INFORMATION SHARING DYNAMICS OF ONLINE COMMUNITY:  
THE CASE OF USENET NEWSGROUP

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ABSTRACT

An online community is defined as a virtual group of people who communicate and interact with a theoretically unlimited number of community members via electronic media without geographical boundaries. Due to the rapid advance of IT that enables the virtual communities to be more realistic and convenient, online communities has become an important research topic in the Information Systems (IS) discipline. However, studies in the area are still at infancy. This study is an empirical investigation of such factors in one of the largest online communities, USENET. As a measure of sustainability of online communities, member loyalty is assessed using a returning member ratio. Factors that have positive impacts on sustainability are derived from several communication characteristics such as breadth, depth, responsiveness, and social identity. The relationships between sustainability and those factors are empirically examined using multiple regression models.

Keywords: Online community, USENET, Member Loyalty

INTRODUCTION

An online community is defined as a virtual group of people who communicate and interact with a theoretically unlimited number of community members via electronic media without geographical boundaries [4]. On an average day, 145 million of American adults use the Internet in 2005 [3], and online communities are literally becoming a crucial part of modern life. These days, pure-play Internet communities may have even million of members. While Information technologies (IT) offer a variety of ways to interact, collaborate, and trade, major online activities take place in various types of communities including blogs, e-mail listservs, business Web sites, and instant message groups. Among these, the USENET newsgroup stands out because of its scalability, reliability, diversity of formats and contents, and multi-faceted social interaction. In fact, USENET has become a worldwide teleconferencing system consisting of newsgroups. Online communities in general offer a number of benefits to the modern society. Some communities are organized to facilitate business activities. Other communities take the form of group decision support systems that allow groups to collaborate over computer networks. Among most of the known benefits, the real power of an online community is that it creates opportunities for people to go beyond interaction with content to contributing information and sharing it with other people, which becomes valuable social capital.

Due to the rapid advance of IT that enables the virtual communities to be more realistic and convenient, online communities has become an important research topic in the Information Systems (IS) discipline. However, studies in the area are still at infancy. While researchers agree that online communities will provide an efficient and effective mechanism of information and knowledge sharing, only a handful of studies tackling this topic. IS researchers have called for research on developing theoretical frameworks of the dynamics of information/knowledge sharing in online communities. In response to the call, we attempt to develop a theoretical framework of information sharing in online communities, and examine the dynamics of the factors associated with it. This study empirically investigates online community activities, and the factors for the sustainability of those communities, in the context of USENET.
The proposed model has four facilitators of member loyalty: communication breadth, communication depth, and responsiveness. Each is measured in terms of online community interaction activities. The dependent variable is the returnee ratio, which represents loyalty of community members. Established with the resource based model [1] and the communication structure model [2], we contend that the community members, and messages created by them, constitute the important resources of online communities.

**Member Royalty: The Sustainability of Online Communities**

The membership size of an online community is the core element establishing the sustainability of the online community. Since members are the primary source of resources for an online community [1], communities need a critical mass to remain active and attract members. Generating a critical mass is key to online community success [6]. Because available resources including members’ contribution and posted messages in an online community result in the benefits from the community, a larger community may provide more benefits to members, thereby luring more members and improving sustainability over time [1]. Membership size, therefore, is an indicator of sustainability. The increasing number of returning members is an indicator of the community’s attraction for members, and in turn, is the community’s ability to retain the existing members. Since the number of returning members accounts for the retention part of membership size, it is reasonable to consider the community’s tendency to retain loyal members as an indicator of the community’s sustainability.

**Communication (Interaction) Characteristics: Breadth, Depth, and Responsiveness**

**Breadth of Communication**

Simonson and Tversky [5] suggested that people seek variety because they are risk averse and uncertain about their preferences. Choosing variety reduces the likelihood of repeatedly consuming something undesirable. In the context of an online community, breadth of communication is defined as “the number of discussions initiated by the members” [2]. Breadth of communication is the degree of diversity of the topics and issues discussed in a community. It has been argued that the communication breadth will be broader in electronic media environments, such as a USENET online community, than in a traditional face-to-face social circumstance in general [2]. The current study suggests that even within the same online communication environment, the communication breadth of an online community may positively influence member loyalty. The breadth of communication can be considered an important dimension of resource availability and benefit provision, and thus positively affect the member loyalty of an online community. Even within the same online community, participants may prefer a community with more breadth of communication. Such online communities would attract and retain more members than communities with less breadth of communication making them more sustainable. This leads to the following hypothesis.

**HYPOTHESIS 1:** Breadth of communication of an online community has a positive impact on the member loyalty of the online community.

**Depth of Communication**

Depth of communication is defined as “the extensiveness of group members’ responses to the initiated discussions” [2]. Communication depth of an online community refers to the degree to which the members of the online community respond to discussions initiated by other members. In a community with a high depth of communication, a threaded discussion on a topic may be extensively expanded with various ideas. Members of an online community tend to pursue communication depth in terms of more relevant, detailed, and extensive information. Miranda and Saunders [2] empirically examined the positive effect of communication depth on decision quality [2]. Their study investigated the positive effect of communication depth on decision quality. The study further provided support for the relationship between communication depth and member loyalty of an online community in the sense that both decision quality and member loyalty of an online community are the outcomes of interpersonal communication interaction (in the context of computer mediated communication). This leads to our second hypothesis.

**HYPOTHESIS 2:** Communication depth of an online community has a positive impact on the member loyalty of an online community.

**Responsiveness of Communication**

Responsiveness of communication of online communities is defined as ‘the immediacy and likelihood of responses to the initiated discussions.’ To information seeking individuals, responsiveness of communication represents accessibility to the resources of the online community. It is reasonable to say members will return and become more associated with an online community where there exists easy access to resources (i.e. a community that is more responsive to the
members’ request), than to a community that has less accessible resources. People tend to become more committed to an online community with a higher responsiveness of communication. Therefore, we suggest the following hypothesis.

**HYPOTHESIS3:** Responsiveness of Communication has a positive impact on the member loyalty of an online community.

**METHODOLOGY**

The current study uses secondary data collected from a Netscan Web site, (http://netscan.research.microsoft.com/). Data from five major top-level hierarchies of USENET including Computer (comp), Recreation (rec), Science (sci), Social (soc), and Controversial (talk) was collected for the period January, 2004 - January, 2005. The dataset consists of data of two consecutive months so that a case includes antecedents of a month and the dependent variable of the following month. The results show the time lag effect between the two periods. Multiple regression analyses were conducted based on the independent variables of the first period and the dependent variables of the second period. A total of 45,360 data points were compiled during the period. From the Netscan site, we compiled the seven items (# of Posts, Posters, Returnees, Replies, Repliers, and Un-replied Messages) of the five top-level hierarchies. The values of all variables are calculated using the dataset obtained from Microsoft Netscan website. The formulas are provided in Table 1 with descriptive statistics. Then, 10-base log transformations were applied to the calculated variables to avoid possible non-normality problems in multiple regression analyses. In taking the log transformation, a constant value (1.00) was added to the ratio so that the cases of zero (0) numerator are not excluded in the assessments.

**RESULTS**

**Empirical Results**

Multiple regression results of Model (1) and (2) examine the effect of communication characteristics on member-loyalty (Table 2). The results are statistically significant and indicate that communication breadth and depth, and responsiveness have significant effects on the member loyalty in all model specifications. Model (1) shows the impacts of the two characteristics of online communication. Both communication breadth and depth have significant effects on the loyalty ($X_{Bt} = .252$, $X_{Dt} = .494$). Model (2) presents the effect of the responsiveness of online communities in addition to the two communication characteristics. According to the standardized estimates, responsiveness ($X_{Rt} = .314$) has the most strong influence on the dependent variable while the two factors, breadth and depth, still have statistically significant effects. The adjusted $R^2$ of model specifications (1) and (2) is 0.482 to 0.542 respectively. The statistical results support all three hypotheses. We extend the model to investigate possible interaction effects among the variables. Model (3) and (4) show significant 2-way and 3-way interaction effects among the three antecedents with the main effects respectively. Except for the interaction effect of depth and responsiveness in Model (3), all interaction effects appear to be statistically significant at the .1% significance level of one-side test. The adjusted $R^2$ of model specifications with interaction (Model 3 & 4) terms are 0.568 and 0.571.

**TABLE 2. Empirical Results**

<table>
<thead>
<tr>
<th>Variable</th>
<th>(1)</th>
<th>(2)</th>
<th>(3)</th>
</tr>
</thead>
<tbody>
<tr>
<td>$X_{Bt}$</td>
<td>.252 ***</td>
<td>.264 ***</td>
<td>.499 ***</td>
</tr>
<tr>
<td></td>
<td>(.002)</td>
<td>(.002)</td>
<td>(.003)</td>
</tr>
<tr>
<td>$X_{Dt}$</td>
<td>.494 ***</td>
<td>.289 ***</td>
<td>.625 ***</td>
</tr>
<tr>
<td></td>
<td>(.001)</td>
<td>(.001)</td>
<td>(.003)</td>
</tr>
<tr>
<td>$X_{Rt}$</td>
<td>.314 ***</td>
<td>.111 ***</td>
<td>(.004)</td>
</tr>
<tr>
<td></td>
<td>(.004)</td>
<td>(.010)</td>
<td></td>
</tr>
<tr>
<td>$X_{Bt} \times X_{Dt}$</td>
<td>- .665 ***</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>(.003)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>$X_{Dt} \times X_{Rt}$</td>
<td>- .007</td>
<td></td>
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</tr>
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<td>(.016)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>$X_{Bt} \times X_{Rt}$</td>
<td>.260 ***</td>
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<td></td>
</tr>
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<td>(.021)</td>
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<tr>
<td>$Adj. R^2$</td>
<td>0.482</td>
<td>0.542</td>
<td>0.568</td>
</tr>
</tbody>
</table>
Dependent Variable: Member-Loyalty ($Y_{t+1}$). Standard Errors are in parentheses, *** denotes $p < .001$, and **, $p < .01$

DISCUSSION AND CONCLUSION

The importance of community and understanding its dynamics cannot be overstated. We have witnessed that information technologies can be used to reinforce communities of practice, especially between other learning events or after the formal training is over. We attempted to investigate the utilitarian approach of the dynamics of online communities by examining the relationship between member loyalty and characteristics of communication and characteristics of online communities. We analyzed regression models examining the effects of communication breadth, depth, and responsiveness on the member-loyalty. The results clearly indicate that the two communication characteristics (communication breadth and depth) and the community characteristics (responsiveness) are significantly positively related to the member loyalty of an online community. The outcome results suggest that, higher volume and diversity of communication activity enhances its sustainability, attracting and retaining the community members. That is, more communication activity is expected to enable more information sharing, development of strong relationships among community members, and coordination of more complex activities all of which result in more benefits for individual members. When well structured, community members create a strong relationship that contributes to a climate of openness to sharing information.

The findings of this study could become a platform model in designing a sustainable online community network either in profit oriented or non-profit organizations. Decision-makers and practitioners of online community establishments may use the results as a framework for designing the online community network structures, features, strategies and policies in terms of the online community’s communication characteristics and social identity. The current study explores the unexplored research venue by empirically investigating the online community activities in one of the most popular types of online community. This enhances the understanding of the dynamics of member loyalty and its antecedents. Furthermore, the study empirically examines the social aspect of online community participation, providing insights into the relationship between member loyalty and social identity in online communities. Finally, the current study integrates the two dimensions of online community characteristics into one model, formulating the relationship between the member loyalty and communication characteristics and characteristics of online communities.

REFERENCES