Knowledge Sharing in Virtual Community: The Comparison between Contributors and Lurkers

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知识分享在虚拟社区：贡献者与潜伏者之间的比较

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摘要
互联网为基础的虚拟社区正在以前所未有的速度增长。虚拟社区被视为共享知识的平台。本研究提出一个综合模型，通过调查社会资本和动机因素，以影响成员的知识分享态度。从207名专业虚拟社区用户的数据中收集数据（包括53名贡献者和154名潜伏者）。结果表明，信任和分享规范会调节共享理解与知识分享态度之间的关系。享受帮助、承诺和与社区相关的结果期望会增强贡献者的知识分享态度。当潜伏者在社区中感受到更多的互惠性和期望更好的与社区相关的结果时，他们倾向于与他人分享知识。

关键词：虚拟社区，知识分享，社会资本理论，动机

介绍
互联网已经成为人们获取信息的重要资源。虚拟社区是一个有效的知识分享平台。社区成员可以交换资源并增强他们与其他人的关系。人们可以产生新的知识并通过连续分享和与他人讨论来创建它。

根据用户的特点，虚拟社区可以分为三种类型： demographics, professional, and personal interest [1]。知识资本被视为一个重要的因素，因为它有助于建立一个专业的虚拟社区[2]。这些成员来自不同的社会网络，通过虚拟联系相互连接。它们可以共享资源给其他成员。它使成员能够积累社会资本，同时获取相关的信息或知识。如何管理一个专业的虚拟社区并鼓励成员分享知识是管理者和研究人员的重要问题。

根据过去的研究所指出，许多虚拟社区成员被称为“潜伏者”，大约80%到90%的总社区用户[25]。潜伏者是指那些在网站上浏览以获取所需信息或知识的成员。他们可能是注册或非注册成员，他们机会性地发布文章寻求直接帮助。开发虚拟社区时，需要吸引大量用户参与，并鼓励他们参与知识分享活动，如自愿发布文章和回复他人。他们可以通过与社区其他成员建立联系来发展长期关系。

成员在虚拟社区中来自不同的组织。他们甚至彼此并不熟悉。为什么人们在虚拟社区中愿意与他人分享知识？研究的目的是调查影响知识分享的社会资本和动机因素对成员知识分享态度的影响。我们还比较了贡献者和潜伏者之间的差异，为社区发展和管理提供建议。

文献回顾和假设
虚拟社区是一个社会在网络空间中的聚合。参与者们有相似的兴趣、目标，或经历，他们会讨论和互动在虚拟社区[2] [8] [34]。成员们将虚拟社区视为一个知识分享平台。知识分享是一种行为，其中某人向他人传播他的知识和经验[29]。不同的知识分享活动对社区的生存[7]。因此，这是一个重要的问题，需要讨论对这些影响知识分享的因素。

社会资本理论
社会资本理论可以用来解释为什么人们愿意在知识分享中与他人分享，同时避免免费投机的机会[32]。
Social capital could be distinguished into three dimensions [23]: (1) Structural dimension. The influence of network type on members is considered, such as network ties, network configuration, and appropriable organization; (2) Cognitive dimension. The interaction between members would produce medium for member communication, such as shared language, symbols and stories; (3) Relational dimension. It would trigger interactions in the social network to develop individual network and achieve social goals such as social contact, identification, and reputation [9].

Granovetter [15] suggested that social capital is embedded in the social network. Devi and Ravindranath [13] proposed structural embeddedness and suggested that network density is an important property of network. Network density refers to the extent of member connection. Members interact with others by replying article on website or by sending e-mail. The more connection they build up, the higher density they have. Stronger network ties would form restriction and enable member to build up trust. Therefore, they would like to obey the norms and general behavioral models [6] [9]. Based on the argument above, we postulate two hypotheses:

H1: Network density is positively associated with trust.
H2: Network density is positively associated with pro-sharing norms.

Shared understanding refers to the similar work value, norms, philosophy, and experience for certain group [14] [24]. The knowledge sharing participants should have basic understanding about their communication language [23]. Through shared understanding, members can develop stronger trust and incline to comply with norms. We propose following two hypotheses:

H3: Shared understanding is positively associated with trust.
H4: Shared understanding is positively associated with pro-sharing norms.

Trust plays an important role in knowledge sharing [12]. Trust is an adhesive which could shorten the distance between members. If there is lack of trust, members would incline to hide their knowledge or experience and decline to spend their time and effort to share knowledge. The higher extent of trust community member has, the more sharing activities would take place [5]. The above argument is captured by the following hypothesis:

H5: Trust is positively associated with knowledge sharing attitude.

Pro-sharing norms are norms which were built up to stimulate members to share their knowledge [21] [27]. Stronger pro-sharing norms would decline the influence of external benefits [19]. Pro-sharing norms could enhance sharing climate and motivate individual to share knowledge [31]. Members in a professional virtual community would like to engage in sharing knowledge if there were pro-sharing norms. We postulate the following hypothesis:

H6: Pro-sharing norms are positively associated with knowledge sharing attitude.

Extrinsic Motivations

Extrinsic motivations are extra resources that someone gains. Bock et al. [5] suggested that extrinsic motivations would trigger someone to share knowledge. One may share knowledge after balancing the costs and benefits and expect to have beneficial reward [11]. When the knowledge shared by someone had been adopted by others, contributor would increase his/her reputation and status.

Reputation is that someone perceived his/her status or image has been promoted by sharing useful and valuable knowledge [10] [21]. Constant et al. [10] found that reputation could stimulate employees to propose constructive advice and increase their participation in the activities of virtual communities. People would like to share their expertise with others for increasing his/her status and earning others’ respect [21] [22]. Based on the argument above, we propose the following hypothesis:

H7: Reputation is positively associated with knowledge sharing attitude.

Reciprocity is defined as someone would share with others for expecting to have similar returns or help when they in need [12]. Two strangers with weak-ties would share their knowledge in electronic virtual community is evidence of reciprocity [33]. The higher level expectation on reciprocity of members, the more motivation to share knowledge they have [32]. The above argument is captured by the following hypothesis:

H8: Reciprocity is positively associated with knowledge sharing attitude.

Community-related outcome expectation is defined as the assessment by someone according to the knowledge sharing behavior in virtual community [8]. Chiu et al. [8] suggested that members would like to contribute more knowledge to help the community to sustain its operation. If members care more about the community-related outcomes, they would incline to share their knowledge to help the community to achieve its goal and vision. We postulate the following hypothesis:

H9: Community-related outcome expectation is positively associated with knowledge sharing.
Intrinsic Motivations

Osterloh and Frey [28] referred that intrinsic motivations can stimulate knowledge creation and transfer when extrinsic motivations do not work. Kollock [21] suggested that one believes in altruism would share knowledge. Pro-social behaviors are derived from stimulation of intrinsic motivations. They would help others and do not expect for returns.

Davenport & Prusak [12] advocated that the pro-social behavior of knowledge contributor is derived from the aspiration to help others. Kollock [21] found that one would contribute his/her knowledge in electronic virtual community for the property of enjoyment to help others. One may enjoy the fun and challenges during problem-solving. Members would gain psychological fulfillment through pro-social behavior. We propose the following hypothesis:

**H10:** Enjoy helping is positively associated with knowledge sharing attitude.

Self-efficacy is defined that someone perceives he/she has the capabilities to finish specific work [3]. Knowledge self-efficacy is someone believes he/she can provide valuable knowledge [10] [18]. When members have strong knowledge self-efficacy, they believe that they can provide valuable knowledge to others for solving their problems. The above argument is captured by the following hypothesis:

**H11:** Knowledge self-efficacy is positively associated with knowledge sharing attitude.

Commitment is a kind of duty or obligation which would drive someone to increase participation [9]. Commitment not only exists in the relationship between individuals but also in the relationship between individual and group. Wasko and Faraj [32] found that participation of member base on shared membership. They think that they have responsibility and obligation to help others. We postulate the following hypothesis:

**H12:** Commitment is positively associated with knowledge sharing attitude.

The research model is illustrated in Figure 1.

**Figure 1. Research model**

**Methodology**

**Instrument Development**

The research constructs were measured by adapting existing scales to enhance validity. Network density is adapted from Devi and Ravindranath [13]. We asked the extent of respondent’s interaction with other members. The other 11 constructs were measured by five-point Likert scales, from “strongly disagree” to “strongly agree”. In order to make sure the face validity and understanding of wording, we invited one manager and 11 members to conduct a pre-test. A summary of our questionnaire was shown in Table1.

**Data Collection**

Respondents were the users of a professional virtual community - “JavaWorld@TW”. This virtual community focused on the discussion of Java-related techniques. We also discriminated users as contributors and lurkers. The former are registered members and also share their knowledge. Lurkers who may be registered or non-registered do not share their knowledge.

We conducted an Internet-based survey by posting the questionnaire link on the virtual community website. The survey was conducted during March, 2009 to April, 2009 by two phases and totally returned 207 valid responses (172 for phase 1, 35 for phase 2). According to the results of non-response bias test, there is no significant difference in gender ($\chi^2 = 0.600, p > 0.05$) and
average time online per day ($x^2 = 5.136$, $p > 0.05$).
Out of 207 respondents, 130 were male (62.8%). Most of respondents were in the age of 21 to 25 (46.9%). Many of respondents were Internet heavy users, about 80% of them spend more than 3 hours online. Most of users were non-registered (46.4%). There are 25.6% respondents had shared their knowledge on the virtual community.

<table>
<thead>
<tr>
<th>Table 1. Summary of measurement scales</th>
</tr>
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<tbody>
<tr>
<td>Construct</td>
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<tr>
<td>Shared Understanding (SU)</td>
</tr>
<tr>
<td>Cronbach’s $\alpha = 0.70$</td>
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<tr>
<td>Trust (TR)</td>
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<tr>
<td>Cronbach’s $\alpha = 0.77$</td>
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<td></td>
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<td></td>
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<tr>
<td>Pro-sharing norms (PNR)</td>
</tr>
<tr>
<td>Cronbach’s $\alpha = 0.82$</td>
</tr>
<tr>
<td></td>
</tr>
<tr>
<td>Reputation (REP)</td>
</tr>
<tr>
<td>Cronbach’s $\alpha = 0.72$</td>
</tr>
<tr>
<td>Reciprocity (REC)</td>
</tr>
<tr>
<td>Cronbach’s $\alpha = 0.77$</td>
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<tr>
<td></td>
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<tr>
<td>Community-related Outcome Expectation (COE)</td>
</tr>
<tr>
<td>Cronbach’s $\alpha = 0.87$</td>
</tr>
<tr>
<td>Enjoy Helping (EH)</td>
</tr>
<tr>
<td>Cronbach’s $\alpha = 0.85$</td>
</tr>
<tr>
<td></td>
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<tr>
<td>Knowledge Self-Efficacy (KSE)</td>
</tr>
<tr>
<td>Cronbach’s $\alpha = 0.70$</td>
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<td></td>
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<tr>
<td>Commitment (COM)</td>
</tr>
<tr>
<td>Cronbach’s $\alpha = 0.84$</td>
</tr>
<tr>
<td>Knowledge Sharing Attitude (KSA)</td>
</tr>
<tr>
<td>Cronbach’s $\alpha = 0.87$</td>
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</tbody>
</table>

Results

Measurement model
Both Cronbach’s alpha and composite reliability
(CR) were used to assess the extent of internal consistence. As show in Table 1 and Table 2, most of them were greater than 0.7 suggest by Nunnally [26].

As to convergent validity, the loading of all items were greater than 0.60 (see table 1). In table 2, the values of composite reliability range from 0.82 to 0.94; and AVE scores for each construct range from 0.62 to 0.89 and above the 0.50 recommended level. To examine discriminant validity, as table 2 shows, the square root of AVEs for each construct is great than the correlation between constructs.

**Structure model**
The proposed hypotheses were tested with Partial Least Squares (PLS). As shown in Figure 2, 59.2% of the variance in knowledge sharing attitude was explained. Network density and shared understanding explained 27.6% of the variance in trust and 13% of pro-sharing norms.

As to social capital factors, shared understanding had positive relationship with trust ($\beta = 0.523$, $p < 0.01$) and pro-sharing norms ($\beta = 0.358$, $p < 0.01$), supporting H3 and H4. Both trust ($\beta = 0.252$, $p < 0.01$) and pro-sharing norms ($\beta = 0.165$, $p < 0.01$) had a significant association with knowledge sharing attitude, supporting H5 and H6. For extrinsic motivations, reciprocity ($\beta = 0.155$, $p < 0.05$) and community-related outcome expectation ($\beta = 0.322$, $p < 0.01$) had positively association with knowledge sharing attitude, supporting H8 and H9.

**Post hoc Analysis**
We divided respondents into two group namely contributors ($n = 53$) and lurkers ($n = 154$) to compare the difference in motivation factors. The knowledge sharing attitude of contributor was significantly influenced by community-related outcome expectation ($\beta = 0.321$, $p < 0.05$), enjoy helping ($\beta = 0.274$, $p < 0.1$), and commitment ($\beta = 0.159$, $p < 0.1$), supporting H9, H10, and H11. As to lurkers, reciprocity ($\beta = 0.148$, $p < 0.1$) and community-related outcome expectation ($\beta = 0.326$, $p < 0.01$) had positively association with knowledge sharing attitude.

**Mediation Effect Tests**
We adopted Baron and Kenny’s [4] three-step method to examine the mediating effect of trust and pro-sharing norms. Firstly, independent variable (IV) should have significant effect on dependent variable (DV). Then, IV should significantly predict the mediator (M). Finally, IV and M should simultaneously include in the analysis model to predict DV. If M is significant but IV is not, this is full mediation. If both M and IV are significant, this is partial mediation. As shown in table 3, both trust and pro-sharing norms had full mediating effect on the relationship between sharing understanding and knowledge sharing attitude.

![Figure 2. PLS analysis of research model](image-url)
Table 2. Composite reliability, AVE and correlations

<table>
<thead>
<tr>
<th></th>
<th>CR</th>
<th>AVE</th>
<th>REC</th>
<th>SU</th>
<th>TR</th>
<th>PNR</th>
<th>REP</th>
<th>REC</th>
<th>COE</th>
<th>EH</th>
<th>KSE</th>
<th>COM</th>
<th>KSA</th>
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<tr>
<td>SU</td>
<td>0.83</td>
<td>0.62</td>
<td>0.43</td>
<td>0.79</td>
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<tr>
<td>TR</td>
<td>0.87</td>
<td>0.69</td>
<td>0.56</td>
<td>0.52</td>
<td>0.83</td>
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<tr>
<td>PNR</td>
<td>0.89</td>
<td>0.73</td>
<td>0.50</td>
<td>0.36</td>
<td>0.56</td>
<td>0.86</td>
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<tr>
<td>REP</td>
<td>0.88</td>
<td>0.78</td>
<td>0.61</td>
<td>0.44</td>
<td>0.30</td>
<td>0.28</td>
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<tr>
<td>REC</td>
<td>0.90</td>
<td>0.81</td>
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<td>COE</td>
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<td>0.94</td>
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<tr>
<td>EH</td>
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<tr>
<td>KSE</td>
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<td>0.29</td>
<td>0.42</td>
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</table>

Discussion and Conclusion

The purpose of present study was to investigate the influence of social capital and motivational factors on members’ knowledge sharing attitude. Our results had shown that shared understanding has positive influence on trust and pro-sharing norms. The consensus existed in the virtual community could enable the emergence of pro-sharing norms. Members with similar work experience and problem-solving method could increase the trust between virtual community members.

While higher trust and pro-sharing norms, member would incline to share their knowledge. Past research focused on the direct relationship between sharing understanding and knowledge sharing attitude. The present study found that trust and pro-sharing norms play mediating roles between sharing understanding and knowledge sharing attitude.

In general, the knowledge sharing attitude of member is affected by extrinsic motivators, such as reciprocity and community-related outcome expectation. But for contributors, they would share with others base on their enjoyment of helping and commitment. The objective of lurkers is to surf the information or knowledge they need, they would share with other only if they feel reciprocal and expect this community would have positive feedback to them.

Table 3. Results of mediating effect tests

<table>
<thead>
<tr>
<th></th>
<th>Model</th>
<th>Step 1</th>
<th>Step 2</th>
<th>Step 3</th>
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<tr>
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<td>M</td>
<td>DV</td>
<td>IV to DV</td>
<td>IV to M</td>
<td>IV to DV</td>
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<tr>
<td>SU</td>
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<td>0.088</td>
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<td>KSA</td>
<td>0.393***</td>
<td>0.319***</td>
<td>0.088</td>
</tr>
</tbody>
</table>

Implications

In order to develop a successful virtual community, manager should promote more knowledge sharing activities to attract users to participate the activities of the community. Virtual community consists of people with similar knowledge background and work experience. They have shared understanding about the issues they discuss. But for new comers, this kind of shared understanding would be the barrier to share knowledge. Manager can set up a specific area for new comers to learn, such as FAQs. Manager also could establish rules and sharing principles to foster trust and pro-sharing climate.

Our results show that different kinds of users focus on different motivators. Contributor motivate by intrinsic factors such as enjoyment and commitment. However, lurker stimulate by extrinsic factors such as reciprocity. Both contributor and lurker would take community-related outcome expectation into consideration when they engage in sharing activity. Manager should have different strategies for attract lurkers and retain contributors.

Limitation and Future Research

There were several limitations in our study. Firstly, the data were collected through Internet base on self-report. Here, we focus our research on one professional virtual community. Future research could design a more comprehensive method to...
compare the results from different communities. Secondly, although the items we used were adapted from past literature. Network density was measured by users’ perception of their connection level with others. Future research could adopt more appropriate measures for structural dimension. Finally, our research is cross-sectional that limited our discussion on the difference between contributor and lurker. Future research could design a longitudinal research to discuss more detailed on the variation and difference of different users. We hope our study provides needed advancement for knowledge sharing.

Reference


