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Fostering Knowledge Exchange in Online Communities: A Social Capital Building Approach

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FOSTERING KNOWLEDGE EXCHANGE IN ONLINE COMMUNITIES: A SOCIAL CAPITAL BUILDING APPROACH

Favoriser l'échange de connaissances dans les communautés en ligne : une approche par le capital social

Completed Research Paper

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Abstract

Prior studies on knowledge contribution started with the motivating role of social capital to predict knowledge contribution but did not specifically examine how they can be built in the first place. Our research addresses this gap by highlighting the role technology plays in supporting the development of social capital and eventual knowledge sharing intention. Herein, we propose four technology-based social capital builders – identity profiling, sub-community building, feedback mechanism, and regulatory practice – and theorize that individuals' use of these IT artifacts determine the formation of social capital, which in turn, motivate knowledge contribution in online communities. Data collected from 253 online community users provide support for the proposed structural model. The results show that use of IT artifacts facilitates the formation of social capital (network ties, shared language, identification, trust in online community, and norms of cooperation) and their effects on knowledge contribution operate indirectly through social capital.

Keywords: Online community, knowledge exchange, knowledge contribution, social capital

Résumé

Cette recherche souligne le rôle de la technologie dans la création du capital social au sein des communautés en ligne. Quatre facteurs basés sur la technologie permettent de construire le capital social : profilage d'identité, création de sous-communautés, mécanisme de feedback et pratique régulatrice. L'utilisation de ces artefacts technologiques par les individus détermine la formation du capital social qui, à son tour, favorise le partage de connaissances.

Introduction and Theoretical Background

Social computing technology has facilitated online interactions among geographically distributed groups of people with similar interests or goals. These online groups, known as online communities, are defined as "the cyberspace supported by computer-based information technology, centered upon communication and interaction of participants to generate member-driven contents, resulting in a relationship being built up" (Lee et al. 2003). Online knowledge communities represent a form of these communities where people share their knowledge for mutual learning or problem solving, and thus, have significant source of value for knowledge building and exchange. For example, it is found that online knowledge communities support organizational knowledge flows between dispersed research and development efforts (Ahuja et al. 2003), and help to gather worldwide individuals interested in particular knowledge domain (Koh and Kim 2004; Wasko and Faraj 2000; Walther 1995; Hemetsberger and Reinhardt 2006).

Successful operation of an online knowledge community relies on the voluntary, cooperative, and prosocial participation of its members. Particularly, the presence of a group of people dedicated to contributing their knowledge to others and advancing the knowledge contents of the collective is required to ensure its effective functioning. Otherwise, such an online community would simply be a cyberspace containing static pieces of outdated contents rather than an ongoing source of value for knowledge sharing and creation. Accordingly, it is important to understand the reasons that drive individuals' knowledge contribution behaviors in online communities.

Some hints on the direction to study the drivers of knowledge contribution can be found within Lee et al.'s (2003) definition of online community as quoted at the beginning. Firstly, the terms "communication and interaction" and "relationship" highlight the social component of knowledge exchange activities within an online community. That is, knowledge exchange does not just happen in an individual's mind alone, but is situated in a social context where interpersonal relationships and social interactions among the community members play a key role. This suggests that the drivers of knowledge contribution are better approached with concepts covering the several aspects of a social context and with theories grounded in social relationships. Secondly, the term "information technology" highlights the need to consider the role IT may take in motivating individuals' knowledge contribution. Since technology is the medium through which community members interact and communicate, it is essential to understand how IT can support social interaction and facilitate the formation of a social context conducive to knowledge contribution.

Based on the aforementioned points, a theoretical framework from the knowledge-based view of the firm – the social capital theory (Nahapiet and Ghoshal 1998), which takes into account various complex aspects of a social context, is chosen to inform the model development in this study. Social capital is generally defined as "the features of social life – networks, norms, and trust – that enable participants to act together more effectively to pursuer shared objectives" (Putnam 1996). This concept encompasses many aspects of a social context which Nahapiet and Ghoshal (1998) regarded as the structural, the cognitive, and the relational dimensions of social capital. The structural dimension concerns the overall pattern of relationships found in a collective. This dimension, manifesting as instrumental network ties and expressive network ties, involves the extent to which members in the online community know and connect one another. The cognitive dimension concerns the extent to which individuals share a common perspective or understanding in the online community. It involves such resources as shared language that makes possible shared meaning and representation among the community members. The relational dimension concerns the nature of the connections among community members. It involves the extent to which individuals identify with the online community, trust this online community, and share a norm of cooperation there. According to social capital theory, individuals are more likely to contribute knowledge to one another when there are network ties between them (structural capital), when they can communicate with a shared language (cognitive capital), and when their relationships have strong, positive characteristics such as identification, trust, and norms of cooperation

(relational capital). These three dimensions of social capital have been put forward as the main drivers of knowledge contribution within a collective, based on the reasoning that they create supportive conditions for knowledge exchange (Nahapiet and Ghoshal 1998).

The concept of social capital has been applied in a number of knowledge management studies. It has been found useful in explaining and predicting various knowledge exchange behaviors and outcomes, such as knowledge transfer (Levin and Cross 2004; Rhodes and Lok 2008), knowledge creation (Chua 2002), knowledge acquisition and exploitation in interorganizational relationships (Yli-Renko et al. 2001), intrafirm resource exchange and combination (Tsai and Ghoshal 1998), and knowledge contribution in electronic networks (Chiu et al. 2006; Wasko and Faraj 2005; Wiertz and de Ruyter 2007; Chen 2007). Appendix A summarizes the literature related to the study of social capital in the area of knowledge management, with the social capital factors grouped into the structural, the cognitive, and the relational dimensions of social capital suggested by Nahapiet and Ghoshal (1998). The studies fall into two categories. One of them attempts to develop the conceptual models of knowledge management that include social capital factors as the determinants while the other category attempts to test the proposed models empirically.

As can be seen from Appendix A, the research models for most studies were developed and tested in an organizational context. Few studies have applied the social capital theory to other contexts. Also, many studies focused on either one or two dimensions of social capital when applying the theory. Among the studies that attempt to examine knowledge contribution behaviors in computer-mediated settings, only one has considered all three dimensions of social capital and empirically tested their effects in a non-organizational context (Chiu et al. 2006). This suggests that more research is required to extend the application of social capital theory beyond the organizational context and to investigate how each social capital dimension influences computer-mediated knowledge sharing behaviors.

Another observation from the reviewed studies is the lack of research on the antecedent of social capital. As shown in Appendix A, many empirical studies have supported social capital as a salient driver of knowledge exchange, demonstrating its importance in motivating knowledge contribution. Despite this insight, extant literatures have not addressed the possible ways to foster the development of social capital in online communities. This leaves a gap in advancing our understanding of the drivers of knowledge contribution as well as the role of technology in online communities. Therefore, it is incumbent on researchers to find a feasible approach to build social capital in online communities and identify any technology-enabled way that can achieve the desired change effectively.

Regarding the above issues, this research attempts to develop and test a variance model for building effective online knowledge communities by examining the role of technology. Given that social capital arises out of social interactions among individuals (Nahapiet and Ghoshal 1998; Adler and Kwon 2002) and that technology is the medium through which people interact in the online community, there should be an implicit linkage between individuals' use of certain IT artifacts available in the online community and the level of social capital there. Thus, we investigate how individuals' use of certain IT artifacts available in the online community fosters the development of social capital. In so doing, this research aims to understand what technology-enabled ways can be taken to cultivate social capital so as to encourage knowledge contribution in online communities.

Research Model and Hypotheses

Grounding the research framework on Nahapiet and Ghoshal's (1998) social capital theory, our research model is shown in Figure 1. The hypotheses to be tested can be divided into two groups. One group of hypotheses addresses the relationships between a set of social capital factors and knowledge contribution. The other group of hypotheses deals with the links between the use of IT artifacts and the social capital factors. Our model proposes that individuals' use of IT artifacts facilitates the development of social capital, which in turn, motivates knowledge contribution in the online community.

Knowledge Contribution

In the research model, the key dependent construct we focus on is knowledge contribution. Knowledge contribution concerns the willingness of individuals to share with others the knowledge they have acquired or created. It is defined here as the extent to which one voluntarily shares his/her knowledge with the online community and thus, makes such knowledge available to other community participants.

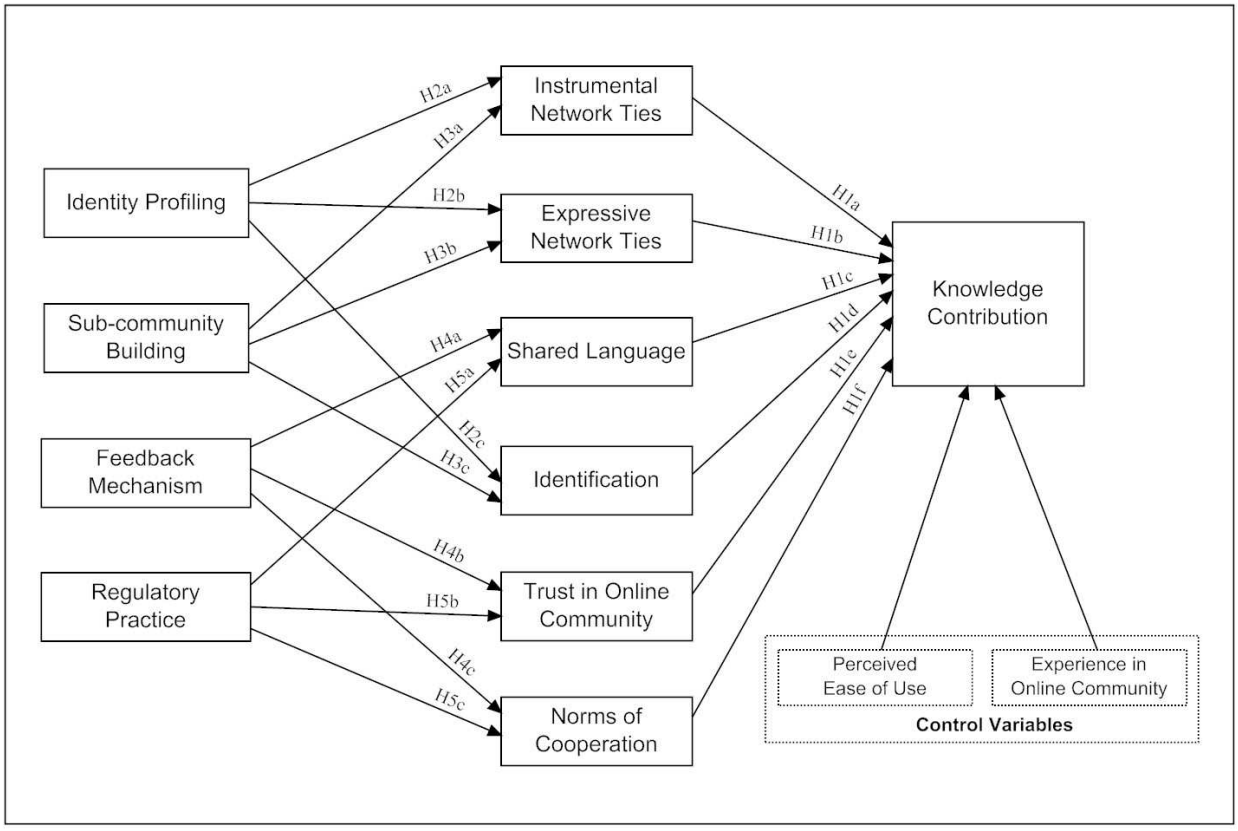

Figure 1. Research Model

Social Capital and Knowledge Contribution

As mentioned before, social capital encompasses various aspects of a social context that provide the supportive conditions for knowledge exchange (Nahapiet and Ghoshal 1998). Following Nahapiet and Ghoshal (1998), we propose that the structural dimension of social capital (instrumental network ties and expressive network ties), the cognitive dimension of social capital (shared language), and the relational dimension of social capital (identification, trust in online community, and norms of cooperation) motivate individuals' knowledge contribution in the online community.

Network Ties

In an online community, people may know some members whom they regard as experts, mentors etc., or may get acquainted with some members from whom they can derive a feeling of friendship and comfort. These "other members" whom an individual knows or gets acquainted with represent his/her network ties in the online community. Network ties refer to those community members that an individual knows at a personal level and regards as more accessible than his/her "nodding community acquaintances." They are the channels for resources flow and may exist in the form of instrumental or expressive network ties. While instrumental network ties mainly serve as the channels for task-related resources and information flow, expressive network ties are more friendship-based that they usually function as the channels for emotional support (Ibarra and Andrews 1993).

Network ties provide a cost-effective way for resource access and constitute a valuable source of information benefits (Tsai and Ghoshal 1998). They influence access to parties for combing and exchanging knowledge, as well

as the anticipation of value through such exchange (Nahapiet and Ghoshal 1998). Prior research provided evidence that the size of personal network in which a person is embedded influences his/her willingness to share knowledge (Tsai and Ghoshal 1998; Yli-Renko et al. 2001; Wasko and Faraj 2005). Thus, the more network ties an individual develops in the online community, the more likely he/she will contribute knowledge there. This leads to the following hypotheses.

H1a. Instrumental network ties are positively related to knowledge contribution.

H1b. Expressive network ties are positively related to knowledge contribution.

Shared Language

Language is the means by which people communicate, exchange information, ask questions, and conduct collective activities. As language influences individuals' perception, it serves an important function in social relations (Berger and Luckman 1966; Pondy and Mitroff 1979). Meaningful communication requires at least some sharing of context between the parties to such exchange (Boisot 1995; Boland and Tenkasi 1995; Campbell 1969) since a degree of shared understanding is essential for people to comprehend and integrate newly acquired information (Cohen and Levinthal 1990). This common base of understanding can be achieved through the use of shared language to transmit or retrieve information (Nahapiet and Ghoshal 1998).

In an online community, the wording, symbols, terms, jargon, and narrative forms commonly adopted by its members constitute their shared language which allows them to communicate effectively with one another. Shared language facilitates individuals to access information, to integrate new ideas, and to exchange knowledge because it reduces both their encoding and decoding efforts (Szulanski 1996). Thus, people are more willing to share knowledge with one another when they posses common set of language, codes, and communicative pattern. This leads to the following hypothesis.

H1c. Shared language is positively related to knowledge contribution.

Identification

Identification refers to the degree to which individual sees the self as similar to other members of the online community, attributes community-defining characteristics to the self, and takes the community's interest to heart (Turner 1987). It is the individual's feeling of relationship to the online community (Heller et al. 1984; Newbrough and Chavis 1986) and his/her perception of an acknowledged interdependence with other community members (Sarason 1974). According to social identity theory, once individuals identify with a group, they are likely to support it in a variety of ways because the group's welfare is psychologically incorporated into their self-concept. Also, they are likely to focus on tasks that benefit the whole community rather than on purely self-interested ones (Tajfel and Turner 1986; Hogg 2003). For example, researchers have found that people having high identification to their group are more willing to engage in voluntary behavior on behalf of the group because they feel that the group is providing them with a favorable identity (Tyler and Blader 2000).

Some studies have also demonstrated that people share knowledge with the expectation of helping the online community to accumulate its knowledge, continue its operation and grow (Bock and Kim 2002; Kolekofski and Heminger 2003; Lesser 2000; Chiu et al. 2006). In an online community, individuals can probably provide support by keeping themselves informed about the available knowledge resources in the community, by reading others' postings to see if improvement can be made, by inputting new knowledge resources to the community etc. Thus, the more individuals identify with the online community, the more they are motivated to voluntarily provide support to other community members. This leads to the following hypothesis.

H1d. Identification is positively related to knowledge contribution.

Trust in Online Community

Trust is the belief that the intended action of others would be appropriate from our point of view (Mistzal 1996). It indicates a willingness of people to be vulnerable to others due to the belief in their good intent and concern, competence, and reliability (Mishra 1996). Trust plays a key role as a foundation for effective collaboration (Kramer

1999; Mayer et al. 1995; Rousseau et al. 1998; Whitener et al. 1998) and is a crucial factor in determining the effectiveness of many relationships (George and Jones 1998; Newell and Swan 2000).

Instead of studying one's trust in other community participants, our study concentrates on one's trust in the online community. This kind of trust refers to an individual's subjective belief with which he/she believes that fair rules, procedures, and outcomes will be enforced competently, reliably, and with integrity in the online community. Trust in online community is especially essential to online-originated knowledge exchange communities where people interact with unknown others and share knowledge through the Internet infrastructure held by an online community provider. Actually, individuals' trust in the online community is arguably the first determinant of whether they will seek or contribute knowledge there. People may not be able to consider individual community participants nor have intention to develop trust with them unless they make the decision to visit the online community in the first place. Hence, this leads to the following hypothesis.

H1e. Trust in online community is positively related to knowledge contribution.

Norms of Cooperation

A norm exists when the socially defined right to control an action is held not by the actor but by others. It represents a degree of consensus in the social system (Coleman 1990). Some interaction norms that have been posited to enhance collective actions include norms of teamwork (Starbuck 1992), collaboration and sharing (Goodman and Darr 1998; Jarvenpaa and Staples 2000; Orlikowski 1993), willingness to value and respond to diversity, openness to conflicting views, and tolerance for failure (Leonard-Barton 1995). Norms of cooperation emphasize personal effort toward group outcomes as opposed to individual outcomes and convey the message that social interaction within the community should be carried out in a cooperative manner.

According to Nahapiet and Ghoshal (1998), norms of cooperation can establish a strong foundation for the creation of intellectual capital because they open up access to parties for knowledge exchange and ensure the motivation to engage in such exchange. Prior studies on knowledge management also showed that norms of cooperation encourage individuals' usage of electronic knowledge repositories for knowledge seeking and knowledge sharing (Bock et al. 2006; Kankanhalli et al. 2005). Thus, individuals may be more willing to contribute knowledge when norms of cooperation are prevalent in the online community. This leads to the following hypothesis.

H1f. Norms of cooperation is positively related to knowledge contribution.

Use of IT Artifacts and Social Capital

To investigate how social capital can be built, we take into account the role of technology and suggest that individuals' use of particular IT artifacts available in the online community can foster the development of social capital. Since there was no established theoretical framework addressing the linkage between IT artifacts and social capital, we identified the IT artifacts that could support the formation of social capital through an extensive review of the literature and an in-depth observation of a large number of online communities. Besides, we observed and engaged in the knowledge sharing activities of several popular online communities, such as Wikipedia, Yahoo! Answers, Google Groups etc. Based on a literature review, observation of the technology features of different online communities, and participation in community members' discussions, we summarized the IT artifacts that could potentially facilitate the development of social capital into four groups, namely, identity profiling, sub-community building, feedback mechanism, and regulatory practice.

Use of Identity Profiling

Identity profiling represents the IT artifacts that allow an individual to communicate and present his/her personal information to other members in the online community. Some examples of these IT artifacts include the user login IDs, the screen names or nicknames used in the online community, the user profiles, and the personal webpage for posting photos, stories or other personal information.

Use of identity profiling is proposed to facilitate the formation of instrumental network ties and expressive network ties, based on the premise that self-disclosure (the sharing of personally revealing information about the self) provides opportunities for chance connections and the building up of new contacts among individuals. This

argument is supported by prior findings that personal information can promote interpersonal bonds among people who have not yet interacted (Walther and Parks 2002; Collins and Miller 1994).

In real life, people may establish relationships with others and make new contacts by sending out their business cards to others. This piece of personal information which is self-disclosed in the form of a visiting card, a business card, or a calling card is likely to facilitate the formation of relationships between people who are not already acquainted. In the online community, an individual's use of identity profiling may function similarly to his/her disseminating of a name card to others in real life. By using a consistent user ID, a meaningful screen name, and presenting personal information in the user profile, individuals can lay the groundwork for building up their network ties (no matter instrumental or expressive) because it helps to increase their visibility in the online community.

Besides, use of identity profiling is believed to promote individuals' identification based on the argument that it facilitates the self-categorization process. The social identity theory posits that people categorize themselves and others into categories to derive their social identities (Turner 1987). In this self-categorization process, people evaluate the perceived similarities between the self and other group members based on any traits and social cues they can observe from others. The traits and social cues can be anything like attitudes, beliefs and values, affective reactions, behavioral norms, styles of speech etc. However, in the online community where social interaction is highly anonymous and face-to-face communication is not always possible, it is difficult for people to undergo self-categorization due to insufficient social cues for them to make an accurate evaluation.

With the help of identity profiling, an individual can communicate his/her identity through the use of a specific screen name or a user ID which enable others to form a more accurate perception and understanding of him/her. Also, by presenting photos, a tailored background, and a certain amount of information in the personal profiles, individuals can make themselves more identifiable and visible in the collective. This in turn facilitates the self-categorization process and fosters individuals' identification with the online community. Based on the above arguments, we therefore suggest the following hypotheses.

H2a. Use of identity profiling is positively related to instrumental network ties.

H2b. Use of identity profiling is positively related to expressive network ties.

H2c. Use of identity profiling is positively related to identification.

Use of Sub-community Building

Sub-community building represents the IT artifacts that help an individual to organize their own groups within the online community. Some examples of these IT artifacts include the user directories and archive search tools that allow individuals to form groups with other members based on their interested knowledge topics.

Use of sub-community building is proposed to foster the formation of instrumental network ties, expressive network ties, and identification, based on the premise that similarity increases the likelihood of relationship building and promotes interpersonal attraction. People with similar traits (e.g. interests, attitudes, experiences, beliefs, values, affective reactions, and styles of speech) tend to build relationships with each other and form themselves as a social group (Stets 2000). According to social identity theory, people in a social group view themselves as members of the same social category. They take on group-based identities and have a high level of shared understanding (Hogg and Abrams 1988). Prior studies showed that mutual understanding removes the barriers of communication and information flow (Krauss and Fussell 1990). Also, shared values and goals bind the members of human networks and make cooperative action possible (Cohen and Prusak 2001). Thus, individuals within the same social group are more willing to communicate and have frequent interaction.

Using sub-community building, an individual can interact with group members who have a shared understanding with him/herself and can probably identify those possessing useful knowledge to him/her. This helps to increase one's network ties in the online community and extends his/her personal network. Besides, according to social identity theory, people having group identities feel a strong sense of belonging to their groups and tend to make positive evaluations of their group members (Haslam et al. 1996). For example, it is found that individuals who use the group label to describe themselves behave in harmony with one another (Ethier and Deaux 1994) and demonstrate strong commitment to the group (Ellemers et al. 1997). Hence, use of sub-community building helps an individual to develop his/her group identities and sense of belonging in different groups in the online community. Given that these groups are nested within the broader online community to which an individual belongs, it is

believed that one may generalize his/her sense of identification developed in sub-communities to the broader online community. This suggests that use of sub-community building can improve individuals' identification with the online community. Based on the above arguments, we therefore suggest the following hypotheses.

H3a. Use of sub-community building is positively related to instrumental network ties.

H3b. Use of sub-community building is positively related to expressive network ties.

H3c. Use of sub-community building is positively related to identification.

Use of Feedback Mechanism

Feedback mechanism represents the IT artifacts that function as informal, self-regulated systems where an individual can describe his/her past experiences with specific community members. They are usually constructed based on peer evaluations, reviews, and ratings.

Using the feedback mechanism, people can give comments to others and each person can have their own profile showing all feedbacks from others. In traditional communities, some informal social mechanisms can facilitate transaction and cooperation by establishing economic rules of conduct and punishing those who do not adhere to these rules (Fukuyama 1995). The feedback mechanism also works in a similar way. By capturing the overall reputation of the community participants, the feedback mechanism gives people a self-reference on what constitutes appropriate conduct, and provides incentives not to engage in opportunistic behavior (Ba and Pavlou 2002). Thus, the feedback mechanism can act as a sanctioning system that penalizes opportunistic behavior and promotes cooperative behavior. This suggests that use of feedback mechanism can help develop trust in online community and norms of cooperation.

Besides, use of a feedback mechanism is believed to facilitate the formation of shared language, based on the premise that the feedback mechanism serves as a back channel for communication other than the common knowledge exchange area in the online community. For example, in Wikipedia, there is an area intended for joint editing of the knowledge content as well as a "talk page" dedicated to off-topic discussion or members' communication which is more social in nature. Using the feedback mechanism, individuals have more opportunities to engage in the sharing of non-technical information like personal anecdotes or comments. It is believed that this kind of social interaction is important for the development of shard language in the online community. Some real life example also illustrated this point. For instance, employees are more likely to learn the myths, stories and metaphors of their company by participating in some informal social events with their managers or peers rather than do so during their work. Based on the above arguments, we suggest the following hypotheses.

H4a. Use of a feedback mechanism is positively related to shared language.

H4b. Use of a feedback mechanism is positively related to trust in online community.

H4c. Use of a feedback mechanism is positively related to norms of cooperation.

Use of Regulatory Practice

Although the user-driven feedback mechanism enables mutual monitoring among community participants by establishing economic rules of conduct, they are sometimes costly to use. For example, individuals have to spend time to input their feedback comments or to verify the feedbacks posted by others. Also, since individuals hold different opinions and standards, they may find it difficult to gain consensus on such issues as "how to judge the quality of knowledge posted by others?" or "what vocabularies and narratives best function as our shared language?" According to transaction cost economics (Coase 1937; Williamson 1975; Williamson 1985), people can rely on certain governance structures held by a third party as complements when it is costly to use the market mechanism. In an online community, the regulatory practice predefined by the online community provider is expected to function as such governance structures to complement the user-driven feedback mechanism. While regulatory practice may reduce uncertainty and transaction cost in many ways, our focus in this study is its ability to develop shared language among community participants, to build individuals' trust in the online community, and to promote norms of cooperation there.

Regulatory practice refers to any rules, procedures and guidelines instituted by the online community provider. Usually, it helps to develop shared language via two ways. Firstly, many online communities require knowledge

contributors to follow some rules when posting their messages. For example, Wikipedia provides a standard template for people so that they can have a consistent editing reference for crafting their knowledge postings. Secondly, the regulatory practice may cover guidelines that explain any special vocabularies commonly adopted by community participants. This aids the "new comers" to understand the communication patterns used in the community.

Besides, the regulatory practice formalizes specific rules to restrict opportunistic behavior within the community. Enforcing these rules, the online community provider can, for instance, remove the offending postings or cancel the membership of any troublemakers. Such measures help to grow a reliable environment for knowledge exchange. Especially, they allow individuals to build trust in the online community and support the development of cooperative norms by conveying fair treatment and fair outcomes. Based on these discussions, we suggest the following hypotheses.

H5a. Use of regulatory practice is positively related to shared language.

H5b. Use of regulatory practice is positively related to trust in online community.

H5c. Use of regulatory practice is positively related to norms of cooperation.

Control Variable

Besides the variables proposed in hypotheses 1a to 5c, we control for the effects of other variables that may influence the level of knowledge contribution.

Perceived Ease of Use

The idea that technology varies in terms of its ease of use is well established in the information systems literature (Davis 1989). The extent to which a system is easy to use increases the extent to which people seek or contribute knowledge in the online community. Thus, to ensure that the hypothesized effects are not confounded by software quality issues, we control for perceived ease of use.

Experience in Online Community

Individual experience in an online community can have a positive effect on knowledge contribution. People who have been with an online community for a longer time are likely to better understand how their expertise is relevant, and are thus better able to share knowledge with others.

Research Method

Operationalization of Constructs

The constructs of interest to this study included: identity profiling, sub-community building, feedback mechanism, regulatory practice, instrument network ties, expressive network ties, shared language, identification, trust in online community, norms of cooperation, perceived ease of use, and experience in online community. Measurement items for these constructs were adapted from pre-validated instruments wherever possible while new measures were developed based on relevant theories and prior studies.

The measurements for identity profiling, sub-community building, feedback mechanism, and regulatory practice were developed based on insights derived from Ma and Agarwal's (2007) study. Their ways to theorize and operationalize the role of technology served as the basis for designing these measurement items. The measurements for instrumental network ties and expressive network ties were developed based on relevant literatures. We used the network measures adopted in Brass's (1984) study, Ibarra and Andrews's (1993) study, Shane and Cable's (2002) study, and Westphal et al.'s (2006) study as a guide to design the measurement items. Shared language was measured with items developed based on Chiu et al. (2006). Knowledge contribution was measured with items developed based on Bock et al. (2005). The measurements for identification, trust in online community, norms of

cooperation, perceived ease of use, and experience in online community were adapted from prior studies, with the items modified to fit the current study.

The preliminary survey instrument was first reviewed by academics with expertise in survey methods and then pilot tested with 41 individuals who had at least three years worth of experience in various online knowledge communities. Feedback was gathered on the applicability of the measurement items, the conciseness of wording used, the layout of the questionnaire, as well as the time required to complete the survey. After that, the measurement instrument was shortened, refined, and validated for its statistical properties. The finalized scale items, along with their sources were presented in Appendix B.

Data Collection

The population of interest for this study is those Internet users who have had experience with online knowledge communities, both as existing and potential users of these online community systems. This population was chosen because the respondents should at least have some understanding of the online knowledge community systems to provide opinions on a number of the survey questions.

Data for testing the research model were collected using both Web-based and paper-based surveys. Participants of the Web-based survey were recruited via an announcement posted on a number of online communities. Since the focus of this study is on knowledge exchange, we limit our scope of research sites to one type of communities classified by Armstrong and Hagel (1996) as the community of common interest or information exchange. In each online community, a formal request detailing the purpose of this study together with a hyperlink connecting to our Web survey were posted on the discussion forums, and community members were invited to fill out the online questionnaire. To capture the responses from those less-active online community members, we also conducted an offline survey through distributing paper questionnaires to a sample of students and alumni from the universities in Hong Kong. By the time this survey was concluded, 253 complete responses were received. Table 1 lists the demographic profile of the respondents.

Data Analysis and Results

The research model was tested using the partial least squares (PLS) approach of structural equation modeling. PLS is suitable for handling complex predictive models as it avoids inadmissible solutions and factor indeterminacy (Fornell and Bookstein 1982). We employed the SmartPLS 2.0 software (Ringle et al. 2005) for data analysis with raw data as input to the PLS program. All measured items were modeled as reflective indicators of their corresponding constructs and path significances were estimated with the 500-resample bootstrapping technique. Following the recommended two-stage procedures (Hair et al. 2006), the measurement model was first assessed using confirmatory factor analysis (CFA); then, the structural relationships among constructs were examined.

Measurement Model

To test for the adequacy of the measurement model, both convergent and discriminant validities were assessed. Convergent validity was assessed by inspecting the composite reliabilities for each construct, the average variance extracted (AVE) from the measures, and by examining the loadings of the measures with their respective constructs. As shown in Table 2, the composite reliabilities of all constructs exceeded the recommended level of 0.70, indicating adequate internal consistency (Bagozzi and Yi 1988). Besides, all AVEs were greater than the generally recognized 0.50 cutoff. This suggested that the constructs captured much higher construct-related variance than error variance (Fornell and Larcker 1981). Although the loadings for a few items (ranged from 0.52 to 0.68) did not reach the 0.70 guideline, an inspection of the cross-loading table (Table 4) found that they still loaded significantly higher on their own constructs (IdPro, Exper, FbMec, RegPra) than the others. Given that these constructs had sufficient AVEs and composite reliabilities, overall, the measurement model exhibited convergent validity.

Discriminant validity was assessed by comparing the square root of the AVE with the inter-construct correlations. As shown in Table 3, all values for the square root of AVE displayed in the diagonal were greater than the off-diagonal elements in the corresponding rows and columns. Also, the inter-construct correlations were all well below the 0.90 threshold. This indicated that the constructs were distinct from one another. To further verify the validity of our measures, the loadings and cross-loadings of all measurement items were examined. According to Table 4, each

item loading in the table was much higher on its assigned construct than on the other constructs. Jointly, the evidences suggested adequate convergent and discriminant validities of the constructs.

Considering the high inter-correlations among some constructs and the self-report nature of our survey data, we also assessed the potential threat of multicollinearity and common method bias. To evaluate the severity of multicollinearity, the variance inflation factor (VIF) for all constructs was calculated. Results from regression analysis showed that the values of VIF ranged from 1.10 to 2.78, which were lower than the recommended cutoff threshold of 10 (Hair et al. 2006; Meyers et al. 2006). This indicated that multicollinearity did not present a serious problem. The extent of common method bias was assessed using the Harman's one-factor test. Following Podsakoff et al. (2003), we subjected all measurement items to a principal components factor analysis. Results from this test showed that multiple factors were present and no single factor explained a majority of the covariance, suggesting that common method bias was not a likely threat.

Table 1. Demographic Information of Respondents

Measure	Frequency	Percentage
Gender		
Male	118	46.6
Female	134	53.0
Missing	1	0.4
Age		
17 – 20	21	8.3
21 – 30	154	60.9
31 – 40	34	13.4
41 – 50	12	4.7
51 – 60	26	10.3
> 60	5	2.0
Missing	1	0.4
Education		
Primary or below	2	0.8
Secondary	17	6.7
College or university	135	53.4
Master or above	98	38.7
Missing	1	0.4
Occupation		
Studying full-time	102	40.3
Working full-time	112	44.3
Studying and working part-time	18	7.1
Unemployed	8	3.2
Retired	10	4.0
Others	2	0.8
Missing	1	0.4
Weekly Usage of Online Knowledge Community System in Hours		
< 1	15	5.9
1 – 5	144	56.9
6 – 10	57	22.5
11 – 15	17	6.7
16 – 20	8	3.2
21 – 25	3	1.2
26 – 30	3	1.2
> 30	5	2.0
Missing	1	0.4
No. of Months Using Online Knowledge Community System		
1 – 10	89	35.2
11 – 20	52	20.6
21 – 30	38	15.0
31- 40	33	13.0
41 – 50	18	7.1
51 – 60	11	4.3
> 60	10	4.0
Missing	2	0.8

Table 2. Results of Confirmatory Factor Analysis

Construct	Scale Item	Loading	T-value	Composite Reliability	AVE
IT_iIP	IT_iIP1	0.52	6.27	0.81	0.54
	IT_iIP2	0.51	6.54		
	IT_iIP3	0.89	50.92		
	IT_iIP4	0.91	72.14		
IT_iSB	IT_iSB1	0.82	28.10	0.89	0.66
	IT_iSB2	0.86	38.18		
	IT_iSB3	0.75	18.48		
	IT_iSB4	0.83	26.58		
IT_oFM	IT_oFM1	0.71	12.33	0.82	0.53
	IT_oFM2	0.68	15.59		
	IT_oFM3	0.80	23.10		
	IT_oFM4	0.73	16.32		
IT_oRP	IT_oRP1	0.73	19.34	0.81	0.51
	IT_oRP2	0.68	12.80		
	IT_oRP3	0.75	16.53		
	IT_oRP4	0.70	14.85		
TiesIns	TiesIns1	0.88	39.59	0.93	0.81
	TiesIns2	0.91	59.73		
	TiesIns3	0.91	63.28		
TiesExp	TiesExp1	0.94	88.06	0.96	0.89
	TiesExp2	0.95	128.20		
	TiesExp3	0.94	93.32		
ShaLang	ShaLang1	0.77	15.61	0.87	0.68
	ShaLang2	0.87	40.47		
	ShaLang3	0.83	24.08		
Ident	Ident1	0.83	30.47	0.94	0.81
	Ident2	0.94	98.11		
	Ident3	0.91	59.83		
	Ident4	0.91	57.78		
Trust	Trust1	0.90	40.63	0.95	0.84
	Trust2	0.91	56.22		
	Trust3	0.94	93.23		
	Trust4	0.91	36.97		
NormCop	NormCop1	0.89	56.29	0.91	0.77
	NormCop2	0.84	22.57		
	NormCop3	0.89	52.73		
KnoCon	KnoCon1	0.90	65.73	0.93	0.77
	KnoCon2	0.84	33.77		
	KnoCon3	0.88	41.51		
	KnoCon4	0.90	45.65		
EaseUse	EaseUse1	0.91	58.71	0.95	0.85
	EaseUse2	0.94	69.81		
	EaseUse3	0.92	53.62		
Exper	Exper1	0.89	7.36	0.76	0.62
	Exper2	0.66	3.77		

Note: IdPro = Identity profiling; SubCom = Sub-community building; FbMec = Feedback mechanism; RegPra = Regulatory practice; TiesIns = Instrumental network ties; TiesExp = Expressive network ties; ShaLang = Shared language; Ident = Identification; Trust = Trust in online community; NormCop = Norms of cooperation; KnoCon = Knowledge contribution; EaseUse = Perceived ease of use; Exper = Experience in online community

Table 3. Correlations among Constructs

Construct	1	2	3	4	5	6	7	8	9	10	11	12	13
1. IdPro	0.73												
2. SubCom	0.48	0.81											
3. FbMec	0.42	0.50	0.73										
4. RegPra	0.29	0.31	0.43	0.72									
5. TiesIns	0.50	0.50	0.44	0.29	0.90								
6. TiesExp	0.60	0.46	0.39	0.19	0.68	0.94							
7. ShaLang	0.44	0.36	0.33	0.31	0.34	0.34	0.83						
8. Ident	0.62	0.50	0.48	0.44	0.54	0.63	0.38	0.90					
9. Trust	0.42	0.34	0.36	0.52	0.35	0.42	0.37	0.66	0.92				
10. NormCop	0.49	0.42	0.45	0.56	0.35	0.43	0.42	0.63	0.63	0.88			
11. KnoCon	0.61	0.52	0.50	0.46	0.53	0.47	0.48	0.66	0.46	0.57	0.88		
12. EaseUse	0.27	0.22	0.33	0.43	0.31	0.21	0.34	0.37	0.46	0.44	0.43	0.92	
13. Exper	0.13	0.12	0.19	0.10	0.28	0.14	0.20	0.16	-0.02	0.02	0.19	0.07	0.78
Note: The shaded diagonal elements (in bold) represent square root of AVE for that construct.													

Table 4. Item Loadings and Cross Loadings

Scale Item	IdPro	SubCom	FbMec	RegPra	TiesIns	TiesExp	ShaLang	Ident	Trust	NormCop	KnoCon	EaseUse	Exper
IT_iIP1	**0.52**	0.25	0.36	0.23	0.26	0.23	0.24	0.38	0.24	0.36	0.37	0.24	0.14
IT_iIP2	**0.51**	0.19	0.21	0.20	0.18	0.17	0.24	0.26	0.19	0.21	0.29	0.19	0.13
IT_iIP3	**0.89**	0.42	0.33	0.23	0.50	0.60	0.37	0.54	0.36	0.43	0.53	0.20	0.09
IT_iIP4	**0.91**	0.46	0.35	0.23	0.43	0.57	0.40	0.56	0.39	0.43	0.56	0.20	0.08
IT_iSB1	0.43	**0.82**	0.34	0.24	0.36	0.37	0.27	0.39	0.23	0.31	0.39	0.17	0.04
IT_iSB2	0.43	**0.86**	0.41	0.26	0.40	0.38	0.31	0.44	0.28	0.38	0.48	0.20	0.10
IT_iSB3	0.30	**0.75**	0.42	0.26	0.40	0.28	0.34	0.34	0.30	0.34	0.42	0.20	0.15
IT_iSB4	0.38	**0.83**	0.44	0.25	0.47	0.45	0.25	0.45	0.31	0.35	0.41	0.17	0.10
IT_oFM1	0.27	0.28	**0.71**	0.31	0.25	0.22	0.21	0.31	0.26	0.37	0.37	0.31	0.07
IT_oFM2	0.23	0.29	**0.68**	0.24	0.26	0.18	0.24	0.26	0.20	0.31	0.28	0.18	0.21
IT_oFM3	0.38	0.38	**0.80**	0.34	0.35	0.34	0.28	0.42	0.30	0.31	0.46	0.30	0.12
IT_oFM4	0.34	0.49	**0.73**	0.35	0.42	0.40	0.25	0.39	0.28	0.34	0.34	0.16	0.15
IT_oRP1	0.31	0.31	0.40	**0.73**	0.29	0.24	0.19	0.40	0.47	0.44	0.39	0.39	0.02
IT_oRP2	0.20	0.21	0.37	**0.68**	0.16	0.11	0.23	0.30	0.30	0.43	0.33	0.23	0.11
IT_oRP3	0.18	0.21	0.24	**0.75**	0.22	0.12	0.25	0.29	0.35	0.39	0.35	0.32	0.14

Scale Item	IdPro	SubCom	FbMec	RegPra	TiesIns	TiesExp	ShaLang	Ident	Trust	NormCop	KnoCon	EaseUse	Exper
IT_oRP4	0.12	0.14	0.19	**0.70**	0.15	0.04	0.23	0.24	0.36	0.34	0.25	0.30	0.03
TiesIns1	0.40	0.41	0.40	0.29	**0.88**	0.50	0.30	0.45	0.36	0.34	0.48	0.34	0.24
TiesIns2	0.45	0.51	0.44	0.25	**0.91**	0.61	0.28	0.47	0.26	0.28	0.47	0.24	0.29
TiesIns3	0.50	0.44	0.36	0.25	**0.91**	0.72	0.34	0.53	0.31	0.35	0.50	0.26	0.22
TiesExp1	0.57	0.44	0.39	0.15	0.67	**0.94**	0.30	0.61	0.35	0.37	0.47	0.22	0.17
TiesExp2	0.58	0.44	0.35	0.20	0.63	**0.95**	0.30	0.59	0.43	0.44	0.45	0.19	0.07
TiesExp3	0.54	0.43	0.38	0.19	0.62	**0.94**	0.35	0.59	0.39	0.41	0.42	0.19	0.14
ShaLang1	0.34	0.25	0.26	0.18	0.32	0.28	**0.77**	0.24	0.26	0.30	0.40	0.21	0.19
ShaLang2	0.37	0.30	0.26	0.25	0.28	0.27	**0.87**	0.33	0.29	0.38	0.44	0.27	0.16
ShaLang3	0.37	0.33	0.31	0.34	0.26	0.29	**0.83**	0.37	0.35	0.36	0.35	0.35	0.16
Ident1	0.45	0.37	0.40	0.43	0.32	0.41	0.35	**0.83**	0.64	0.60	0.53	0.39	0.10
Ident2	0.56	0.45	0.42	0.39	0.53	0.61	0.35	**0.94**	0.59	0.54	0.59	0.33	0.17
Ident3	0.59	0.50	0.46	0.37	0.56	0.64	0.34	**0.91**	0.57	0.56	0.57	0.28	0.17
Ident4	0.61	0.47	0.43	0.40	0.50	0.59	0.34	**0.91**	0.59	0.59	0.67	0.35	0.11
Trust1	0.38	0.33	0.30	0.43	0.31	0.41	0.35	0.59	**0.90**	0.56	0.40	0.40	-0.04
Trust2	0.38	0.30	0.37	0.53	0.32	0.34	0.33	0.59	**0.91**	0.60	0.44	0.44	-0.01
Trust3	0.40	0.34	0.36	0.51	0.34	0.38	0.32	0.62	**0.94**	0.60	0.44	0.45	0.01
Trust4	0.38	0.29	0.28	0.43	0.28	0.39	0.34	0.60	**0.91**	0.55	0.39	0.39	-0.03
NormCop1	0.45	0.37	0.41	0.55	0.34	0.35	0.41	0.60	0.58	**0.89**	0.54	0.45	0.03
NormCop2	0.44	0.37	0.39	0.39	0.29	0.40	0.31	0.54	0.53	**0.84**	0.45	0.37	-0.02
NormCop3	0.41	0.38	0.39	0.50	0.30	0.39	0.37	0.53	0.54	**0.89**	0.49	0.33	0.05
KnoCon1	0.58	0.47	0.44	0.39	0.49	0.44	0.39	0.59	0.40	0.50	**0.90**	0.41	0.19
KnoCon2	0.50	0.45	0.39	0.38	0.46	0.42	0.41	0.55	0.37	0.45	**0.84**	0.30	0.12
KnoCon3	0.57	0.43	0.46	0.42	0.48	0.42	0.43	0.63	0.46	0.52	**0.88**	0.43	0.18
KnoCon4	0.50	0.48	0.47	0.44	0.44	0.39	0.46	0.55	0.38	0.52	**0.90**	0.37	0.19
EaseUse1	0.30	0.21	0.33	0.40	0.34	0.25	0.33	0.38	0.42	0.40	0.44	**0.91**	0.13
EaseUse2	0.24	0.22	0.28	0.42	0.26	0.18	0.28	0.37	0.44	0.42	0.39	**0.94**	0.02
EaseUse3	0.19	0.19	0.30	0.38	0.24	0.15	0.33	0.27	0.41	0.40	0.35	**0.92**	0.02
Exper1	0.15	0.13	0.18	0.12	0.30	0.15	0.18	0.15	0.00	0.05	0.18	0.02	**0.89**
Exper2	0.03	0.04	0.11	0.02	0.10	0.04	0.13	0.08	-0.04	-0.03	0.11	0.11	**0.66**

Structural Model

With an adequate measurement model, we proceed to look at the hypothesized structural relationships. A graphical depiction of the PLS results were illustrated in Figure 2, which presented the standardized path coefficients, path significance, and variance explained (R^2) for each dependent variable.

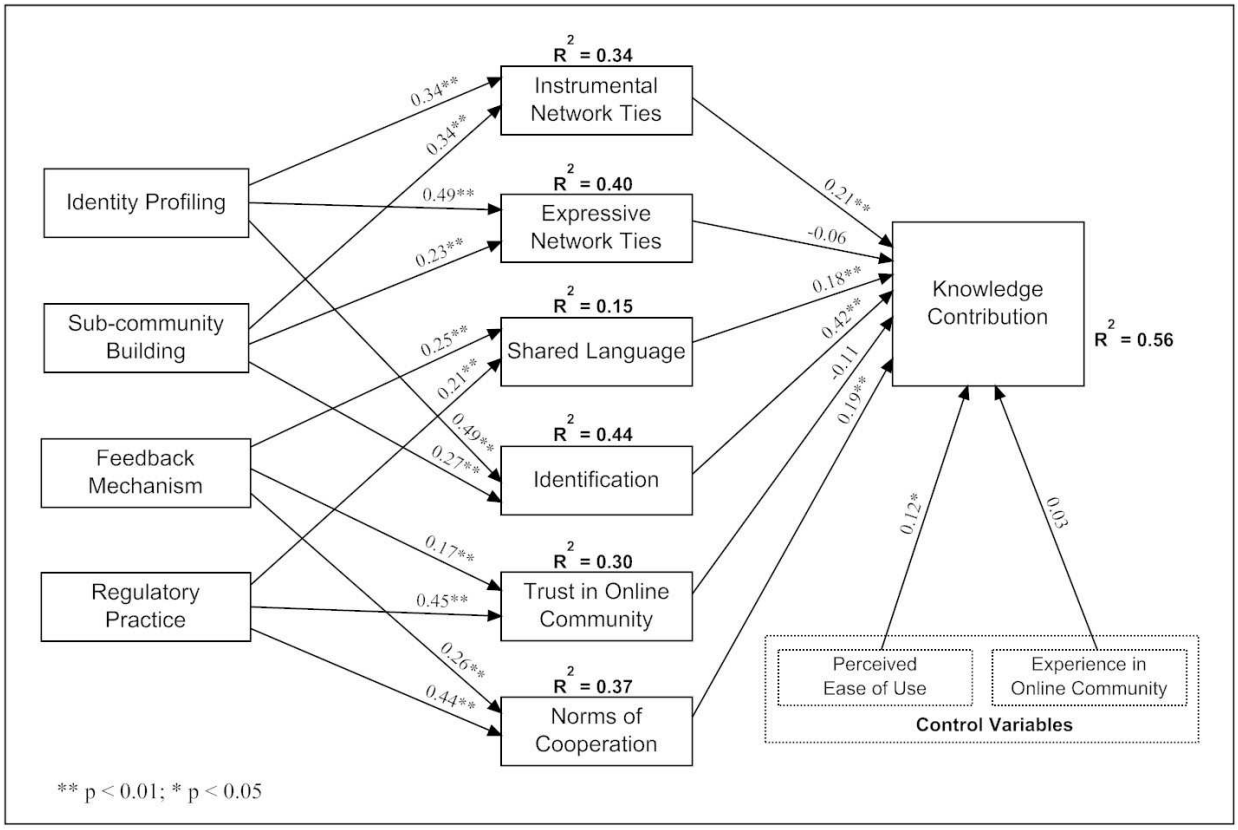

Figure 2. PLS Results of Structural Model

As shown in Figure 2, the social capital and control variables accounted for 56 percent of the variance in knowledge contribution, with identification having the dominant effect. Instrumental network ties ($b = 0.21$, $p < 0.01$), shared language ($b = 0.18$, $p < 0.01$), identification ($b = 0.42$, $p < 0.01$), and norms of cooperation ($b = 0.19$, $p < 0.01$) were positively related to knowledge contribution, thereby supporting H1a, H1c, H1d, and H1f, respectively. Contrary to expectations, expressive network ties and trust in online community had no significant relationships with knowledge contribution. Hence, H1b and H1e were not supported.

In terms of the proposed IT artifacts (identity profiling, sub-community building, feedback mechanism, and regulatory practice), the results showed that they all contributed to building up different kinds of social capital.

The use of identity profiling and sub-community building artifacts jointly determined the formation of instrumental network ties ($R^2 = 0.34$), expressive network ties ($R^2 = 0.40$), and identification ($R^2 = 0.44$), with identity profiling having greater impacts on the latter two social capital. As hypothesized in H2a, H2b, H2c, H3a, H3b, and H3c, identity profiling positively influenced instrumental network ties ($b = 0.34$, $p < 0.01$), expressive network ties ($b = 0.49$, $p < 0.01$), and identification ($b = 0.49$, $p < 0.01$). Similarly, the paths linking sub-community building to instrumental network ties ($b = 0.34$, $p < 0.01$), expressive network ties ($b = 0.23$, $p < 0.01$), and identification ($b = 0.27$, $p < 0.01$) were all positive and significant.

The use of a feedback mechanism and regulatory practice artifacts jointly explained the variance in shared language ($R^2 = 0.15$), trust in online community ($R^2 = 0.30$), and norms of cooperation ($R^2 = 0.37$), with regulatory practice accounting for much more variance in the latter two social capital. Consistent with expectations, feedback mechanism was positively related to shared language ($b = 0.25$, $p < 0.01$), trust in online community ($b = 0.17$, $p < 0.01$), and norms of cooperation ($b = 0.26$, $p < 0.01$). For regulatory practice, its hypothesized impacts on shared language ($b = 0.21$, $p < 0.01$), trust in online community ($b = 0.45$, $p < 0.01$), and norms of cooperation ($b = 0.44$, $p < 0.01$) were all positive and significant. Thus, H4a, H4b, H4c, H5a, H5b, and H5c were supported.

To further understand the effects of IT artifacts, two additional PLS models in which identity profiling, sub-community building, feedback mechanism, and regulatory practice being directly linked to knowledge contribution were examined, following Baron and Kenny's (1986) mediation test approach.

In the first model that only contained the four IT artifacts and knowledge contribution, the direct paths from identity profiling ($b = 0.37$, $p < 0.01$), sub-community building ($b = 0.20$, $p < 0.01$), feedback mechanism (0.11, $p < 0.01$), and regulatory practice ($b = 0.17$, $p < 0.01$) to knowledge contribution were all positive and significant. However, in the second model where the six hypothesized social capital (instrumental network ties, expressive network ties, shared language, identification, trust in online community, and norms of cooperation) were included as the mediators between IT artifacts and knowledge contribution, the direct effects of sub-community building, feedback mechanism, and regulatory practice became insignificant. Although the direct path between identity profiling and knowledge contribution was still significant ($b = 0.22$, $P < 0.01$), its magnitude decreased in the second model. These findings indicated that social capital mediated the effects of IT artifacts on knowledge contribution.

Discussions

Although the role of social capital underlying effective knowledge exchange has been well recognized in the knowledge management (KM) literature, our understanding of its antecedents, especially the theoretical underpinning of its formation in computer-mediated environments remains scant. Using the public online communities as our context of study, this research attempted to make such an endeavor: to move beyond a focus on the benefits of social capital by studying its creation. Herein, the technological settings conducive to social capital creation were examined. We proposed four technology-based social capital builders – identity profiling, sub-community building, feedback mechanism, and regulatory practice – and theorized that individuals' use of these IT artifacts facilitated the formation of social capital, which in turn, motivated knowledge contribution in online communities. Our research model was tested with a sample of online community users via surveys and the empirical findings provided strong support to the hypothesized relationships.

Prior to discussing the implications of this study, we need to note that our findings should be interpreted in light of its limitations. Firstly, as our research model was developed and empirically tested in the public online knowledge communities, caution must be exercised when attempting to generalize the results across a range of online communities operating in varied context. Thus, we suggest future research to replicate this study and examine the robustness of the social-capital-building effects for the IT artifacts in other contexts. Secondly, we investigated only one aspect of knowledge exchange: knowledge contribution. Although it is argued that individuals' knowledge contribution to an online community is very important in that it constitutes the knowledge resources for this community, these resources are of little value if they are not reused. It is both the demand for and supply of knowledge, and the interactions among individuals that bring about a community for knowledge exchange. Based on our research model, future studies can incorporate both knowledge seeking and knowledge contribution as the dependent constructs to examine the relative importance of the hypothesized determinants on each of them. This may offer a more comprehensive understanding of individuals' knowledge exchange behavior. Thirdly, since our data are cross-sectional, the posited causal relationships could only be inferred rather than proven. Future research based on longitudinal and qualitative data may offer a richer view of the dynamics of online communities and the role played by IT artifacts.

This research theoretically proposes, operationalizes, and empirically tests the influence of use of IT artifacts on individuals' knowledge sharing intention. A primary contribution of this study is the attention paid to the technology-based antecedents of social context. Prior studies on knowledge contribution started with the features of social context like social capital to predict knowledge contribution, but did not specifically examine how this social context can be influenced in the first place. In that sense, our research addresses a gap in extant literature by highlighting the technology-enabled approach that can cultivate the development of social capital and eventual

knowledge sharing intention. Fostering knowledge exchange in online communities requires more than just technological competency. Knowledge exchange does not happen within an individual's mind alone but is situated in a social context where interactions among community participants play a key role. Overcoming the social barriers to knowledge exchange requires a fundamental change in the social context, and thus, it is important to understand the means by which such a change can be accomplished.

Establishing the links between use of IT artifacts and social capital, this study demonstrates how technologies support the construction of a social context conducive to knowledge exchange. The empirical results suggest that the use of four categories of IT artifacts – identity profiling, sub-community building, feedback mechanism, and regulatory practice – is a viable means for building up social capital in online communities. Also, the results reveal the relative effectiveness of each social capital builder. As social capital maintain the successful operation of online communities and help realize their knowledge value, it is important to understand how they can be effectively built. Identity profiling and sub-community building are equally effective in helping to develop instrumental network ties. Yet, in supporting the formation of expressive network ties and identification, identity profiling outperforms sub-community building. Feedback mechanism is slightly better than regulatory practice in supporting the formation of shared language. However, regulatory practice plays a better role than feedback mechanism in building up trust in online community and norms of cooperation. These findings have prescriptive implications to focus on the IT artifacts that target specific forms of social capital.

From a descriptive standpoint, this study helps delineate the mechanism through which use of IT artifacts facilitates knowledge contribution. Individuals' use of IT artifacts operate through the social context (characterized by instrumental network ties, expressive network ties, shared language, identification, trust in online community, and norms of cooperation) of an online community. The findings that social capital mediate the effects of use of IT artifacts on knowledge contribution yields an important implication: it demonstrates the efficacy of including social capital as the mediating variables for explaining the impact of technologies on individuals' behavior. While Ma and Agarwal (2007) found that an individual's perceived identity verification is the mechanism through which technologies influence knowledge contribution, this study identifies another mechanism through the lens of social capital. This suggests that social capital variables may serve as the potential mediators in future studies for examining the effects of IT on individuals' behavior.

Apart from highlighting the role of technologies in online communities, the results of this study shed light on the social capital theory. Nahapiet and Ghoshal (1998) posit that the resources that constitute individuals' social context (in the form of structural, cognitive, and relational social capital) play a vital role in facilitating knowledge exchange. Overall, our study confirms this pattern of relationships and provides an interesting comparison with the results found in Wasko and Faraj's (2005) study, which was conducted in the organizational context. Wasko and Faraj's (2005) findings suggested that structural capital (network ties) was the strongest predictor of knowledge contribution while relational capital did not play a motivating role. However, in our study, identification (a facet of relational capital) surpasses other social capital variables in facilitating knowledge contribution.

Social capital are created as the byproducts of activities engaged in for other purposes. Hence, each piece of them together with their relative importance may be bound to a particular social context, given the network of relationships such a context enables (Nahapiet and Ghoshal 1998; Granovetter 1973). In an organization, what individuals mainly focus on tends to be such things as efficiency, job performance, status, promotion etc. The extensity of one's network is usually related to these ends because extensive network ties afford better opportunities for individuals to locate the resources useful for instrumental activities such as moving up an organizational hierarchy (Burt 1997; Lin 1999). Thus, in the organizational context, structural capital may be a more influential factor to motivate knowledge contribution. Contrary to organization-supported online communities, the public online communities consist of world-wide individuals with diverse backgrounds and nearly no prior interactions. In this situation, a strong sense of relational intimacy or affective bond becomes necessary to make individuals step forward to exchange knowledge. This explains why identification (an individual's sense of membership and attachment toward a collective) is found to be the strongest predictor of knowledge contribution in our study. This contrast implies that the effect of social capital can actually be context specific, and therefore, one of the avenues for future research would be to examine any contingency factors so as to strengthen the explanatory power of the social capital framework.

Moreover, this study unveils two social capital variables that do not affect knowledge contribution: expressive network ties and trust in online community. In a follow-up analysis, we found that these two variables exerted substantial positive effects on identification although they did not have direct impact on knowledge contribution.

These findings show that the several facets of social capital may be interrelated in some complex ways. While they do not themselves directly facilitate knowledge exchange, they may do so indirectly through their fostering of other forms of social capital. Thus, the interrelationships among the various facets of social capital should be an important focus for future research.

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Appendices

Appendix A: Summary of Prior Knowledge Management Studies Involving Social Capital

Appendix B: List of Measurement Items

(Due to page limit, the two appendices were not attached to the paper. Please access them online via http://net4.hkbu.edu.hk/~06459072/AppendixA-B.pdf)