Intellectual Capitals' Impact on Participants' Reshare Knowledge Intention in Virtual Communities

YU-REN YEN
Department of Management Information Systems, Far East University
No.49, Chung Hua Rd., Hsin-Shih. Tainan County 744, Taiwan, R.O.C.

Doctoral student, Department of Management, National Kaohsuing First Univ. of Sci. & Tech.

ECHO HUANG
Department of Information Management
National Kaohsiung First Univ. of Sci. & Tech.

SZU-YUAN SUN
Department of Information Management
National Kaohsiung First Univ. of Sci. & Tech.

Abstract: In this study, we treat the virtual community (VC) as one type of non-profitable organization and further explore its intellectual capital which help a VC attract more participants to generating better interaction in compare with other homogeneous VCs did. Integrating expectation confirmation theory (ECT) with capital constructs derived from intellectual capitals, explain the underlying motivations of members' knowledge resharing. We conducted a three month survey by posting a 'call for participate' in *JavaWorld@TW*, one of the representative professional communities in Taiwan, 288 usable responses were collected from members. Using Partial Least Square(PLS) regression to test the conceptual model and corresponding hypotheses, the findings show that relation assets, satisfaction, perception of usefulness toward a community's assets have positive impact on members' intention to continue sharing knowledge. Human, structural, and instructional assets are significantly influencing members' satisfaction and perception of usefulness. Implications are proposed in the final section.

Keywords: Intellectual capital, Social Capital Theory, Expectation Confirmation Theory, Continuance, Virtual Communities, PLS.

1 Introduction

Individuals in this knowledge era have a need to become 'intelligent' about its environment to gain knowledge from their environment and subsequently value its intangible resources. Successful acquisition intangible resources from external environment are positively affecting the individual's performance and competitiveness in workplace. Success in the workplace flows to those individuals that can most quickly exploit their tacit knowledge from experience, intuition or self-study. That tacit knowledge is hold in their organization's collective intelligence and stored in individuals' memories. This knowledge is lost to the organization when the individual leave the organization.

The scenarios also happened in Virtual communities (VCs), which are online social networks in which people with common interests, goals, or practices interact to share information and knowledge, and engage in social interactions (Chiu, Hsu, and Wang 2006). In volatile cyberspaces, VCs without specific domain knowledge may face challenges such as large populations, unstable memberships, and imperfect information and memory, which also affect knowledge flows within members. Therefore, they must capitalize on their intellectual capital by retaining tacit knowledge, building intellectual inventories and making these assets instantly available to the members who need them. Maintaining the inventory requires effort and discipline. A VC master must specify in standard summary format how they deployed existing knowledge resources to serve the members and what new knowledge they have contributed to the repository. Since knowledge is a key intangible asset, the ability to transfer knowledge from one to another is a key virtual community capacity. The greater the transfer of knowledge, the more overall member competence improves. The most popular ways in VCs for transferring knowledge is through direct experience sharing with a subject. Once the flow of information within VCs is managed properly, the competence of the VC increases, and the relation with members improved.

VCs are increasing in population, category, and size in the pas decades. This phenomenon reveals an interesting question; why individual want to continue share privately owned knowledge in VCs? Therefore, identifying the motivations

underlying the knowledge sharing continuance behavior would help both academics and practitioners gain insights into how to stimulate knowledge sharing within VCs. This study attempts to extend expectation confirmation theory (ECT) with constructs derived from intellectual capital to explain members' knowledge reshaping in VCs.

2. Literature review

2.1 Capitals in Organizations

Intellectual capital is a concept that deals with intellectual property concepts, like patents and licenses, but also includes fewer tangible assets like know-how, skills and information systems. The need to measure the amount of intellectual capital in an organization has grown in importance. Stewart (1997) argued that intellectual capital includes human capital, structural capital, instructional capital and social capital. Smith (2001) defined human capital as skills, dexterity (physical, intellectual, psychological, etc) and judgment. Investment in human capital is as well as investment in material capital. Becker (1964) argued that human capital is a means of production, into which additional investment yields additional output. Human capital is substitutable, but not transferable like land, labor, or fixed capital. Instructional capital can be used to guide or limit or restrict action by people or equipment (if the learning materials are web-based systems). It cannot generally make either individuals or infrastructure do what they are not trained or designed to do, but it can help prevent them from doing most stupid, destructive and dangerous things. When people begin to trust instructions, they tend to associate social capital with them. This is usually opens up a possibility for those with power to start cheating and creating bad instructions that can no longer be trusted, but the good reputation of the brand, experience, and interactivity protects them from being caught for longer than would be the case without the management that is associated with good reputation.

2.2 Capital and Knowledge in VCs

Unlike physical factors, knowledge is *expandable* and *self generating with use*: as doctors get more experience, their knowledge base will increase, as will their endowment of human capital. Knowledge is *transportable* and *shareable*: knowledge is easily moved and shared. This transfer does not prevent its use by the original holder. However, the transfer of knowledge may reduce its scarcity-value to its original possessor.

The concept of social capital existed ever since small communities formed and humans interacted with the expectation of reciprocation and trust (Platteau, 1994; Woolcock, 1998); however, the term in its present form and associated meanings was popularized amongst others by Bourdieu (1989), Coleman (1990) and Putnam (2004). In Putnam studies, social capital benefits communities, Social capital resources include trust, norms, and networks of association representing any group which gathers consistently for a common purpose. Coleman and Bourdieu believe that social capital exists between individuals and can be studies at the individual level. The latter approach rests on the premise that ' my connections can help me'(Cross and Cummings, 2004), it is all about establishing relationship purposefully and employing them to generate intangible and tangible benefits in short or long terms. Lin (2000) argued that benefits could be social, psychological, emotional, and economical. Mentoring, job networking, and mutual support associated with high levels of social capital is a partial cause of success in education (Loury, 1977; Coleman, 1988). Such mutual support also is associated with self-reliant economic development without need for government intervention (Putnam, 1993; Fukuyama, 1995).

People who come to a virtual community are not just seeking information or knowledge and solving problem; they also treat it as a place to meet other people, to seek support, friendship, and a sense of belongingness. They attempt to develop social relationship with other people within the community. The Social Capital Theory (SCT) helps explains why do individuals spend their time and effort on sharing knowledge with members in virtual communities, should be addressed form the perspectives of both personal cognition and social network.

2.3 Knowledge Sharing Continuance

Knowledge sharing is the behavior when an individual disseminates his acquired knowledge to other members within an organization (Ryu et al, 2003). In this approach, knowledge is viewed as an object (Alvai and Leidner, 2001) that could be transferred from the minds of people who possess it to the minds of those who seek it (Huber, 2001). Hence, knowledge sharing may concern the individuals' willingness to share their knowledge

they have created and acquired (Gibbert and Krause, 2002; Bock, et al, 2005).

Why individual continues to transfer their expertise to someone they don't know? One possible reason is that sharing behavior is the only way to maximize her or his utility (Bock et al, 2005) and minimize the costs to gain needed knowledge in VCs (Kankanhalli et al, 2005). More and more individuals participate in PVCs, for seeking helpful and useful knowledge to resolve problems at work. They can be motivated when their needs (e.g. knowledge acquisition) are satisfied, or when their satisfaction lies in the content of the activity (website use) itself. Semin and Smith (2002) argued that sharing is a type of social behavior, the ongoing interaction context of knowledge sharing within an organization will influence individuals perceive, interact with, and influence each other. Through an interaction with the others in this social network (VCs), individuals could build unique social relationships such as friendship, norm, belief, and respect. The accumulation of these relationships could be a form of public wealthy for each individual of the system. The resource creation is a continuous process of dynamic interactions, which emphasizes the social interactions for exchanging information, collaborating, and initiating spontaneous interactions.

2.4 The research model and hypotheses

Figure 1 depicts the research model. Note that the model deviated in three major ways from standard ECT formulation in recognizing that knowledge sharing continuance: satisfaction, perceived usefulness, and relational asset are posited to directly influence continuance intention to share knowledge. The main assumption of ECT is that predicting consumers' repurchase intention and ongoing use of information systems is at the core of the Expectation-confirmation Theory (ECT) (Bhattacherjee, 2001a). ECT holds that consumers' intention to repurchase a product or continue service use is determined primarily by their satisfaction with prior use of that product or service, and satisfaction is determined by consumers' pre-consumption expectation and post-consumption confirmation. Prior continuance studies indicate that satisfaction is an ex post evaluation of consumers' initial experience with the web service, trigger B2C continuance(Bhattacherjee, 2001b; Coughlan et al, 2001; Hsu et al, 2004; Wu and Wang, 2006). Therefore, intention to continue sharing knowledge is posited directly influence by satisfaction, perceived usefulness, and social asset. This leads the following hypotheses.

H_1: Satisfaction positively affects reshare intention in a VC.

H_2: Perceived usefulness positively affect reshare intention in a VC.

H_3: Social capitals positively affect reshare intention in a VC.

H_4: Perceived usefulness of a VC positively affects satisfaction.

The conceptual model includes specific asset which is posited directly influencing satisfaction and perceived usefulness. VCs' strategic asset is a critical driver of satisfaction is generally understood. Based on previous studies, we have identified four aspects of strategic asset as being particularly conducive to satisfaction and perception usefulness toward a VC: human asset, technical asset, complementary asset, and social asset. Per Bhattacherjee (2001b) assumption of the theoretical model, confirmation of post-purchase expectation should be affect individual's satisfaction and perceived usefulness. This leads the following hypotheses.

H_{5a}: The confirmation of human capital positively affects satisfaction toward a VC.

H_{5b}: The confirmation of human capital positively affects perception of usefulness toward a VC.

H_{6a}: The confirmation of instructional capital positively affects satisfaction toward a VC.

H_{6b}: The confirmation of instructional capital positively affects perception of usefulness toward a VC.

H_{7a}: The confirmation of instructional capital positively affects satisfaction toward a VC.

H_{7b}: The confirmation of instructional capital positively affects perception of usefulness toward a VC.

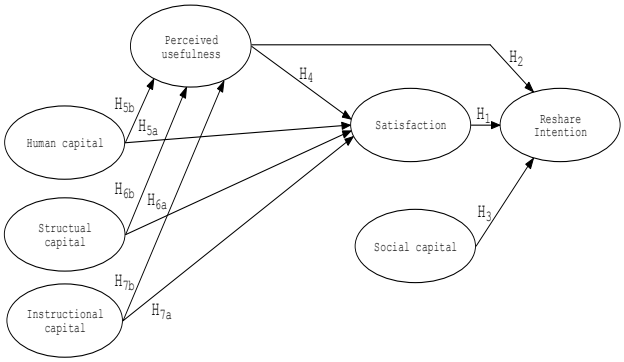

Fig. 1 The research model

3 Research methodology

3.1 Sample and data collection

The research model was tested with data from members of one professional virtual community(PVC) called *JavaWorld@TW*. It is a well-known IT-oriented virtual community in Taiwan. *JavaWorld@TW* was founded in May 2001; it had over 85,000 registered members by the end of May 2007. A banner with a hyperlink connecting to our web survey was posted on homepage of *JavaWorld@TW* from April 1 to June 24, 2007 and the members with knowledge sharing experience were cordially invited to support this survey. A number of respondents will be randomly selected for offering incentive payments amounting to US$20. This is done for increasing the incentives of participants and the quality of questionnaires. Of the 297 surveys received back, 288 were fully completed and usable for the purpose of this study.

The respondents were a diverse sample: 15% of the respondents were female; 85% were male. Their age ranged from 18 to over 40 years old, with 53.5% twenty three to twenty nine years old, 24.3% between 30 and 39, and 17.6% between 19 and 22. Their J*avaWorld@TW* history ranged from three months to over 3 years, with 33.4% between 1 to 3 years, and with 30% less than three months. Weekly usage is reported from 20 minutes to over 1 hour, 38% over 1 hour, and with 27.4% between 20-40 minutes. More than 60% had a college degree, 40% of the respondents reported they work in IT companies.

3.2 Construct measurement

Measurement items were adapted from the literature wherever possible. New items were developed based on the definition provided by the literature. Items from perceived usefulness, satisfaction, continuance reshare intention were adapted from Bhattacherjee (2001b), Wu and Wang (2006), Mathieson (1991), and Hsu and Chiu (2004); items from human capital and instructional capital were adapted from Andreou et al (2007); items from structural capital were self-defined and developed; items from social capital were adapted from Chiu et al. (2006) and Kankanhalli et al. (2005). In this study, human capital was defined that a virtual community's ability from the collective capabilities (e.g. knowledge, skill, competence, know-how) of a virtual community members. Instructional capital was defined that a virtual community's ability to collect and disseminate its information and knowledge in the right form and content to the right people at the right time. Structural capital was defined that a virtual community's ability to manage and promote its information and knowledge in the logical and intuitive way to the members. Social capital was defined that refer to the relationship, such as trust, appreciation, common language, and mission, between participants in a virtual community. Satisfaction was defined that refer to the positive feeling after joining a virtual community. Perceived usefulness was defined that refer to the performance of effectiveness after using the resources of a virtual community. Continuance share intention was defined that willing to reuse a virtual community and reshare knowledge.

The attributes were then summarized to create a survey instrument, which asks respondents to identify the extent to which they agree/disagree with respect to their experience with knowledge sharing on *JavaWorld@TW*. Each item was rated on a scale of 1 to 7, where 1 equals "strongly disagree" and 7 "strongly agree." Table 1 shows the measurement items of constructs.

Pretests were conducted to ensure the instrument is acceptably valid. The instrument was first evaluated for content validity by three IS/KM scholars, and then further tested for reliability, item consistency, ease of understanding, and question sequence appropriateness. Twenty MBA students who have taken Java were asked to complete the questionnaire. Comments on question sequence, wording choice, and measures were solicited, leading to minor modifications of the questionnaire. Based on feedback from pretest subjects, several items were removed from our instrument.

4. Data analysis and results

4.1 Measurement model

The measurement model was evaluated in terms of convergent validity and discriminant validity (Anderson and Gerbing, 1998). Factor loadings λ in the study exceeded 0.7 (see Table 1), which represents the measure model is significant due to high convergent validity. Composite reliabilities in the measurement model ranged from 0.895 to 0.945 (see Table 1) and were all above the minimum of 0.7 as suggested by Nunnally (1978). Average variance extracted (AVE) ranged from 0.67 to 0.85. For discriminant validity, diagonal

elements should be larger than off-diagonal elements. Comparing all the correlations and the elements on the diagonal, the results demonstrate adequate discriminant validity for all the reflective constructs. Hence, all two conditions for convergent validity were met.

Table 1 Summary of measurement scales

Variable	Item	Weight	Loading(λ)
Human capital	I confirm that members of *JavaWorld@TW* have high level of Java skills.	0.3818	0.8785
(CR=0.905)	I confirm that members of *JavaWorld@TW* have innovative capabilities.	0.3769	0.8632
	I confirm that members of *JavaWorld@TW* are outstanding elites in Java field.	0.3881	0.8741
Instructional	I confirm the content of *JavaWorld@TW* is reliable.	0.4070	0.8979
capital	I confirm the content of *JavaWorld@TW* is detailed.	0.4082	0.9074
(CR=0.895)	I confirm the rating & feedback mechanism of *JavaWorld@TW* is accurate.	0.3436	0.7686
Structural capital	I confirm the stability of *JavaWorld@TW's* platform is reliable.	0.3810	0.8685
(CR=0.903)	I confirm the web pages management and subject classification of *JavaWorld@TW* is easy to use and understandable.	0.3711	0.8754
	Overall, I confirm the high quality of the service providing by *JavaWorld@TW*.	0.3983	0.8642
Social capital	When I try to share my professional knowledge in *JavaWorld@TW*, I also expect to gain needed responses while I need.	0.2557	0.8393
(CR=0.909)	I confirm the members of *JavaWorld@TW* are truthful in dealing with one another.	0.2247	0.8263
	I confirm the members of *JavaWorld@TW* usually obey their commitments.	0.2377	0.8026
	I confirm the members of *JavaWorld@TW* understand how to communicate each other by using the common languages.	0.2277	0.7456
	I confirm the members of *JavaWorld@TW* with the same mission to help other people solving their problem.	0.2772	0.8626
Satisfaction	I satisfied the knowledge and resources of *JavaWorld@TW*.	0.3675	0.9192
(CR=0.945)	I satisfied the response effectiveness of *JavaWorld@TW*.	0.3380	0.9198
	I satisfied the response efficiency of *JavaWorld@TW*.	0.3783	0.9287
Perceived	After using *JavaWorld@TW* I gain new Java knowledge and new ideas.	0.4042	0.8725
usefulness	Using *JavaWorld@TW* make me more efficient.	0.3789	0.9056
(CR=0.915)	Using *JavaWorld@TW* enhance my performance.	0.3481	0.8737
Continuance share	I plan to reuse *JavaWorld@TW* to gain new Java knowledge and skills.	0.2808	0.8759
intention	I 'll reuse *JavaWorld@TW* and reshare my knowledge.	0.2614	0.8748
(CR=939)	After my trial, I plan to reuse *JavaWorld@TW*.	0.2907	0.9152
	I'll reuse *JavaWorld@TW* even new Java communities emerge.	0.2889	0.8974

Legend□CR=Composite reliability

4.2 Structural model and hypotheses testing

This study selected PLS for data analysis because of the use of noninterval scales, the absence of multivariate normality, and the small sample size. The ability to detect and accurately estimate the strength of interaction effects are critical issues that are fundamental to social science research in general and IS research in particular. As shown in Figure 2, all the hypotheses were supported. The extended ECT model with capital factors is supported. Satisfaction with VC use is the strongest predictor of numbers' revisit intention, followed by perceived usefulness as a significant but weaker predictor. Since PLS does not generate an overall goodness of fit index, one primarily assesses validity by examining the R^2 of the endogenous constructs and the structural paths. The variance in intention explained (R^2) in this study was 62%; in the studies of Bhattacherjee (2001a), Chiu et al. (2005), Chen (2007), they were 41%, 48%, 46%, respectively.

Hypothesis H5-H7 were supported and implied that the intellectual capital of a VC (human capital, Structural capital, and Instructional capital) had positive effects on members' satisfaction (R^2=0.719) and perceived usefulness (R^2=0.531).

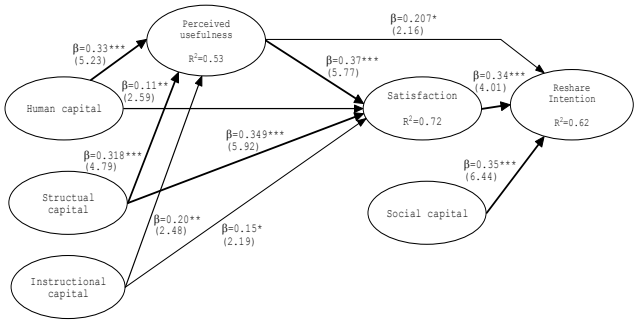

Fig. 2 The path of measurement model

Note □ Path coefficients, βi are shown above with their corresponding t-critical ratio below.

Path significance: * is $p<0.05$, ** is $p<0.01$, and *** is $p<0.001$

5. Discussion and conclusion

This study expanded the expectation confirmation theory with intellectual capital factor including human capital, structural capital, instructional capital, and social capital. The findings showed that social capital has a positive direct effect on resharing intention. We then further explore the time effect of newcomer (stayed below 3 mouths) and seniors (stayed over 3 years). The results also present the difference of reshare behaviors between newcomers and seniors. The path coefficient form social capital to reshare intention in the seniors is significantly stronger than in the newcomers (β_{new}=0.23, $\beta_{seniors}$=0.41, t=7.73). Furthermore, accompanying with longer tenure, the degree of interactive intensity is getting important than other factors (satisfaction and perceived usefulness). Intensive interactivity naturally increased the level of trust, friendship, and understanding between members. This finding is similar with Lee et al(2003) and Tsai and Ghoshal(1998) research, they argued that when members participate in the community, they expect to establish a good interpersonal interaction relation with other members. Because of these positive interactive experiences, it enhanced the knowledge sharing continuance, and thus the members were willing to keep on participating the community for further discussion and knowledge exchange.

The result of this study provided some suggestions to the vendors of the communities so that they could continue to develop the knowledge assets of PVC and maintain the reshare intention of members. For the practice of platform design, this study shows that effective quality of website (such as reorganizes the bulletin board, well web-interface design, stabilized platform and so on) by the vendors can improve satisfaction and perceived usefulness of the numbers.

Based on intellectual capitals, human assets are the important content of the community because they could contribute the achievement of knowledge sharing, problem-solution, and expertise experience store by the process of communication, exchange, and integration. This study suggest encouraging the senior members and webmaster makes and opens the innovation topic (the example: Creates content the difference), provides the new knowledge subject to enable the member to be allowed to share respective experience and the accumulation knowledge, and invites this domain the expert in the keeping society group in, can explain the related question.

Some prior studies showed the reasons the community members had knowledge sharing over the website, or the reasons for the members to stay on a certain specific websites was because the was attracted by the relationship asset. When the members participated in the community, they expected to establish the good interpersonal interaction relations with other members (Lee et al. 2003). Over the questions raised and answers distributed, these inter-actives could build a good relationship. More over, by following the time the interaction, it naturally increased the level of trust, friendship, and understanding. Because of these positive inter-active relationships, it enhanced the knowledge sharing, and thus the members were willing to keep on participating the community for discussion and knowledge accumulation.

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