

A Social Cognitive Framework of Knowledge Contribution in the Online Community

Fan-Chuan Tseng

Department of Business and Management
National University of Tainan
Tainan, Taiwan
misfctseng@gmail.com

Feng-Yuan Kuo

Department of Information Management
National Sun Yat-Sen University
Kaohsiung, Taiwan
kuofengyang@gmail.com

Abstract—In recent years, knowledge management has become an important issue for many organizations to boost their intellectual capital and business performance. Rather than the emphasis of system functions, a social cognitive model is proposed to examine the associations among members' cognition, interpersonal relationships, and their knowledge contribution behavior. The research results demonstrate that the online members' outcome expectancy, personal efficacious beliefs, as well as the strength of online ties among online peers, have positive and direct influence on their knowledge contribution behavior. Moreover, the mediating effects of outcome expectancy and self-efficacy are both significantly proved on members' engagement in knowledge contribution.

Keywords—knowledge contribution, outcome expectancy, self-efficacy, knowledge contribution satisfaction, strength of ties

I. INTRODUCTION

An online community, established and developed through information and computer technology, is composed of individuals with the same goals or similar needs. This new type of interpersonal networks have impact on activities like retrieving and using of community resources, taking collective actions, seeking emotional comfort, and developing working strategies [1, 2]. Even though the benefit of knowledge management has been widely recognized, information technology is not a solution to all problems. Behavior of learning and knowledge sharing has to be interactively adjusted among personal beliefs and the environment [3, 4]. knowledge management is not an objective and individual phenomenon in an organization [5], but is embedded in the close connection among individuals, environment and behaviors that are constantly under the influence of social background, system regulations and interpersonal interactions [3, 6, 7].

The purpose of this research expects to demonstrate the reciprocal relationships among individuals' cognition and affection toward knowledge contribution engagement. In this paper, we focus on the social cognitive and interpersonal relationship perspectives to explore individuals' outcome expectation toward online knowledge community participation, personal efficacious beliefs and satisfaction in knowledge

contribution, as well as members' relational ties emerged in the online environment, where the knowledge contribution behavior further arises.

II. THEORETICAL BACKGROUND AND RESEARCH HYPOTHESES

A. Outcome Expectancy

According to Vroom's expectancy theory, the reason why an individual takes certain action is not just because of his special likes, but also depends on his judgment on the possibility of expected results [8]. An outcome expectation indicates the judgment of the likely consequences that one specific action will produce [9]. The attractiveness and expectancy of goal attainment would affect an individual's determination and promise to achieve certain goals, by making effort to fulfill the goal and would not give up easily [10]. Behavior of knowledge contribution comes from the expectation and satisfaction with extrinsic rewards and reciprocal relationships [11]. Only when they are certain that sharing can create other benefits, like monetary rewards, respect from others, or contribute to maintaining reciprocal relationships with others will knowledge sharing be smoothly processed. People think that they can actually fulfill some kind of expectation and benefits through the sharing and reuse of knowledge, they will be encouraged to participate in related activities [12], such as acquiring new knowledge, getting recreation and entertainment, enhancing interpersonal communication, promoting professional skills, and enhancing closeness of family.

According to perspective of public good, an individual's willingness to share knowledge with others is considered to be the collective benefits of the social community but not their own profits [3, 13]. Through sharing and solving other people's problems, one feels pleasant and recognizes the value of oneself. Besides, the "perceived enjoyment" (PE) has a significant influence on the willingness to use work-related information systems [14]. In terms of knowledge contribution of online communities, the sharing and communication of both information resources and knowledge skills not only help with

the execution of tasks, but the contents and process of the sharing may also include interactive pleasure and emotional support [1, 15]. Finally, self-actualization – the highest level in Maslow's hierarchy of need theory, refers to how an individual does what he wants to do, demonstrates the inner potentials, equips oneself with creativity and adjustability, faces challenge and grows aggressively according to self-awareness [16]. Bandura argues that how an individual considers an activity with rewarding values derives from self-satisfaction after actualizing his personal achievement, which is even more meaningful than substantial monetary rewards [17]. Hendriks [18] and Andriesses [19] argue that the actualization of personal achievement and values is the primary factor of the willingness to knowledge sharing.

From all of the above discussion about one's outcome expectancy of altruistic good, hedonic expectancy, and value of self-actualization, the first hypothesis can be raised from this research:

H1: The outcome expectancy of knowledge contribution has a direct and positive influence on knowledge contribution behavior.

B. Self-Efficacy

The concept of self-efficacy refers to the judgment on one's capabilities for completing specific task, further affecting what kind of strategic move to plan, how much efforts to put in, the persistence when they encounter obstacles and adversities, the capability of recovery and the feasibility of achieving anticipated objectives. Many studies have proved the significant effect of self-efficacy on the performance in various settings, such as workplace, health management, and educational development. Caprara and others [20] have demonstrated the influence of teachers' self-efficacy beliefs on their satisfaction with teaching and students' learning achievement. In terms of related researches on self-efficacy and knowledge management, Bock & Kim [21] point out that an individual's judgment on whether he can make the expected contribution is a key issue that affects how he processes knowledge management activities in an organization. When organizational employees think they have the ability to contribute to better performance and target achievement, they hold a more positive and affirmative attitude toward knowledge contribution.

In the discourse of social cognitive theories, Bandura further points out that outcome expectancy is an important factor that affects on whether certain behavior can produce certain results, and the levels of efficacy belief are different for the anticipation of behavioral outcome [17]. People with higher self-efficacy believe that their action can lead to good results; therefore, it is positive and stimulating in actual action to achieve the desired outcome. In the field of information management, the relationship between self-efficacy and outcome expectancy is verified that people with higher self-efficacy expect to use ICT to increase other people's recognition in one's ability, enhance one's sense of achievement with work, and have chances of getting a job promotion [22, 23]. Then, the outcome expectancy has a

significant influence and explanation to the intention of utilizing information systems.

Based on the above-mentioned argument concerning how self-efficacy affects the behavior and the relationship between individual's self-efficacy and outcome expectancy, we raise the following two hypotheses:

H2: The self-efficacy of knowledge contribution has a direct and positive influence on knowledge contribution behavior.

H3: The self-efficacy of knowledge contribution has a direct and positive influence on the outcome expectancy of knowledge contribution.

C. Knowledge Contribution Satisfaction

User satisfaction indicates that how individuals compare the actual performance of a service or product with prior expectation. When they feel satisfied with the service or product, he can be prompted to continue to use it. Alavi et al. [24] indicate that satisfaction is a useful indicator to evaluate learning effectiveness derived from instructions and assistance from other users. Within the realm of knowledge management practice, the facilitation of individuals' satisfaction with knowledge management also becomes a critical cognitive dimension to evaluate the state of organizational knowledge management [25, 26]. An individual's perceived knowledge satisfaction, instead of the objective assessment of knowledge effectiveness, constitutes an essential element of one's access to the resources and the personal commitment to greater knowledge contribution for the reciprocal or future exchange within their social group [27, 28]. Accordingly, we propose the following hypothesis,

H4: The user satisfaction with online knowledge community has a direct and positive influence on knowledge contribution behavior.

Individuals' satisfaction derived from the successful experience can increase their self-efficacy perception from a sense of personal fulfillment, reflecting the degree to how well they feel capable of completing the specific task [17]. Based on the positive perceptions and self-efficacy beliefs toward the learning program and expected outcome of ICT utilization [29-31], our study also attempts to examine the relationship between satisfaction and self-efficacy regarding knowledge contribution in the online community. Thus, the hypothesis is proposed as follows,

H5: The user satisfaction with online knowledge community has a direct and positive influence on knowledge contribution self-efficacy.

D. Online Ties

According to social capital theory, the establishment and maintenance of social relations help individuals obtain the power to get resources available with his identity as a member of the social network [32-34]. Granovetter [35] identifies the social relations as strength of ties, which reflect intensified, emotionally oriented and reciprocal relationship, continue to

Identify applicable sponsor/s here. (*sponsors*)

offer reliable support and speed up the flow of information to resolve the conflicts, crisis, or uncertainties that the members face in the social environment [36, 37]. The mutual experience, goal-setting, resources exchange and emotional support among members can invoke creativity and learning efficiency, as well as boost the production and application of intellectual capital [38]. Through the special properties of online environment which is unconfined by space or time and facilitated by ICT, members of the online community not only know other peers, they also realize under what circumstance can they win resources like the support of their peers, coordination, cooperation, and mutual learning [39, 40]. Moreover, Coleman [41] emphasizes the forming of social capital comes from the structural obligations, expectations, and trustworthiness among members in a closed social network. Due to the mutual benefits or sense of responsibility within the group, online community members with closer community recognition, mutual trust and obligation awareness are more willing to express their feelings and opinions toward something with no conservation.

To conclude the aforementioned points, we assume in this research that members of online communities form their social recognition as well as relationships, and have an influence on their knowledge contribution behavior as well as high expectancy on the reward generated from participating in the activities of knowledge contribution.

H6: The online ties of knowledge community members have a direct and positive influence on their knowledge contribution behavior.

H7: The online ties of knowledge community members have a direct and positive influence on their outcome expectancy of knowledge contribution.

Through the collective faith that social interaction contributes to sharing, community members put together their knowledge, skills and resources to provide mutual support among members, form alliance, collaborate mutually to solve problems and promote living qualities [42]. With collective social persuasion, the level of an individual's self-efficacy can be affected. Through the establishment and maintaining of relationships between social members, the vicarious experience produced by the social models further make them realize the possibility of fulfillment toward the behaviors [43-45]. Accordingly, we assume that the strength of ties among members of an online knowledge community would affect how an individual judges whether he has the ability to contribute knowledge, resources or experience. So we come up with the following hypothesis:

H8: The online ties of online knowledge community members have a direct and positive influence on their knowledge contribution self-efficacy.

In the context of interpersonal relationships, individuals develop beliefs and values as a major source of happiness as well as a buffer against conflicts [46]. The expressive interaction increases group partners' feelings of relationship satisfaction and commitment to remain in the relationship [47]. Since the sense of belonging in the online community encourages participants' collective actions to create and share

instrumental resources or emotional support [48], their satisfaction with accessibility and adequacy of needed knowledge can be reinforced [25, 49]. Thus, this study proposes the following hypothesis:

H9: The online ties of knowledge community members have a direct and positive influence on their satisfaction with online knowledge community.

According to the previous literature review, our research model is depicted as Figure 1.

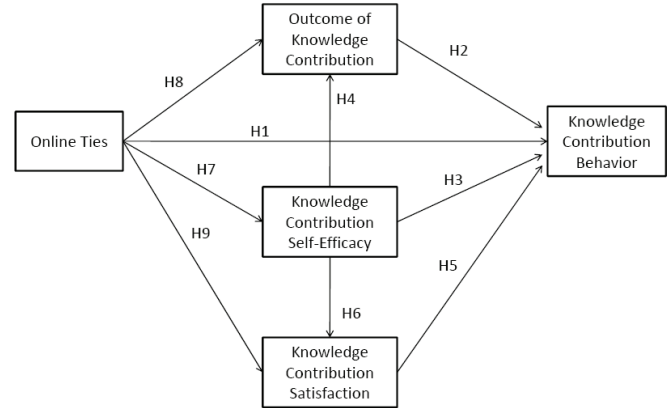


Figure 1: Research Model

III. RESEARCH DESIGN AND DATA ANALYSIS

A. Participants and Data Collection

This study focuses on a teachers' professional online learning community, the biggest web-based KMS for the teacher professional community in Taiwan. Practically, teachers need to upgrade their domain knowledge and teaching skills in order to work effectively with their students [50, 51]. The teacher communities of practice may facilitate professional collaborations and enhance better understanding about teachers' teaching practices, frustration, needs, and desires [52].

For this study, we adopt a survey methodology to collect and analyze empirical data. The operational definition and its references for the research model is demonstrated in Table 1. The instrument was examined by three senior members to examine the construct validity in ease of understanding, logical consistencies, and context fitness. The questionnaire was placed on the web site for members' voluntary participation. 433 survey responses were received, with 22 being discarded owing to their incomplete answers. The remaining 411 questionnaires were brought into further examination and analysis.

Table 1: Operational Definitions of Constructs

Construct	Operational definition	Sources
Outcome expectancy of knowledge contribution	An individual's outcome expectation of contributing knowledge in the online knowledge community, such as helping others, increasing one's own happiness and enjoyment, demonstrating the competence, gaining other's recognition, and achieving the desired goal.	Wasko & Faraj, 2005; (Kankanhalli, Tan, & Wei, 2005; Davis et al., 1992; Sun & Zhang, 2006; Maslow, 1954; Tickle, 2001, 2005; Woods, 2002
Knowledge contribution self-efficacy	An individual's judgment on his ability in executing knowledge contribution in the online knowledge community.	Bandura, 1989, 1997, 2002; Chan and Cheng, 2004; Smith, Kass, Ronunda, & Schneider 2006
Knowledge contribution satisfaction	An individual's perceptual evaluation of knowledge contribution, reflecting members' motives when engaging in the online knowledge community.	Becerra-Fernandez and Sabherwal, 2001; Kulkarni, Ravindran, and Freeze, 2006-7
Online ties	The strength of relationships linking individuals with other members in the online knowledge community.	Hansen, 1999; BarNir & Smith, 2002; Janssen & Koenig, 2002
Knowledge contribution behavior	The behavior that an individual contributes his/her resources, knowledge, experience, or emotional support to other members in the online knowledge community.	Morahan-Martin and Schumacher, 2003; Wasko and Faraj, 2000, 2005; Wellman & Gulia, 1999

B. Measurement Instrument

The measurement items (see the appendix) are developed on the basis of literature discussed above.

1) *Outcome expectancy of knowledge contribution*: Three aspects of outcomes are considered in terms of altruism, enjoyment, and self-actualization, indicating that online members expect to provide teaching resources and opinions to help solve other members' problem. By contributing their valuable knowledge or experience, people believe they will feel pleasant, interesting, and accomplished with the professional development.

2) *Knowledge contribution of self-efficacy*: To measure the online community members' confidence in contributing knowledge, we develop eight items to assess the level of subjects' beliefs in sharing their teaching practices, resources, and personal experiences with other members in the online knowledge community.

3) *Knowledge contribution satisfaction*: According to Bhattacharjee (2001), the concept of satisfaction is measured via three items to assess if the online members feel satisfied and content while contributing their knowledge with others. Furthermore, they would like to recommend this online community to their friends.

4) *Online ties*: Three items are adopted to examine their reciprocal identification from complete unknown stranger to good partners with common goals or interests. We suppose that more strength of ties can lead to more knowledge contribution.

5) *Knowledge contribution behavior*: As for the knowledge contribution behavior in the online knowledge community, we develop five items to measure the discussion, upload teaching resources, experience, or skills, as well as share their own emotional stories and express the concern or encourage to other members.

C. Data Analysis and Resultss

In this study, the structural equation analysis — partial least square (PLS), is used to test the research hypotheses. The first step in PLS is to assess the measurement reliability and validity by Confirmatory Factor Analysis (CFA). The internal consistency, convergent validity, and discriminant validity are examined. As a result, the factor loadings of each item is greater than 0.5 [53]. The CR value exceeds the generally recommended threshold values of 0.7 [54]. Finally, the square root of average variance extracted [55] is compared with the correlations among constructs [56]. All square roots of Ave values are greater than the correlations between pairs of constructs. Thus, all the constructs and items meet the requirement of internal reliability, convergent validity, and discriminant validity.

Table 2: CFA Results for Reliability and Validity of Measurement Items

Construct	Original items	Mean	SD	Factor loading	Cronbach's alpha	Composite reliability	Average variance extracted
Online ties	Ra1	3.88	2.33	0.91	0.80	0.88	0.73
	Ra2	2.27	2.22	0.70			
	Ra3	3.76	2.20	0.93			
Outcome expectancy of knowledge contribution	Al	4.74	1.24	0.89	0.87	0.92	0.79
	He	5.22	1.21	0.87			
	Sf	4.83	1.17	0.90			
Knowledge contribution self-efficacy	Se1	6.24	1.81	0.82	0.94	0.95	0.69
	Se2	6.15	1.88	0.86			
	Se3	5.82	1.85	0.88			
	Se4	6.27	1.79	0.82			
	Se5	5.74	2.07	0.80			
	Se6	6.03	1.87	0.84			
	Se7	6.09	1.87	0.82			
	Se8	6.46	1.77	0.81			
Knowledge contribution satisfaction	Ksa1	5.04	1.17	0.90	0.89	0.93	0.82
	Ksa2	5.42	1.27	0.89			
	Ksa3	5.14	1.21	0.93			
Knowledge contribution behavior	Kcb6	3.76	1.80	0.88	0.93	0.95	0.78
	Kcb7	3.45	1.96	0.84			
	Kcb8	3.53	1.85	0.93			
	Kcb9	2.94	1.71	0.86			
	Kcb10	3.45	1.84	0.91			

Table 3: Discriminant validity for the research constructs

Construct	OT	OE	KCSE	KSA	KCB
OT	0.83				
OE	0.35	0.89			
KCSE	0.40	0.61	0.83		
KSA	0.27	0.70	0.52	0.91	
KCB	0.43	0.43	0.47	0.36	0.88

OT = Online tie, OE = Outcome expectancy of knowledge contribution, KCSE = Knowledge contribution self-efficacy, KSA = Knowledge contribution satisfaction, KCB = Knowledge contribution behavior
 Diagonal elements represent the square root of AVE for each construct; off diagonal elements are correlations among constructs.

After assessing the validity and reliability of the research construct, we continue to use PLS to test hypotheses by measuring the relationship between constructs. As demonstrated in Figure 2, except for the relationship between individuals' satisfaction and their knowledge contribution behavior (H4), the other three paths (H1, H2, and H6) are significant. The R^2 value shows that outcome expectancy, self-efficacy, satisfaction, and online members' strength of ties account for 31.7% of the variance in knowledge contribution behavior. Furthermore, the path between self-efficacy and outcome expectancy is also supported (H3); while individuals' satisfaction and their online ties with other members are both significant to influence their self-efficacious belief in knowledge contribution (H5 and H8). Finally, online ties in this study are proved to have significant influence on online members' outcome expectancy and self-efficacy in the realm of knowledge contribution.

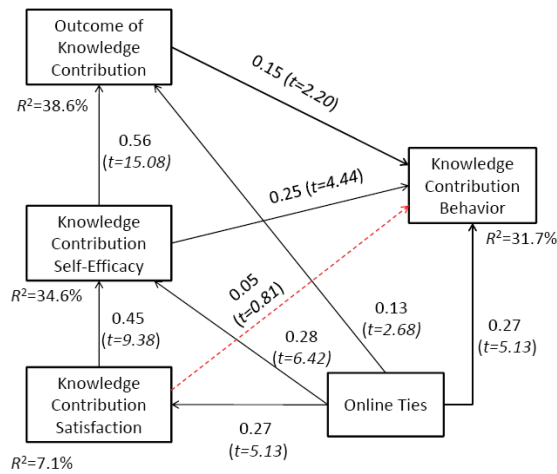


Figure 2: Results of model test

IV. DISCUSSION AND CLUSION

In recent years, knowledge economy has emerged as an important issue for many organizations to establish the online community as internal or inter-organizational platforms of knowledge management. By using the existing human resources and intellectual capital to strength organizational members' interpersonal connection, knowledge management help increase resource-sharing, promote task-execution, boost

learning, evoke knowledge innovations, and promote organizational performance [57-59]. Although the benefit of knowledge management has been emphasized via the utilization of information and computer technologies (ICTs), it is not a total solution to all knowledge management practices. Actually, the formation and application of knowledge is embedded in people's everyday activities, involving a knowing and understanding state of mind, as well as a process that focuses on the relationships among members.

In this paper, we propose a social cognitive framework of knowledge management to understand the associations among online members' outcome expectancy, self-efficacy, satisfaction regarding knowledge contribution, the strength of online ties, and individuals' knowledge contribution behavior. The hypotheses tested in this study are all supported, with the exception of people's satisfaction with their knowledge contribution in the online community. Consistent with the studies of Watson and Hewett [12], Andriesses [19], as well as Bock et al., [11], as people think they can achieve some expectation and benefits in terms of the collective good, perceived enjoyment, and self-actualization, they are more willing to participant in knowledge management activities. Online members' perception of self-efficacy also plays an important role in determining one's behavior and outcome expectancy of knowledge contribution. The more beliefs that one can provide the instrumental resources or emotional support to help others, the more knowledge they would like to contribute, with the positive evaluation of good results that their knowledge contribution can lead to.

Although online members' satisfaction with knowledge contribution does not significantly influence their knowledge contribution behavior, it is consistent with Bandura's social cognition perspective that satisfaction derived from the successful experience can increase people's self-efficacy perception, indicating they can feel capable of completing one specific task. In this study, self-efficacy reflects a stronger mediating effect to influence online members' outcome expectancy and participation of knowledge contribution. Finally, the development of social relationships among online knowledge community members is proven to help them get potential resources and reliable support with one's identity as a member of the social network. It is useful to speed up the flow of information to resolve the conflicts, crisis, or uncertainties that online members face in their social settings [36]. Furthermore, the mutual experience, goal-setting, resources exchange and emotional support among members can increase creativity and learning performance, as well as enhance the production and application of intellectual capital [38].

Our research results support the view that knowledge management is not confined to only system functions. Instead of an illusionary space where people may meet without face-to-face interaction, learning and sharing derived from knowledge contribution has to be reciprocally adjusted among personal cognition and the environment. Therefore, the online members' outcome expectation, efficacious beliefs, satisfactory perception, and the strength of online ties are critical to the success in knowledge management practices.

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 8. Contributing knowledge in SCTNet can enhance my professional capabilities and development.
 9. Contributing knowledge in SCTNet can help increase my concentration and enthusiasm for teaching.
 10. Contributing knowledge in SCTNet can help release my frustrations and stresses of teaching.

Knowledge contribution self-efficacy

1. I have confidence in contributing my teaching experience with other SCTNet members.
2. I have confidence in contributing my teaching resources with other SCTNet members.
3. I have confidence in sharing my emotion with other SCTNet members.
4. Even I have different opinions from other SCTNet members, I have confidence in keeping discussion on related issues.
5. Even my opinion may be an offense to other SCTNet members, I have confidence in keeping discussion on related issues.
6. I have confidence in sharing my success or joyfulness with other SCTNet members, rather than worrying that it is regarded as show off.
7. I have confidence in sharing my failure or frustration with other SCTNet members, rather than worrying that I may be ridiculed.
8. I have confidence in engaging the knowledge contribution activities in SCTNet.

Knowledge contribution satisfaction

1. I feel satisfied with contributing knowledge in SCTNet.
2. I will recommend SCTNet to my friends.
3. I am content to contribute knowledge in SCTNet.

Oline ties

1. Is there any SCTNet member with whom I contribute knowledge?
Yes. Our relationship varies from totally unknown stranger to the partner in the same camp.
2. Is there any discussion group member with whom I contribute knowledge?
Yes. Our relationship varies from totally unknown stranger to the partner in the same camp.
3. On the whole, is there any SCTNet member with whom we share our knowledge to each other?
Yes. Our relationship varies from totally unknown stranger to the partner in the same camp.

Knowledge contribution behavior

1. I often respond to the topics discussed in SCTNet.
2. I often upload my teaching resources to SCTNet.
3. I often contribute my teaching experience, knowledge or skill in SCTNet.
4. I often share my emotion in SCTNet.
5. I often express my concern or encourage to other SCTNet members.

APPENDIX

Outcome expectancy of knowledge contribution

1. As the online community members need teaching resources, I provide what I have to them.
2. As the online community members need suggestion for teaching,, I will provide what I have to them.
3. As the online community members express their emotion, I will response and encourage them.
4. It is joyful for me to contribute knowledge in SCTNet.
5. It is pleasant for me to contribute knowledge in SCTNet.
6. It is interesting for me to contribute knowledge in SCTNet.
7. Contributing knowledge in SCTNet can enhance my professional capabilities and development.