionnaire Design

This questionnaire adopts a 5-point Likert scale suggested by Berdie [12], with the responses rated as 5 as strongly agree, and 1 as strongly disagree. The data were gathered through a survey posted on the Internet from January to May 2007. A total of 227 respondents that have ever shared their knowledge in virtual communities were gathered, within the number of responses suggested by previous researchers [2, 10]. The demographics of the respondents follow: 56.8% are male, 43.2% are female; 12.3% were graduated from senior high school, 7.0% were graduated from college, 72.7% were graduated from university and 7.9% were graduated from graduate school.

C. Research Hypotheses

According to above literature reviews and integration, this research establishes hypotheses as follows.

First, a basic norm of reciprocity is a sense of mutual indebtedness, so that individuals usually reciprocate the benefits they receive from others, ensuring ongoing supportive exchanges [57]. In Wasko and faraj's [39] article, they state that knowledge sharing in electronic networks of practice is facilitated by a strong sense of reciprocity – favors given and received – along with a strong sense of fairness. Thus, when there is a strong norm of reciprocity in the collective, individuals trust that their contribution efforts will be reciprocated, thereby rewarding individual efforts and ensuring ongoing contribution [40]. Thus, this leads us to establish the following hypotheses:

Hypothesis 1: Individuals who feel that they can acquire more reciprocal in virtual communities have positive influence on Knowledge Sharing.

Second, according to Wasko and faraj's [40] article, they state that structural capital is also relevant for examining individual actions, such as knowledge contribution, within a collective. Individuals who are embedded in a collective have a relatively high proportion of direct ties to other members, and are likely to develop this habit of cooperation. Hence, when networks are dense, consisting of a large proportion of strong, direct tie between members, collective actions are relatively easy to achieve [11]. Thus, this leads us to establish the following hypothesis.

Hypothesis 2: Individuals who have higher levels of network centrality will positively influence Knowledge Sharing in virtual communities.

Third, by reviewing Wasko and faraj's [40] research, they state cognitive capital consists of mastering the application of expertise, which takes experience. Individuals with longer tenure in the shared practice are likely to better understand how their expertise is relevant, and are thus better able to share knowledge with others. Simultaneously, individuals are less likely to contribute when they feel their expertise is inadequate [39]. Some scholars like Constant [10] also find that individuals with higher levels of expertise are more likely to provide useful advice on computer networks. This leads us to establish the following hypotheses.

Hypothesis 3: Individuals who have higher levels of expertise will positively influence Knowledge Sharing in virtual communities.

Hypothesis 4: Individuals who have longer tenure in their field will positively influence Knowledge Sharing in virtual communities.

Then, Blau [123] posits that individuals engage in social interaction based on an expectation that it will lead in some way to social rewards such as approval, status and respect. Wasko and Faraj [40] consider this suggestion that one potential way an individual can benefit from active participation is the perception that participation enhances his or her personal reputation in the network. Furthermore, reputation is an important asset that an individual can leverage to achieve and maintain status within a collective [7]. Results from prior researches are consistent with Social Exchange Theory and provide evidence that building reputation is a strong motivator for active participation [26]. Simultaneously, there is some evidence that an individual's reputation in online settings extends to one's profession [13]. Thus, this leads us to establish the following hypothesis.

Hypothesis 5: Individuals who perceive that knowledge sharing enhance their reputation will positively influence their willingness in virtual communities.

In addition to enhance individual reputation, Wasko and Faraj [40] also consider individual may also receive intrinsic benefits from contribution knowledge. Knowledge is deeply integrated in an individual personal character and identity. Individuals may contribute their knowledge in an electronic network of practice because they perceive that helping others with challenging problems is interesting, and because it feels good to help other people [44]. In Wasko and Faraj's [39] article, they also find individuals are motivated intrinsically to contribute knowledge to others because engaging in intellectual pursuits and solving problems is challenging or fun, and because they enjoy helping others. Thus, this leads us to establish the following hypothesis.

Hypothesis 6: Individuals who enjoy helping others will positively influence Knowledge Sharing in virtual communities.

At last, by reviewing Yu [46, 47] and Ju and Chung [35] article, they states how habitual tendencies would significantly influence an individual on academic performances as well as human perception management such as behavioral control and decision-making. He discovers that individual habitual tendencies would unconsciously influence people's willingness or behavior. This leads us to establish the hypothesis.

Hypothesis 7. Individuals who have the habit of knowledge sharing will positively influence Knowledge sharing in virtual communities.

IV. DATA ANALYSIS AND RESULTS

To find the results of this research's hypotheses, we examine and analyze hypotheses by applying AMOS 6.0 Software. In order to achieve the purpose of this research and test the hypotheses, this research used descriptive statistic analysis to verify the connections of each research variable. Meanwhile, we applied Confirmatory Factor Analysis (CFA) to authenticate the constructions of the factors. We measured the construct reliabilities of the dimensions, and all variables exceeded more than 0.7. Some scholars like Anderson and Gerbing [34] considered that the values of the construct reliabilities were adaptive to be accepted when the values were

more than 0.7. Simultaneously, we measured the values of Average Variance Extracted (AVE) of variables, and all variables exceeded more than 0.5. Fornell [6] considers the values of Average Variance Extracted (AVE) are better to have validity when the values are more than 0.5. The results of reliability and validity of variables presented at Table II.

TABLE II
THE CONSTRUCT RELIABILITY AND AVERAGE VARIANCE EXTRACTED OF THE VARIABLES

Variables	Construct Reliability	Average Variance Extracted (AVE)
Reciprocity	0.7782	0.5403
Centrality	0.7665	0.5650
Self-rated Expertise	0.8344	0.6284
Tenure in the Field	0.8093	0.5250
Reputation	0.7726	0.5338
Enjoy Helping	0.8301	0.6200
Individual Habit	0.8661	0.6191

With an adequate measurement model, the proposed hypotheses were tested with AMOS. The results of the analysis are depicted in Fig. 2 and summarized in Table III. Next, we discuss the results in following sequence:

Hypothesis 1 is supported in this research; the result suggests when there is a strong norm of reciprocity in the collective, individuals trust that their contribution efforts will be reciprocated. The result is supported in Wasko and faraj's [40] article.

Hypothesis 2 is supported in this research; the result suggests when networks are dense, consisting of a large proportion of strong, direct tie between members, collective actions are relatively easy to achieve. The result is supported in Wasko and faraj's [40] and Krackhardt's [11] article.

Hypotheses 4 is supported as they have been in many previously studies applying cognitive capital to explain why individuals have willingness to share their knowledge. Individuals with longer tenure in virtual communities are likely to better understand how their expertise is relevant, and are thus better able to share knowledge with others. These results are also supported in Wasko and faraj's [40] and Constant's [10] article.

Hypothesis 6 is also supported as individuals perceive that helping others with challenging problems is interesting, and because it feels good to help other people [44]. If anything, the non-significant coefficient observed with Hypothesis 5 and Hypothesis 3 suggests that results from prior research aren't consistent with Social Exchange Theory and provide evidence that building reputation is a strong motivator for active participation. It should also be noted that reputation and higher levels of expertise aren't essential for individuals when they share knowledge in this research.

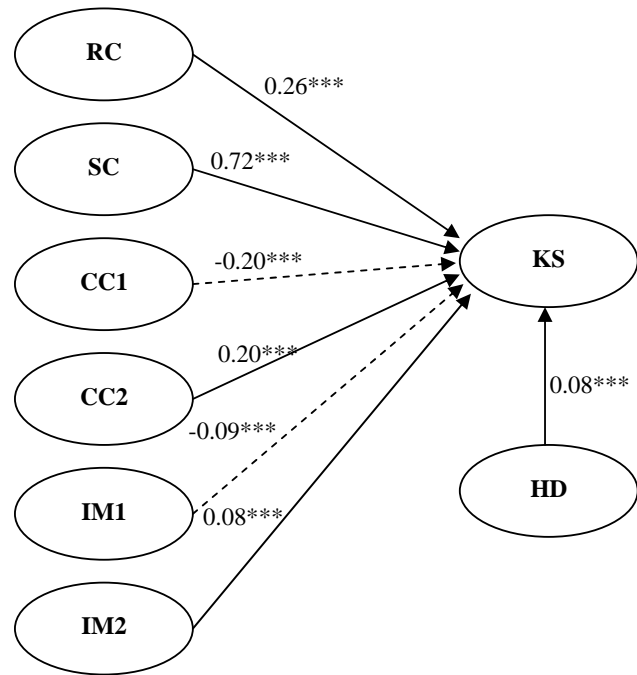
Finally, Hypothesis 7 tells that individual learning habit will influence individuals to share their knowledge in virtual

communities. The result supports Yu [46, 47] and Ju and Chung [35] opinion that individual decision-making might be influenced by their habits.

Furthermore, we received the result: GFI=. 931, AGFI= .906, RMSEA=. 052. According to Hu [6] and McDonald's [51] research, when the values of GFI and AGFI are over .90, RMSEA value is under .06, which makes the measures of goodness-of-fit of the researchable model better to be accepted. Table III depicts the model-fit evaluation of the Research model.

TABLE III
THE MODEL-FIT EVALUATION OF THE RESEARCH MODEL

Fit Indices	Standard value	Analysis Results
Adjusted goodness-of-fit Index (GFI)	>0.9	0.931
Adjusted goodness-of-fit Index (AGFI)	>0.9	0.906
Root Mean Square Error of Approximation (RMSEA)	<0.06	0.052
Normal Fit Index (NFI)	>0.9	0.915
Relative Fit Index (RFI)	>0.9	0.923



^a **RC** : Reciprocity, **SC** : Centrality, **CC1** : Self-rated Expertise, **CC2** : Tenure in the Field, **IM1** : Reputation, **IM2** : Enjoy Helping, **HD** : Individual Habit.
^b The dash-line indicates significant but does not support the hypothesis.

Fig. 2 Results of Structure Equation Model Analysis

TABLE 4 (A)
SUMMARY OF HYPOTHESIS TESTING

Hypotheses	Results
Hypothesis 1: Individuals who feel that they can acquire more reciprocal in virtual communities have positive influence on Knowledge Sharing.	Supported
Hypothesis 2: Individuals who have higher levels of network centrality will positively influence Knowledge Sharing in virtual communities.	Supported
Hypothesis 3: Individuals who have higher levels of expertise will positively influence Knowledge Sharing in virtual communities.	Not Supported (Significant but in opposite direction)
Hypothesis 4: Individuals who have longer tenure in their field will positively influence Knowledge Sharing in virtual communities.	Supported

TABLE 4 (B)
SUMMARY OF HYPOTHESIS TESTING

Hypotheses	Results
Hypothesis 5: Individuals who perceive that knowledge sharing enhance their reputation will positively influence their willingness in virtual communities.	Not Supported (Significant but in opposite direction)
Hypothesis 6: Individuals who enjoy helping others will positively influence Knowledge Sharing in virtual communities.	Supported
Hypothesis 7: Individuals who have the habit of knowledge sharing will positively influence Knowledge sharing in virtual communities.	Supported

*P < = 0.1 **P < = 0.05 ***P < = 0.01

V. CONCLUSION

As knowledge has become more and more important in today's society, most companies worldwide apply knowledge to gain and maintain benefit. The purpose of this research is to find why people have willingness to share knowledge in virtual communities. According to results of this research, we conclude several aspects and suggestions as follows.

First, we find that when there is a strong norm of reciprocity in virtual communities, individuals trust that their contribution efforts will be reciprocated by other members. Hence, it is important for members to reward individual efforts and ensure ongoing contribution in virtual communities.

Second, we also find individuals who have a relatively high proportion of direct ties to other members and develop this habit of cooperation will have willingness to contribute their knowledge in virtual communities. Hence, individuals will be more willing to share knowledge when networks are dense, consisting of a large proportion of strong, and direct tie between members.

Third, we find individuals with longer tenure in the field are likely to better understand how their expertise is relevant, and are better able to share knowledge with others. Simultaneously, individuals are more likely to share their knowledge when they feel their expertise is adequate. Hence, we can find that individuals with higher levels of expertise will be more willing to provide useful advice in virtual communities.

Fourth, the result of this research also observes that helping others with challenging problems is interesting for individuals and make them feel good to help other people in the meanwhile. Simultaneously, individuals are motivated intrinsically to share their knowledge with others because engaging in intellectual pursuits and solving problems are challenging or interesting, and because they enjoy helping others.

Fifth, we surprisingly discover that individual habit will simultaneously influence their willingness of knowledge sharing when they share knowledge in virtual communities. Individuals will share their knowledge or information unconsciously when they raise the habit of knowledge sharing and consider this habit is valuable for keeping on.

According to previous studies, individuals who have willingness to share their knowledge with others have become more and more important in companies. Because of sharing knowledge, the development of companies or organizations will rapidly advance and grow. In our research, we apply Social Capital Theory and Habitual Domain Theory to find and prove the behavior of knowledge sharing in virtual communities. After integrating above conclusions, we suggest several aspects as follows. 1) We can apply Social Capital Theory to increase people's willingness of knowledge sharing. For instance, increasing reciprocity and centrality will improve individuals' willingness to share their knowledge in virtual communities. 2) We are also able to try to change the habit of individuals. Because of changing habit, individuals will unconsciously continue to share their knowledge in virtual communities when they feel this habit is ponderable to keep on.

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