



Individual, social, and organizational contexts for active knowledge sharing in communities of practice

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ARTICLE INFO

Keywords:

Communities of practice
Knowledge management
Knowledge sharing

ABSTRACT

Firms that have implemented knowledge management initiatives are now interested in nurturing voluntary knowledge sharing organizations, called communities of practice (CoPs). Adopting the Triandis model on attitude formation, we identified and validated a set of organizational factors that was anticipated to have effects on knowledge sharing by CoP members such as perceived consequences, affect, social factors and facilitating conditions. One hundred and seventy-nine members from 70 CoPs of a large multinational electronics firm participated in this survey. Based on the PLS analysis, perceived consequences, affect, social factors, and facilitating conditions were found to significantly affect knowledge sharing in CoPs.

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1. Introduction

As knowledge management (KM) emerges as the core management of paradigm future survival strategy of the 21st century, firms across the world implemented knowledge management initiatives, investing in information technologies to register, access, and share explicit knowledge of their organizational members through repositories of corporate knowledge objects (Choi & Lee, 2002). However, such repository or system oriented approaches are not leading to the desired outcomes of KM implementation (creation of high quality knowledge, utilization of knowledge for competitive edge, improving organizational learning and innovation) (Brown & Duguid, 2002; Garud & Kunarawamy, 2005; Koh & Kim, 2004; Malhorta, 1998), building up piles of useless data and documents (McDermott, 1999). Thus, firms which focused on building an enterprise-wide knowledge management system (KMS) to manage mostly explicit knowledge are looking for an alternative way of knowledge creation and sharing.

Community of practice (CoP) is emerging as an alternative to the system or explicit knowledge oriented KM implementation, by establishing a social process where an organizational member voluntarily participates in creating and sharing one's implicit as well as explicit knowledge and help each member to learn from one another (Chen, Huang, & Cheng, 2009; Chu & Khosla, 2009; Lesser & Storck, 2001; Swan, Newell, & Robertson, 2000; Wenger & Snyder, 2000). From the CoP perspective, knowledge sharing

activity has meaning when it is conducted in the context of a community of people sharing common context and practices. By collaborating on the same task or creating and sharing knowledge in the common interest area across organizational boundaries, CoP members contribute to securing the validated, resource-based competitiveness of the firm, avoiding the meaningless piling of corporate data and documents.

Despite such promise and interest in CoPs by firms, theory building or validating studies on CoP implementation are rare. If there are any, they are mostly conceptual (Brown & Duguid, 1991; Lave & Wenger, 1991; Orr, 1990), specific case-oriented (Kodama, 2002; Pan & Leidner, 2003; Storck & Hill, 2000), or examine a special type of CoP (Wasko & Faraj, 2005). We do not seem to know, yet, what factors differentiate the highly activated, productive CoPs from the not-so-successful CoPs. Since informal organizations, such as CoPs, have an operating system different from formal organizations, understanding the unique internal working mechanism of a CoP is essential for successful CoP nurturing. Thus, this study intends to identify key individual, social, and organizational factors that affect the knowledge sharing of the CoP members.

2. Theoretical background

2.1. Community of practice: its origin and evolution

The concept of CoP was first introduced by Lave and Wenger (1991). They observed that, in the traditional master-apprentice relationship, the apprentice becomes a member of the profession's

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community by sharing life with the master and learning the profession gradually and naturally. That is, the concept of CoP was not originated as a KM-related organizational structure but as a context for a special type of organizational learning.

The learning process in a CoP is conducted from a social constructivism perspective. In social constructivism, which philosophically focuses on how we acquire knowledge, objective knowledge (or knowledge as an object) is denied and all knowledge is linked to the context where individuals actively create or absorb knowledge as the primary subject of cognition, and the validity of such knowledge must always be examined in its context (Lave, 1988; Wasko & Faraj, 2000).

Orr's (1990) ethnographic study on the Xerox service personnel applies this social constructivism to a learning process within an organization. In the study, Orr confirmed that service personnel at Xerox were not satisfied by the standardized, context-free training programs but learned about their work through sharing work-related knowledge with their colleagues through informal, voluntary community interactions.

Based on Orr's findings, John Seely Brown in charge of Xerox research center's organizational learning suggested the potential of integrating work, learning, and innovation through CoPs (Brown & Duguid, 1991). That is, when collaboration and social interaction among individual workers take place through a community of practice, learning on non-canonical practice is maximized and organizational innovation can be expedited. Then, they argued that, to promote organizational learning that leads to organizational innovation, organizations should consist of self-sustaining communities of practice.

The concept of CoP thus evolved from the social context for situated learning to the organizational structure supporting KM implementation. Lesser and Prusak (1999) identifies a CoP as a structure to resolve the issues and challenges an organization faces, and argues that an organization can increase its knowledge and human capital through the social capital accumulated by CoP activities. They view social capital as the primary knowledge capital that, as the web of social relationships, is crucial in motivating individuals' behaviors and society's development and regard CoP as a critical organizational structure for building social capital.

Liedtka (1999) also saw a CoP as an organizational structure to effectively achieve organizational learning, participative leadership, and enterprise-wide quality management and as a source of competitive edge for building core competencies. Wenger and Snyder (2000) defined a CoP as "groups of people informally bound together by shared expertise and passion for a joint enterprise" and predicted that a CoP will be an organizational structure for the 21st century beyond the traditional team structure.

Recently, CoPs are evolving in two new directions. On one hand, beyond the original community of informal, voluntary nature, strategic communities to support the organization's strategic business objectives begin to emerge, receiving formal resource support from the organization. On the other hand, the context of CoPs is expanding from the face-to-face, off-line setting to the distributed, on-line workspace.

Xerox and NTT DoCoMo cases provide insight on how strategic communities can be formally operated. Storck and Hill (2000) explain how a strategic community of 50 internal IT professionals successfully managed the change management process for the Xerox's enterprise-wide information systems infrastructure building project that was critical for competitive edge. According to Kodama (2002), NTT DoCoMo operated strategic communities consisting of internal people, phone manufacturers, platform solution providers, and portal developers as it started i-mode non-voice multi-media service in 1997. Through three years of strategic communities' activities that started from knowledge sharing and led to knowledge creation and innovation, NTT DoCoMo was able to offer a ser-

ies of successful new services and develop IMT 2000-based new technologies.

In addition to strategic communities, more and more CoPs become distributed beyond their traditional workplace setting. Wenger, McDermott, and Snyder (2002) define a distributed community as a community of practice that cannot depend on face-to-face meeting and interactions as its primary vehicle for connecting members. Migration of off-line CoPs to distributed on-line CoPs took place as the need to pool people from different units, different geographical locations, different time zones, and different cultures emerged as a critical CoP operating issue in firms involved in national or multinational business. In these firms, CoPs needed to depend on information technologies to replace face-to-face human interactions to help people collaborate over remote areas.

However, even in distributed CoPs, keeping CoP members' identity through human relationships is critical. Hildreth (2004) maintains that sharing of tacit knowledge is important for maintaining distributed CoPs and organizations should be able to provide the information technologies to enable tacit knowledge sharing in the distributed CoP environment. Pan and Leidner (2003), discussing the trial and errors of the Buckman labs in implementing its global distributed CoPs in the 1990s, argue that firms need to reflect the diverse culture and languages of its constituents and should pursue a flexible KM strategy.

Despite CoP's evolution into strategic and distributed dimensions, if the CoP's origin of social constructivism is not recognized and reflected in its operation, most essential benefits of CoPs may not materialize. Based on the social constructivism that knowledge cannot have meaning apart from its human context, this study explores the contextual variables within an organization that are believed to affect individual CoP members' knowledge sharing activities.

2.2. Triandis model on attitude formation

According to the Triandis (1980) model, human behaviors are influenced by the person's intentions which are affected by social factors, affect, and perceived consequences. Behaviors are also influenced by the existence of facilitating conditions. Despite high intentions, for instance, behaviors cannot materialize easily when there exist an obvious obstacle against such behavior.

Triandis model was selected as the theoretical basis for this study because the model explains a combination of complex human behaviors influenced by social, emotional, cognitive and facilitating conditions (see Fig. 1). Table 1 provides a summary of the prior studies in the IS field that empirically verified the Triandis model in explain user behaviors in IS/IT utilization.

We can summarize prior MIS studies as follows. First, we find that the Triandis model has been used as an alternative to Technology Acceptance Model (TAM) in explaining individuals' adoption of

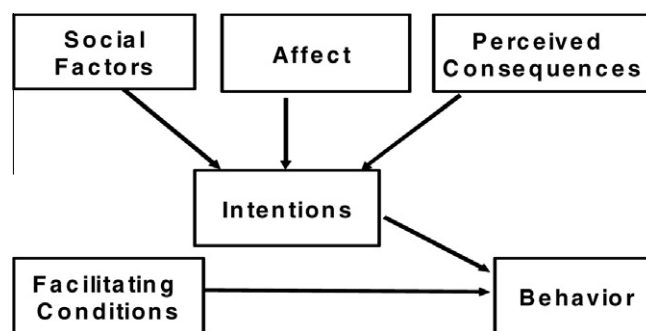


Fig. 1. Subset of the Triandis (1980) model.

Table 1
IS studies using Triandis (1980) model.

Author(s)	Purpose of study	Analysis method	Verified determinant	Dependent variable
Thompson et al. (1991)	To find determinants of PC use	PLS	* Perceived consequences (long-term consequences, usefulness, complexity) * Social factors	Utilization of PCs (behavior)
Bergeron et al. (1995)	To find determinants of EIS	Correlation regression	* Perceived consequences * Affect * Facilitating conditions * EIS experience * Social factors	Internalization of EIS use frequency of EIS use (behavior)
Al-Khaldi and Wallace (1999)	To find determinants of PC use	F-statistic regression	* Perceived consequences (Usefulness) * Affect * Social factors * Facilitating Conditions * PC experience, degree of PC access	Utilization of PCs (behavior)
Cheung et al. (2000)	To find determinants of Internet/WWW	Regression	* Perceived consequences (usefulness, complexity) * Social factors * Facilitating conditions	Current Internet/WWW use (behavior)
Chang and Cheung (2001)	To find determinants of Internet/WWW	EQS	* Perceived consequences (usefulness) * Affect * Social factors * Facilitating conditions	Intention of Internet/WWW use (intention)

a new technology or system (Venkatesh, Morris, Davis, & Davis, 2003). Second, for the dependent measure, most of the previous studies focused on user behavior rather than their intention toward such, to the study context. Third, independent variables affecting behavior change accordingly affecting the user's usage behavior change, according to the studies. Lastly, the prior studies, while using the same variable names as in the Triandis model, operationalized them to suit the appropriate context of the particular technology adoption.

Other examples of utilizing Triandis model can be seen in the field of marketing. Viane (1997) utilized Triandis model in analyzing the factors affecting customers of health foods (light product) in Belgium, not as a practical research in exploring causality but trying to find out the influencing factors and the percentages of influence of each influencing factor by using Triandis model. Aside from the Triandis (1980) model, there are researches in the field of marketing where another Triandis (1994) model was used to research consumer behavior (Lee, 2000). This research used the differences in influencing factors in camera purchasing behavior in Singapore, Korea, Hong Kong, Australia and USA as well as individualism and collectivism theories in a study of comparing consumption behavior. Also, this study considered additional factors such as habits, self-definition and usage situations as independent variables.

For the current study, which aims to analyze the factors affecting knowledge sharing inside CoPs, Triandis (1980) model was selected as the theoretical basis for the following reasons. Firstly, Triandis model is suitable for explaining the social behavior in a setting where a new acceptance situation happens. The studies where Triandis model was used for IS research were instances where a new information system such as PC or WWW was explored in terms of user's social behaviors. Secondly, Triandis model explains the combined impact of different types of individual, social, organizational factors on knowledge sharing by CoP members. Thirdly, the adoption of CoPs in Korean organizations is usually accompanied by the implementation of CoP supporting information systems. Therefore, the Triandis model, which has been heavily applied in understanding the user's behaviors in the diffusion process of new IT, seems appropriate for the current study.

3. Research model and hypotheses

3.1. Research model

The Triandis (1980) model, as shown in Fig. 2, argues that individual factors (affect, perceived consequences) and social factors affect user behaviors through one's intention while facilitating conditions affect the same behavior directly. However, as in other studies based on the Triandis model (Al-Khaldi & Wallace, 1999; Bergeron, Raymand, Rivard, & Gara, 1995; Cheung, Chang, & Lai, 2000; Thompson, Higgins, & Howell, 1991), we test the direct links between individual factors, social factors, organizational factors (facilitating conditions), and user behavior in the CoP context. The reason we skip the mediating variable of intention in this study, is that in the CoP context, intention of knowledge sharing tends to be formed almost concurrently with user behaviors such as actual knowledge sharing or CoP participation.

Furthermore, the Triandis model allows the perceived consequences to be composed of multiple dimensions. Unlike the prior studies where dimensions of the perceived consequences variables (anticipated recognition, anticipated reciprocal relationship, anticipated usefulness) were treated as the first order factors, this study designates the perceived consequences variable as the second-order factor consisting of the three dimensions, putting it at the same level as the social factors, affect, and facilitating conditions variables in affecting knowledge sharing behaviors by CoP members.

3.2. Hypotheses

Prior studies which applied the Triandis model to the information technology acceptance context, in general, defined the *perceived consequences* as consisting of near-term consequences, long-term consequences, and complexity. However, based on the knowledge management and CoP literature, this study defines the perceived consequences construct as consisting of anticipated recognition, anticipated reciprocal relationship, and anticipated usefulness.

Anticipated recognition is what CoP members expect from their organization over their CoP activities, reflecting the organization–

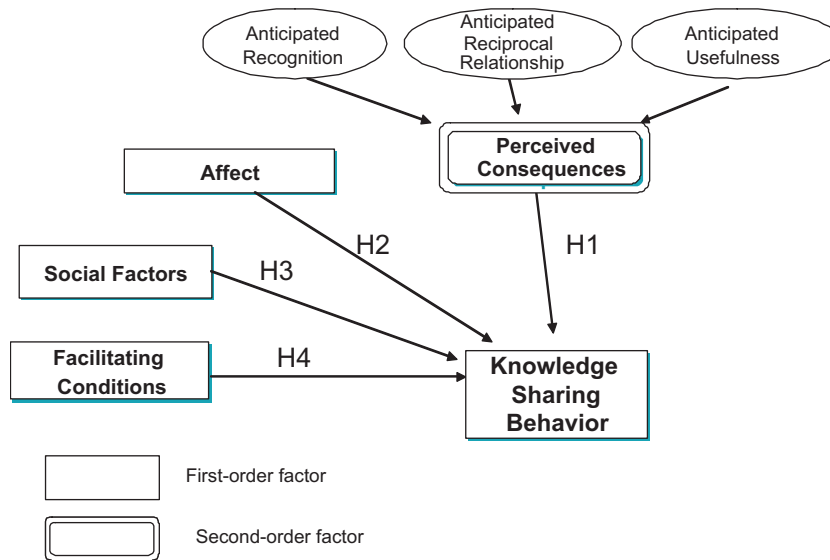


Fig. 2. Research model.

member relationship. Human behaviors are influenced not only by intrinsic factors but also by external stimulus (Bandura, 1986). Reward might be a typical example of such external stimulus in the knowledge sharing context. Bock, Zmud, Kim, and Lee (2005), however, found that anticipated rewards from the organization have rather a negative effect on individual's attitude toward knowledge sharing. In the CoP context where mostly implicit knowledge is shared among its members, explicit reward may actually incur negative perception by the members (Osterloh & Frey, 2000). That is, in the voluntary and informal CoP activities, social and psychological rewards, such as anticipated recognition, seem more critical than formal, economic incentives (i.e., anticipated reward) (Gruen, Summers, & Acito, 2000).

Anticipated reciprocal relationship is what each CoP member expects from another member. Reciprocal relationship was identified as an important motivating factor for collaborative workers to share knowledge in the electronic network context (Wasko & Faraj, 2005). In addition, the act of transferring knowledge is affected by the quality of the mutual relationship between the source and recipient (Ko, Kirsch, & King, 2005). Lesser and Storck (2001) identified a social capital generation through establishment of mutual understanding by connecting members with requirements and generating relationships through CoP activities. Through this link between CoP activities and social capital, those participating in CoP can expect an enhancement in the mutual relationship between members by information exchange in CoPs.

Anticipated usefulness is the positive outcome CoP members expect to see in their work as the result of their knowledge sharing. Since a CoP is a community of common work practices, it seems natural to expect each CoP member to believe that their CoP activities will lead to improved work performance. Wenger and Snyder (2000) report that CoP members can improve their work performance through knowledge sharing. In the electronic CoP context, perceived usefulness of CoP was found to motivate the knowledge sharing in CoPs (Wasko & Faraj, 2000). Lesser and Storck (2001) also perceive the CoP performance in reducing members' training time and unnecessary work, and enabling their workplace innovations.

Understanding CoP members' *perceived consequences* from knowledge sharing in terms of the organization-member (anticipated recognition), member-member (anticipated reciprocal relationship), and member-work (anticipated usefulness) benefit dimensions leads us to the first hypothesis.

Hypothesis 1. CoP members' *perceived consequences* from knowledge sharing are positively related to their level of knowledge sharing.

Triandis (1980) named the affective aspect of attitude as "*affect*" and defined it as "the feeling of joy, elation, or pleasure, or depression, disgust, displeasure, or hate associated by an individual with a particular act", believing that one's *affect* influences one's behavior. According to a unified information technology acceptance model (Venkatesh et al., 2003), *affect* as a variable is regarded as the intrinsic motivation (Davis, Bagozzi, & Warshaw, 1992), and knowledge sharing activity could be motivated by one's intrinsic motivation (Osterloh & Frey, 2000; Wasko & Faraj, 2000). Thus, we expect CoP member's *affect* toward knowledge sharing to reflect the strength of the member's intrinsic motivation to share knowledge with other members and lead to a higher level of knowledge sharing activities.

Hypothesis 2. CoP members' *affect* is positively related to their level of knowledge sharing.

Triandis (1980) defined *social factors* as "the individual's internalization of the reference groups' subjective culture, and specific interpersonal agreements that the individual has made with others, in specific social situations" and believed that one's *social factors* affects one's behavior. In their Theory of Reasoned Action (TRA) model, Ajzen and Fishbein (1980) also argue that *social factors* surrounding an individual (i.e., social norm) affect one's behaviors. Based on TRA model, Bock et al. (2005) found that *social factors* have a positive effect on individual's intention toward knowledge sharing. Lam (2000) also argues that organizational CoPs can create the collective form of knowledge by shared norms embedded in the organizational culture. Thus, we expect *social factors* surrounding CoP members lead to a higher level of knowledge sharing activities.

Hypothesis 3. CoP members' exposure and compliance to *social factors* is positively related to their level of knowledge sharing.

Triandis (1980) defines *facilitating conditions* as "objective factors, out there in the environment, that several judges or observers can agree make an act easy to do". In the CoP environment, orga-

nization's support is believed to play the role of facilitating condition toward more active knowledge sharing by CoP members (Wenger & Snyder, 2000). Yet, cultivating CoPs without proper *facilitating conditions* can give rise to unexpected native consequences, since CoPs are vulnerable (Garud & Kumaraswamy, 2005). Thus we develop the following hypothesis.

Hypothesis 4. Organizational provision of *facilitating condition* is positively related to CoP members' knowledge sharing.

4. Research method and data collection

4.1. Variables

All variables were measured in Likert-style 5 point scales (1 = strongly disagree, 5 = strongly agree). For *anticipated recognition*, Gruen et al.'s (2000) *recognition* variable, Bock and Kim's (2002) *anticipated reward* variable, and Kankanhalli, Tan, and Wei's (2005) *image* variable were adapted for the CoP context. *Anticipated reciprocal relationship* was measured by adapting Bock et al.'s (2005) *anticipated reciprocal relationship* variable for the CoP context. *Anticipated usefulness* was measured by adapting Thompson et al.'s (1991) *job fit* variable for the CoP context. *Anticipated recognition*, *anticipated reciprocal relationship*, and *anticipated usefulness* were used for as indicators to create the superordinate perceived consequences construct (Chin & Gopal, 1995). *Affect* variable measurement was based on Thompson et al. (1991) and Compeau, Higgins, and Huff (1999) studies while *social factors* were based on Chang and Cheung (2001). For calculating the level of social factors, CoP member's reference group members' (CEO, supervisor, colleagues) expectation toward the member's knowledge sharing was multiplied by the member's compliance to such expectation. *Facilitating conditions* variable was adapted from Thompson et al. (1991) and the dependent measure, *knowledge sharing in CoPs*, was adapted from the Bock and Kim's (2002) study to suit the CoP context. Tables 2 and 3 present the definitions and questionnaire items of the research variables, respectively.

4.2. Data collection and analysis

To secure CoPs that are distinguished from the traditional business or task force teams, we looked for an organization where CoP activities were voluntary and informal and the organization was willing to nurture such CoPs without formal control. A large division of a multinational electronics company, based in Korea, fit our target profile and agreed to participate in our study. Their CoPs were initiated in January 1999 to promote internal learning and problem solving. With 400 CoPs, about 50% of the 7300 members of the division are currently participating in CoP activities voluntarily.

About 300 sets of questionnaires were sent to the randomly selected members of the 70 CoPs which were recommended by the internal KM team as active CoPs. Among them, 202 members responded. After 23 questionnaires with incomplete data were eliminated, a total of 179 respondent data was used for final analysis. Respondent characteristics are presented in Table 4.

Since this study constructed the perceived consequences construct as a second order factor composed from anticipated recognition, anticipated reciprocal relationship, and anticipated usefulness formatively, PLS method, which enables the formation of latent constructs from formative indicators, was adopted (Chin, 1988). For this study, PLS-Graph Version 3.00 was used.

4.3. Measurement model

Before the structural relationships were examined, confirmatory factor analysis was conducted to assess the measurement model (see Table 5). Since the model contained one second-order variable (perceived consequences), we create superordinate second-order construct using factor scores of the first-order constructs (Chin, Marcolin, & Newsted, 2003). We treated the indicators of perceived consequences as formative because a drop in one indicator did not imply any change in the others (Hair, Anderson, Tatham, & Black, 1998).

To validate the measurement model, convergent validity and discriminant validity were evaluated. For evaluating convergent validity, composite reliability and average variance extracted were calculated. In the studies which used the PLS analysis, 0.7 is the minimum recommended level of reliability (Hair et al., 1998) and 0.5 was the minimum acceptable level of average variance extracted (Fornell & Larcker, 1981). In our study, composite reliabilities ranged from 0.825 to 0.974, and average variance extracted were 0.613–0.823, exceeding the threshold values for satisfactory convergent validity. In addition, to evaluate the discriminant validity, each variable's square root value of average variance extracted was compared with the correlations between variables. As in Table 5, for every variable, the square root value of average variance extracted was bigger than any correlation values with other variables, proving the discriminant validity of the study.

As shown in Table 6, since some variables were found to have relatively high correlation (e.g., anticipated usefulness and social factors: 0.589), multicollinearity test was also conducted. Since every variance inflation factor (VIF) values ranged from 1.561 to 2.043, multicollinearity did not seem to pose a threat.

5. Results and discussion

As can be verified in Fig. 3, the results of the tests supported all the hypotheses. The variables such as perceived consequences, affect, social factors and facilitating conditions all have a positive impact on knowledge sharing in CoPs, and tend to account for around 47% variance of knowledge sharing activities.

Firstly, the hypothesis that knowledge sharing will be more active in CoPs when the perceived consequences of knowledge sharing by CoP members are higher was supported. The fact that perceived consequences in knowledge sharing activities in CoPs is a factor denotes that if the level of perceived consequences is higher, knowledge sharing activity levels will also be higher. Thus, firms need to invest in improving CoP members' anticipated recognition, anticipated reciprocal relationship, and anticipated usefulness by providing opportunities for outstanding member

Table 2
Definitions of research variables.

Variable	Definition	Items
Anticipated recognition	Expected recognition of the CoP knowledge sharing activities by the organization	4
Anticipated reciprocal relationship	Expected improvement in member–member relationship due to CoP knowledge sharing activities	5
Anticipated usefulness	Expected improvement in work performance due to CoP knowledge sharing activities	4
Affect	Positive state of mind toward knowledge sharing in CoPs	5
Social factors	Reference group member's expectation on CoP knowledge sharing multiplied by one's compliance to such expectation	3
Facilitating conditions	Level of organization's support toward CoP activities	5
Knowledge sharing	Level of exchanging one's knowledge with other CoP members	4

Table 3
Questionnaire items.

Construct	Items	Statistics
Anticipated recognition	1. My knowledge sharing in the CoP would improve senior managers recognition of me. 2. My knowledge sharing in the CoP would improve other co-workers recognition of me. 3. My knowledge sharing in the CoP would have a good effect on the job evaluation of me. 4. My knowledge sharing in the CoP would give me opportunities to get honorable prizes.	Alpha = 0.911 Mean = 3.183 S.D. = 0.960
Anticipated reciprocal relationship	1. My knowledge sharing in the CoP would strengthen the ties between other members and myself. 2. My knowledge sharing in the CoP would get me well-acquainted with other members. 3. My knowledge sharing in the CoP would expand the scope of my association with other members. 4. My knowledge sharing in the CoP would deepen the relationship with other members. 5. My knowledge sharing in the CoP would create smooth cooperation with other members.	Alpha = 0.939 Mean = 3.723 S.D. = 0.767
Anticipated usefulness	1. My knowledge sharing in the CoP would ease learning for my job. 2. My knowledge sharing in the CoP would decrease the time needed for my important job responsibilities. 3. My knowledge sharing in the CoP would increase the effectiveness of performing job task. 4. Considering all tasks, my knowledge sharing in the CoP would assist on job.	Alpha = 0.889 Mean = 3.770 S.D. = 0.818
Affect	1. My knowledge sharing in the CoP is fun. 2. My knowledge sharing in the CoP makes work more interesting. 3. My knowledge sharing in the CoP gives me energy for my working life. 4. My knowledge sharing in the CoP refreshes me for my working life. 5. My knowledge sharing in the CoP provides me with lots of happiness.	Alpha = 0.910 Mean = 3.455 S.D. = 0.659
Social factors	<i>Normative beliefs on knowledge sharing</i> 1. My CEO thinks that I should share my knowledge with other members in the CoP. 2. My boss thinks that I should share my knowledge with other members in the CoP. 3. My colleagues think that I should share my knowledge with other members in the CoP. <i>Motivation to comply</i> 1. Generally speaking, I try to follow the CEO's policy and intention. 2. Generally speaking, I accept and carry out my boss's decision even though it is different from mine. 3. Generally speaking, I respect and put in practice my colleagues' decision.	Alpha = 0.904 Mean = 2.644 S.D. = 1.035
Facilitating conditions	1. Specialized instruction, concerning knowledge sharing in the CoP, is available to me. 2. Activities, promoting knowledge sharing in the CoP, are available to me. 3. A Specialized person (or group) is available for assistance with my Knowledge Sharing in the CoP. 4. Use of Information systems are very supportive for my knowledge sharing in the CoP. 5. Sponsors are very supportive for my knowledge sharing in the CoP.	Alpha = 0.894 Mean = 3.460 S.D. = 0.687
Knowledge sharing behavior	1. I frequently share the work reports and official documents obtained from inside the organization with other CoP members. 2. I frequently share the work reports and official documents obtained outside the organization with other CoP members. 3. I frequently share my experience or know-how from work with other CoP members. 4. I frequently share my expertise from my education or training with CoP members.	Alpha = 0.893 Mean = 3.557 S.D. = 0.725

Table 4
Respondent profile.

Measure	Category	Frequency	Percent (%)
Gender	Male	164	91.6
	Female	15	8.4
Age	21–25	50	27.9
	26–30	78	43.6
	31–35	40	22.4
	More than 35	11	6.1
Position	Employee	119	66.5
	Chief employee	48	26.8
	Manager	12	6.7
Work experience (unit: year)	0–5	116	64.8
	6–10	38	21.2
	More than 10	25	14.0

recognition and incentives for mentoring and joint problem solving behaviors.

In addition, the hypothesis that when the emotions of CoP members affect more positive, knowledge sharing within CoPs will be more active was also supported. When the external factors to knowledge sharing are accounted for, affect reflects the intrinsic motivations for knowledge sharing. The effect of affect at the workplace including fun, interest, energy and happiness on knowledge sharing, shows that knowledge sharing activities are influenced by the intrinsic motivations of the knowledge workers. Touching

CoP members' emotions by first working on establishing their community spirit through diverse membership activities (i.e., quiz, travel, competition, etc.) seems both necessary and effective for more active knowledge sharing among CoP members.

The third hypothesis that knowledge sharing within a CoP will be more active as social factors affecting the CoP members are stronger was also supported. This support suggests that, in addition to the member's personal extrinsic and intrinsic motivations, the social influence to which the member is subject to also affects their knowledge sharing. When the members are in agreement regarding the organizational need for knowledge sharing within CoPs, they were more likely to increase their knowledge sharing.

Lastly, for more active knowledge sharing within CoPs, the facilitating factors (i.e., education, promotion, KM team, IS support, etc.) were found to have a significant effect. Even if there were members' extrinsic and intrinsic motivational factors as well as an expressed organizational need for knowledge sharing within CoPs, if there are no organizational supporting systems to promote the knowledge sharing activities, knowledge sharing activities may not expand. Thus, an organization undertaking CoP initiatives needs to provide diverse educational courses, promotional events, information systems and official sponsors for more active knowledge sharing among its CoP members.

We can see thus conclude that knowledge sharing within a CoP is influenced by a combination of perceived consequences, affective and social motivations as well as facilitating factors. But, when comparing the extent of the effect, we find that the perceived

Table 5
PLS confirmatory factor analysis result.

Measure	Items	Composite reliability/Average variance extracted	Loading	Standard error	t-value
Perceived consequences	PC1	0.825/0.613	0.838	0.030	28.182
	PC2		0.797	0.034	23.309
	PC3		0.797	0.032	24.597
Anticipated recognition	AR1	0.928/0.792	0.921	0.011	81.769
	AR2		0.906	0.014	63.305
	AR3		0.851	0.022	39.399
	AR4		0.881	0.020	46.707
Anticipated reciprocal relationship	ARR1	0.974/0.805	0.901	0.016	56.500
	ARR2		0.904	0.015	60.210
	ARR3		0.903	0.014	63.046
	ARR4		0.876	0.026	34.487
	ARR5		0.902	0.015	60.622
Anticipated usefulness	AU1	0.924/0.751	0.863	0.020	40.882
	AU2		0.858	0.022	39.132
	AU3		0.897	0.018	51.466
	AU4		0.849	0.029	29.052
Affect	AFF1	0.933/0.735	0.860	0.024	36.236
	AFF2		0.883	0.018	49.936
	AFF3		0.854	0.025	33.712
	AFF4		0.875	0.019	46.773
	AFF5		0.814	0.040	20.633
Social factors	SF1	0.949/0.823	0.872	0.029	33.131
	SF2		0.928	0.012	74.220
	SF3		0.909	0.016	57.332
Facilitating conditions	FC1	0.922/0.703	0.819	0.027	30.620
	FC2		0.844	0.027	30.846
	FC3		0.824	0.030	27.684
	FC4		0.859	0.025	34.827
	FC5		0.845	0.024	35.603
Knowledge sharing behavior	KSB1	0.926/0.757	0.888	0.016	55.108
	KSB2		0.828	0.030	27.590
	KSB3		0.871	0.022	38.013
	KSB4		0.893	0.015	59.627

Table 6
Correlation between research constructs.

	PC	AR	ARR	AU	AFF	SF	FC
PC	0.890						
AR	0.508	0.897					
ARR	0.530	0.420	0.867				
AU	0.560	0.504	0.455	0.857			
AFF	0.575	0.574	0.463	0.566	0.907		
SF	0.476	0.348	0.441	0.589	0.477	0.838	
FC	0.443	0.546	0.478	0.575	0.521	0.540	0.870

Note: PC, perceived consequences; AR, anticipated recognition; ARR, anticipated reciprocal relationship; AU, anticipated usefulness; AFF, affection; SF, social factor; FC, facilitating conditions. The bold numbers in the diagonal row are square roots of the average variance extracted.

consequences and facilitating factors are more influential than affective or social motivations on knowledge sharing. This suggest that, as members of the group level collaborative mechanism, CoP members are influenced more by extrinsic factors (i.e., perceived consequences and facilitating conditions) than by intrinsic motivational factors (i.e., affect and social factors).

6. Conclusion and implications

This study identified and validated the factors which affect the CoP members' knowledge sharing activities. Based on the Triandis model, factors such as perceived consequences, affect, social factors, and facilitating conditions were examined as the potential drivers of knowledge sharing in CoPs. Depending upon the technol-

ogy acceptance and knowledge sharing literature, perceived consequences were further broken down into three sub-dimensions such as anticipated recognition, anticipated reciprocal relationship, and anticipated usefulness. The result confirms that all four antecedents (perceived consequences, affect, social factors, and facilitating conditions) significantly affect CoP knowledge sharing.

Contributions of this study are as follows: First, the Triandis model, which has been used to explain the new technology acceptance process in the IS field, has been applied to the CoP knowledge sharing context. Triandis model enabled the integration of the multi-dimensional drivers such as individual extrinsic motivation (perceived consequences), individual intrinsic motivation (affect), social motivation (social factors), and organizational motivation (facilitating conditions) in understanding the various factors affecting individual members' knowledge sharing activities in CoPs.

Second, this study developed the new sub-dimensions for the perceived consequences construct from the organization–member (anticipated recognition), member–member (anticipated reciprocal relationship), and member–work (anticipated usefulness) to fit the CoP knowledge sharing context.

In terms of practical implications of the study, organizations need to pay attention to diverse motivational dimensions and establish an appropriate support system to strengthen each motivational dimension, to activate the CoP members' knowledge sharing activities. For instance, in addition to various rewards or incentives focused on individual compensation, to invest in improving the social surroundings of the CoP members (e.g., reference groups) and an organizational support system is needed (e.g., flexible on-line and off-line CoP infrastructure such as video conferencing, meeting rooms, etc.).

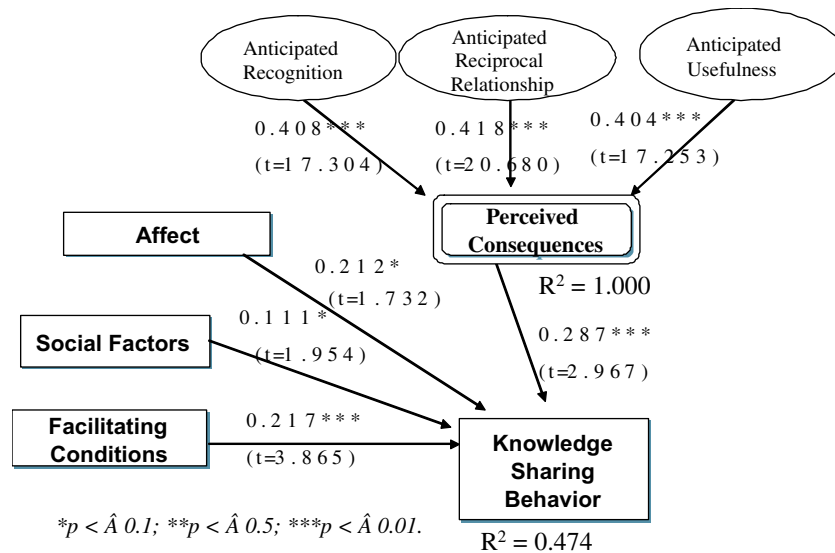


Fig. 3. Results of PLS analysis.

The limitations and future research directions of this study include: First, the findings of this study are not generalizable since all data came from a single organization. At the time of this study, it was rare to find an organization that had a large number of active CoPs operating in voluntary, informal ways as defined in the literature. As more organizations realize the importance of CoPs and introduce them, future studies will be able to collect data from more diverse sources. Second, this study is not free from the Common Method Variance (CMV) problem since it asked the same group of respondents about both independent and dependent variables. To prevent this problem, a future study can separate the groups of respondents between independent and dependent variables or introduce objective dependent measures (e.g., number of knowledge registrations in KMS). Finally, this study did not examine the effects of mediating or moderating variables on the relationship between independent and dependent variables. Future studies may address variables such as knowledge sharing intention (mediating) or IT utilization (moderating) in addition to the current model.

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