A b s t r a c t

This study contributes to the understanding of online communities by examining why community members are willing to make active contributions to their community. A model of motivation for such contributions was developed and tested within the context of an online travel community. The results of a factor analysis and a series of reliability tests indicate that the motivation model is valid and can serve as a basis for the understanding of online community members' motivation of contribution. The results of the path analyses show that motivations of efficacy, instrumental, and expectancy have positive effects on level of contribution. In addition, ease of communication, members' personality as well as their level of general involvement in the community are found to have positive relationships with level of active contribution. Discussion and implications are provided based on the study results.

Keywords: online community, marketing, e-commerce, travel, motivation

Assessing Motivation of Contribution in Online Communities: An Empirical Investigation of an Online Travel Community

YOUCHENG WANG AND D. R. FESENMAIER

INTRODUCTION

Consider the following scenarios:

- *Scenario 1*: After the terrorist attacks on the World Trade Center and the Pentagon in September 2001, people resorted to a number of means for information and support. Many of them sought support and exchanged information via computer-mediated communities. In fact, some 30 million Americans – about one-third of all US Internet users – turned to email, mailing lists, instant messaging, chat rooms, and threaded discussion systems (Pew Internet and American Life Project 2001). They offered detailed eyewitness descriptions and provided tender words of comfort to families of the victims. They also engaged in soul-searching debate about why these events occurred, what response was appropriate, and what measures should be taken to alert and prevent such atrocities in the future (Preece 2002).
- *Scenario 2*: In 1991 a student at the University of Helsinki in Finland named Linus Torvalds developed what became the heart of the Linux kernel, a computer operating system. Torvalds wanted Linux to be the very best and least expensive operating system in the world, but he needed other programmers to make it better. He decided to post the source code for the kernel for anyone to look at, modify and, most importantly, add to. He decreed that anyone can copy Linux and make changes, but everything that was developed must stay free, and the reward for contributing to the improvement of Linux was acknowledgement and fame. This synergy developed into version 1.0 of the Linux kernel, which was released in 1994. Linux has become very robust over the years out-classing many commercial operating systems, and now boasts a user base of over 17 million users (refer to http://www.linuxbox.nu/about/linuxstory.php).

It is generally accepted that computers and computer networks are transforming the ways in which society functions. This transformation is occurring on multiple levels, affecting our modes of production, our modes of learning, our modes of communication and our modes of commerce (Hagel and Armstrong 1997; Morris and Ogan 2000; Rheingold 1993). These changes

A u t h o r s

Youcheng Wang
(ywang13@uiuc.edu) is a PhD candidate, National Laboratory for Tourism and eCommerce, Department of Leisure Studies, University of Illinois at Urbana-Champaign. His research focuses on Internet marketing, e-commerce and technology management.

Daniel Fesenmaier
(drfez@uiuc.edu) is Professor and Director, National Laboratory for Tourism and eCommerce, Department of Leisure Studies, University of Illinois at Urbana-Champaign. His major research interests focus on information technology and tourism; specifically, e-commerce applications in tourism, information search and decision making and knowledge management.

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become pertinent to the study of online communities when one considers the unique situation in which all these activities are conducted and performed. In cyberspace the economics of interaction, production, communication, and coordination are different than when people meet face-to-face (Evans and Wurster 1999). Using network interaction media including email, chat, discussion forums, Usenet and other groupware systems, people are empowered to form thousands of groups/communities to discuss a range of topics such as political, technical, and recreational, play games, entertain one another, conduct business, and even work on a number of complex collective projects. These communities are sustained and supported by these group media (Harrasim 1993) and represent a long term shift to communities organized by shared interests rather than by shared place such as a neighbourhood or village (Wellman 1998). From a marketing perspective, it is believed that the online community as a basic business model will increase in importance in the coming years as the Internet becomes more pervasive in the new global economy (Bressler and Grantham 2000; Wang, Yu, and Fesenmaier 2002), and will become a potential value-added marketing channel for E-tailers (Chaturvedi and Yue 2000).

For online communities to evolve and prosper and for all the community members as well as the community organizers to benefit, the biggest challenge is to make certain that a balanced proportion of members in the community actively contribute to the community in various forms such as asking questions, providing information and expertise, sharing ideas, etc. In a similar fashion, one of the most interesting opportunities as well as challenges when introducing e-commerce in particular is to make certain that the new information technology structure may be used to empower consumers to be more active participants in the economic value creation process (e.g., Alba *et al.* 1997; Hoffman and Novak 1996; Walden 2000). However, the benefits provided in online communities have the quality of public goods, which are goods that might benefit anyone, regardless of whether they have helped contribute to their production (Kollock 1999). An important starting point in the design/development of an online community is a basic understanding of people's motivation to participate based on the following three questions:

1. Why would anyone be willing to give away important information and valuable advice?
2. What can explain the amount of cooperation that occurs in online communities? and
3. How can businesses get individuals to contribute to the provision of a public good despite the temptation to free ride?

The goal of this study is to answer these questions by identifying the fundamental motivations for online community members to contribute and testing the relationships between members' motivation to contribute as well as other influential factors and the level of contribution in online communities.

THEORETICAL FOUNDATIONS

It is argued that the understanding of active online contribution can be examined by looking at three groups of determining factors. First, members' active contribution is driven by their motivations, though motivations may vary with members and the nature of the community. Second, motivation is a necessary but not a sufficient condition for active contribution. That is, contribution to the online community will not happen if the virtual environments members encounter are not conducive for them to make such an active contribution even though they are motivated to do so. Thus, ease of communication of the virtual system can be a facilitator for members to contribute to the community. Third, the social-economic status of members may determine their online behaviour including their willingness to contribute. A list of these characteristics can be very long and diverse; this study focuses attention on the relationships between two factors on members' level of contribution: their personality and level of general involvement in the community. The following is an elaboration of these three groups of factors.

Motivation to Contribute

Online communities exist within an environment that is networked, digital, and full of information (Kollock 1999). Each of these three features drives important changes in terms of the costs to producing public goods, the value of the public goods, and the production function of the public goods. The specific effects of these changes will depend on the motivations driving the decision to contribute and cooperate. In fact, it is common to find individuals who are remarkably generous with their time and expertise in an online community, and researchers in the area of computer-mediated communication are attempting to provide theoretical explanations for this phenomenon. Howard Rheingold (1993) has described the interaction within one online community as a gift economy. Kollock (1999) argued that much online interaction is characterized by a form of exchange that is both more generous and riskier than gift-giving. He also argued that the economics involved in producing many public goods change radically as one moves to an online environment and therefore, the costs of communicating and coordinating the actions of a group are often much lower than in face-to-face interaction. The value of a piece of information or advice that is offered to a group can be amplified because an

unlimited number of people might use or make copies of the information provided.

The offering of free information and provision of suggestions and advice in online communities are more than the traditional notion of gift giving. A gift is defined as: (i) the obligatory transfer, (ii) of inalienable objects or services, (iii) between related and mutually obligated transactors (Carrier 1991; Mauss 1969). The underlying assumption is that a gift transaction usually involves an unstated obligation to repay the gift at some future time. While gift-giving as classically defined certainly occurs in the online communities, much of the help and sharing that occurs is actually different than traditional gift exchange. When people pass on free advice or offer useful information the recipient is often unknown to them and the giver may never encounter the recipient again. Thus, the usual obligation of reciprocity between two specific individuals is difficult or impossible. Indeed, "gifts of information" and advice are often offered not to particular individuals, but to a group as a whole (Kollock 1999). However, others argue that while a balanced reciprocity with a particular individual may not be possible, there is a sense in which a balance might occur within a group as a whole. Ekeh (1974) calls this kind of network-wide accounting system generalized exchange. The combination of the two arguments provide a feasible explanation for online community members to contribute; that is, the motivation is an anticipated reciprocity and sometimes it is the case that reciprocity will occur within the group as a whole in a system of generalized exchange. Such a system in which accounts do not need to be kept continually and exact in balance has numerous potential benefits (Kollock 1999). If a person shares actively and freely, the group as a whole is better off, having access to information and advice that no single person might match.

Another theory of motivation that has been used to explain the phenomenon of contribution to online communities is the self-concept theory which consists of a set of sub-theories – social identity theory (Stryker 1980, 1986; Tajfel and Turner 1985), self-presentation theory (Beach and Mitchell 1990; Schlenker 1985), and self-efficacy theory (Bandura 1982, 1986). All of these sub-theories are fundamentally rooted in the concept of self. According to self-concept theory, the ideal self is derived by adopting the role expectations of reference groups. An individual behaves in ways that satisfy reference group members in order to satisfy his/her own needs of affiliation and power. In a virtual environment, high quality information, impressive technical details in one's answers, a willingness to help others, and elegant writing can all work to increase one's status and prestige in the community. Rheingold (1993), in his discussion of the WELL, identifies the desire for status and prestige as some of the key motivations of individuals' contributions to the group. There is also a well-developed research literature that has shown how important a sense of efficacy (e.g., Bandura 1995), and making regular and high quality contribution to the group can help a person believe he/she has an impact on the group and support his/her own self-image as an efficacious person. In addition, this theory can account for the attachment or commitment one can have to the community as a motivation to contribute.

The willingness for community members to contribute can also be explained from the perspective of social capital creation and appropriation, and the actors' expectation in terms of the benefits they could possibly obtain from the pool of social capital. The role of physical capital in the production of goods has long been understood whereby capital stock is subject to investment (augmentation) and depreciation and decay from both use and non-use. More recently, it has been argued that social capital is an important input into the production of goods and services (Schmid and Robison 1995). Definitions of the term social capital abound in the literature and the notion has been studied extensively under such concepts as informal organization, trust, culture, social support, social exchange, social resources, and social networks (Adler and Kwon 2002). The core principle guiding social capital is that the goodwill and trust that others have toward each other is a valuable resource (Adler 2001; Robison *et al.* 2002). As indicated by Adler and Kwon (2002), social capital lies in the social relations among people and it has several unique dimensions: (i) what is exchanged is favours or gifts; (ii) the terms of exchange are diffuse (a favour I do for you today is made in exchange for a favour and at a time yet to be determined); (iii) the terms of exchange are tacit rather than explicit (a favour for you today is made in the tacit understanding that it will be returned someday); and, (iv) the exchange is usually symmetrical (the time horizon is not specified nor explicit, but favours eventually are returned). In examining the micro-foundations of social capital, Portes (1998) points out that the key question is what motivates "donors" to help recipients in the absence of immediate or certain returns. Realizing that the fact of a tie implies little about the likelihood that social capital effects will materialize, he provides a useful set of distinctions for characterizing the motivations of donors in relations mediated by social capital. Portes (1998) calls the first broad class of motivations "consummatory"; they are based on deeply internalized norms, engendered through socialization in life. The second broad class of motivations is "instrumental"; they, too, are based on norms, but norms that give greater scope to rational calculation. Instrumental motivations can be based on obligations created in the process of dyadic social exchange (Blau 1964). Though influenced by the economically inspired rational actor models, researchers have implicitly assumed

that individual and collective actors are driven by instrumental motivations and thus, actors are seen as cultivating and exploiting social capital for their own benefits (Burt 1992; De Graaf and Flap 1988). It is clear, however, that social capital is sometimes motivated by normative commitments of a less directly instrumental nature such as norms of generalized reciprocity (Portes 1998; Putnam 1993), a notion examined previously when we used theory of gift economy to explain online contribution. Putnam (1993) puts it in a more detailed way: "Generalized reciprocity involves not 'I'll do this for you, because you are more powerful than I,' nor even 'I'll do this for you now, if you do that for me now,' but 'I'll do this for you now, knowing that somewhere down the road you will do something for me'" (pp. 182–3). It is this norm of generalized reciprocity that resolves problems of collective action and binds communities. It transforms individuals from self-seeking and egocentric agents with little sense of obligation to others into members of a community with shared interests, a common identity, and a commitment to the common goods (Kollock 1999).

Contribution Facilitator

Motivation alone, however, is a necessary but not a sufficient condition for contribution. The actual action of making contributions may be facilitated by other factors. Considering the specific context of online community, it is believed that ease of communication of the virtual systems in online communities would facilitate and encourage members' level of contribution. It is easily conceivable that people will be less likely to interact with other people in the community if the communication systems provided in the virtual community is confusing, technically demanding, and difficult to use. This has been proven to be true in technology adoption and diffusion processes for both individuals and organizations (Davis *et al.* 1989; Rogers 1995; Wang, Hila, and Williams 2002). Dellaert (2000) indicated that consumer experience on the Internet was found to be an important explanatory variable for consumer contribution to Internet interfaces. In another study, participants reported the most salient aspects of virtual community are ease of collaboration/communication, availability of technical assistance from peers, playfulness, and community spirit (Bruckman and Resnick 1995).

The perception of ease of communication may also be confounded by the attitudes of individuals toward computer environments. That is, it seems plausible that those who are somewhat technophobic may find any form of computer-mediated community to be unfriendly and difficult to use, whereas individuals that embrace technology might perceive the same environment as warm and inviting. This is related to the concept of self-efficacy (Bandura 1986) which is defined as the judgements of how well one can execute a course of action required to deal with prospective situations. Several studies have found empirical evidence indicating that self-efficacy in the domain of computer technology is significantly related to the perceptions users hold about these technologies (e.g., Burckhardt and Brass 1990; Gist *et al.* 1989; Hill *et al.* 1987). Based on these findings, Compeau and Higgins (1995) defined the construct of computer-efficacy as "an individual's perceptions of his/her ability to use computer (software) in the accomplishment of a task" (p. 191).

Member Characteristics

The characteristics of virtual community members are diverse and this diversity is believed to reflect differences in their online behaviour. An important characteristic of community members that might affect online behaviour is personality. That is, by nature and through the environment in which they live, certain people are more active and efficacious and generous in giving their help to others. These people are usually expressive, sensing-judging people, and are high in self-esteem, high in competence, high in internal locus of control, low in need for approval, and high in moral development (Aronoff and Wilson 1984; Rushton 1981; Staub 1978). They also often feel that they must earn a place by belonging, being useful, fulfilling responsibilities, being of service, giving to and caring for others instead of receiving from them. Studies indicate these individuals are very creative and entertaining; they enjoy helping others and are particularly fond of socializing and are high esteem-oriented (Wilson and Petruska 1984). It is expected that those members who are active and willing to help others in their everyday life will extend this personality into their online activities in that they are willing to make active contributions to the online community in which they are members. Following from this research, it is argued that one's personality may not have a direct linkage to active participation in a virtual community, but will undoubtedly affect the level of active contribution.

Another characteristic believed to affect the level of contribution is the overall level of involvement in the community. Members can be involved in the community at different levels and in different ways. Some might be involved in the community through passive participation without making any active contribution while others join the community only for active interaction and communication with other members. Research has indicated that involvement affects consumer's motivation to process information, attention, and comprehension processes (Greenwald and Leavitt 1984; Zaichkowsky 1985). This is because involvement has an effect on perceived personal relevance (Richins and

Bloch 1986). Involvement has motivational qualities that influence not only cognitive processes, such as attention and comprehension, but also over behaviours, such as shopping or consumption activities (Celsi and Olson 1988). In the context of online community, the particular effects of involvement can be referred to as message-processing involvement (Petty and Cacioppo 1981), audience involvement (Greenwald and Leavitt 1984), and response involvement (Houston and Rothschild 1978). Thus, it is anticipated that general involvement/passive participation in the community and active contribution to the community will have a positive relationship with each other.

RESEARCH METHODS AND RESULTS

Questionnaire Development and Data Collection

A list of possible motivations to contribute to online communities was tentatively identified based on an extensive literature review and a synthesis of the theories of gift exchange, self-concept, and social capital as discussed above. This preliminary list of motivations was reviewed at a graduate seminar in a mid-west university in the United States where the students attending the seminar have a deep understanding of the concept of online communities, and many of them are even members of online communities of one type or another. Based on this discussion, a list of 20 motivations for contribution was identified and included in a survey questionnaire designed for this study. The data in this study were collected from members of a virtual tourism community operated by a US-based travel company with over 150,000 members. The survey questionnaire was first published on a Web server of a tourism research laboratory affiliated with the university and a database was constructed on the same server to receive and store the online responses automatically. Providing an image link on the front page of the travel community facilitated access to the survey. In addition, the hosting organization directly contacted all members about the survey through a community e-newsletter. The URL of the survey was provided in the e-newsletter so that members could go directly to the survey page. In total, 322 complete responses were obtained over the one-month publication period of the survey questionnaire.

Measures

Factor analysis was conducted using the 20 motivations to identify the underlying constructs. All the items were measured using a five point Likert scale with '1' being 'not important at all' and '5' being 'extremely important'. The results of the factor analysis indicated that five motivation constructs can be identified and each construct has multiple items. These five constructs are: (i) instrumental, (ii) efficacy, (iii) quality control, (iv) status, and (v) expectancy. Through factor loading and reliability checking, 17 out of the original 20 items were retained for the five constructs: six items for instrumental (seeking emotional support, finding friends/peers, relationship building, group attachment/commitment, expressing my identity, and increasing self esteem/respect); three items for efficacy (satisfying other members' needs, being helpful to others, and providing advice); three items defined quality assurance (controlling product/service quality, enforcing service excellence, and product suggestions/evaluations); two items for status (gaining prestige, and attaining status in the community); and, two items for expectancy (seeking future exchange from anybody in the community, and seeking future exchange from whom I provide help). The perceived importance of each of the motivation elements is presented in Table 1 and the correlation matrix of the 17 motivation elements is reported in Table 2.

The adequacy of the measurement model was evaluated using criteria of overall fit with the data, convergent validity, and reliability. The results are reported in Tables 3 and 4. The factor structure appears to be valid as acceptable coefficient alpha values were obtained for each of the respective constructs and provide support for internal consistency. All measures loaded significantly on their intended latent construct as shown in Table 3, establishing convergent validity. Further, the values of the percentage of variance support convergent validity

Table 1. Perceived importance of contribution motivation

Motivation to Contribute	*Mean*	*S. D.*
Sharing enjoyment	3.65	1.03
Gaining a sense of helpfulness to others	3.54	1.12
Seeking/Providing advice	3.49	1.04
Satisfying other members' needs	3.36	1.16
Finding friends/peers	3.08	1.23
Product suggestions/evaluations	3.01	1.12
Enforcing service excellence	3.00	1.17
Relationship building	2.94	1.19
Controlling products/service quality	2.94	1.18
Seeking future exchange from whom I provide help	2.88	1.18
Seeking future exchange from anybody in the community	2.88	1.13
Expressing my identity	2.58	1.21
Group attachment/commitment	2.54	1.14
Seeking/providing emotional support	2.32	1.22
Increasing self-esteem/respect	2.31	1.22
Attaining status in the community	2.19	1.11
Gaining prestige	2.02	1.09

Table 2. Means, standard deviation and correlations of motivation elements

Variable	*Mean*	*S.D.*	*1*	*2*	*3*	*4*	*5*	*6*	*7*	*8*	*9*	*10*	*11*	*12*	*13*	*14*	*15*	*16*	*17*
1. Gaining prestige	2.02	1.09	1.00																
2. Sharing enjoyment	3.65	1.03	.21	1.00															
3. Finding friends/peers	3.08	1.23	.40	.41	1.00														
4. Seeking future exchange from whom I provide help	2.88	1.18	.33	.35	.51	1.00													
5. Seeking future exchange from anybody in the community	2.88	1.13	.25	.37	.52	.74	1.00												
6. Enforcing service excellence	3.00	1.17	.24	.36	.32	.36	.29	1.00											
7. Controlling products/service quality	2.94	1.18	.23	.33	.36	.38	.30	.85	1.00										
8. Product suggestions/evaluations	3.01	1.12	.13	.34	.26	.35	.26	.66	.74	1.00									
9. Relationship building	2.94	1.19	.31	.38	.70	.42	.44	.45	.48	.38	1.00								
10. Seeking/providing emotional support	2.32	1.22	.35	.29	.64	.44	.40	.29	.33	.23	.56	1.00							
11. Expressing my identity	2.58	1.21	.41	.37	.58	.46	.39	.29	.32	.26	.53	.63	1.00						
12. Increasing self-esteem/respect	2.31	1.22	.42	.25	.52	.44	.33	.36	.41	.31	.53	.65	.74	1.00					
13. Attaining status in the community	2.19	1.11	.69	.30	.49	.42	.37	.29	.32	.21	.43	.53	.63	.65	1.00				
14. Group attachment/commitment	2.54	1.14	.38	.37	.64	.45	.46	.35	.37	.29	.61	.64	.61	.62	.61	1.00			
15. Seeking/Providing advice	3.49	1.04	.17	.34	.33	.37	.39	.32	.30	.33	.33	.31	.35	.34	.28	.44	1.00		
16. Gaining a sense of helpfulness to others	3.54	1.12	.26	.42	.45	.48	.38	.43	.45	.42	.44	.35	.43	.39	.34	.45	.49	1.00	
17. Satisfying other members' needs	3.36	1.16	.22	.51	.49	.46	.49	.42	.41	.39	.47	.43	.39	.38	.32	.56	.53	.72	1.00

Note: All the correlations are significant at a=.05 level.

Table 3. Factor loadings and reliability test for the motivation measurement model

Motivation construct	*Factor loading*	*Eigenvalue*	*% of Variance*	*Cumulative % of Variance*	*Cronbach Alpha*
Instrumental		10.50	46.60	46.60	.92
Seeking/Providing emotional support	.80				
Finding friends/peers	.74				
Relationship building	.74				
Group attachment/commitment	.66				
Expressing my identity	.65				
Increasing self esteem/respect	.63				
Efficacy		2.55	11.32	57.92	.82
Satisfying other members' needs	.82				
Being helpful to others	.77				
Seeking/Providing advice	.69				
Sharing enjoyment	.54				
Quality assurance		1.69	7.49	65.86	.90
Controlling products/service Quality	.90				
Enforcing service excellence	.87				
Product suggestions/evaluations	.81				
Status		1.18	5.26	71.12	.82
Gaining prestige	.82				
Attaining status in the community	.80				
Expectancy		1.12	4.97	76.09	.86
Seeking future exchange from anybody	.84				
Seeking future exchange from whom I provide help	.79				

Note: Extraction method: Principle Component Analysis.
Rotation method: Varimax with Kaiser Normalization.

as a substantial amount of the variance in the measures is captured by the latent constructs. Though as shown in Table 4, the overall fit of the model is significant (Chi-square = 222.56, $p < .00$), limitations of the Chi-square statistic have been noted (Bentler 1990; Fornell and Larker 1981). As further evidence of the measurement model, GFI (.93), CFI (.97), RMSEA (.06), and RMR (.05) were found to be within acceptable range (Bentler 1990), thus supporting the overall fit of the measurement model.

Ease of communication was measured using the mean of three items (on a five point Likert scale) which were adapted from a perceived ease of use scale developed within the context of technology adoption and diffusion (Davis *et al.* 1989). Personality was measured using a single item (on a five point Likert scale) by asking the respondents how active they are in their everyday lives. Community involvement was also measured using a single item based upon the amount of time, on average, they spend participating in online communities per week. Lastly, the dependent variable level of contribution was measured using a four level single item ranging from "tourists who make very little active contributions to the community" to "insiders who typically treat the online community as their homes and very much devote and commit themselves in terms of making contributions to the community".

Table 4. Goodness-of-fit statistics for the measurement model

Model	*df*	x^2	*p*	*GFI*	*CFI*	*RMSEA*	*RMR*
Measurement model	88	222.56	0.00	.93	.97	222.56	.05

Development of Hypotheses

It is posited that the five motivation constructs drive community members to make contribution to their communities. Specifically, the following hypotheses can be proposed:

- **Hypothesis 1:** There is a positive relationship between instrumental motivation to contribute and the level of contribution to the community.
- **Hypothesis 2:** There is a positive relationship between efficacy motivation to contribute and the level of contribution to the community.
- **Hypothesis 3:** There is a positive relationship

between quality control motivation to contribute and the level of contribution to the community.

- **Hypothesis 4:** There is a positive relationship between status gaining motivation to contribute and the level of contribution to the community.
- **Hypothesis 5:** There is a positive relationship between expectancy motivation to contribute and the level of contribution to the community.

As argued previously, ease of communication might affect level of contribution indirectly by facilitating level of general involvement and active participation in the community. In addition, the more generally involved the members are in the community, the more likely it is that they will make active contribution, and vice versa. Thus, the following four hypotheses can be proposed:

- **Hypothesis 6:** There is a positive relationship between ease of communication and the level of contribution to the community.
- **Hypothesis 7:** There is a positive relationship between ease of communication and the level of general involvement in the community.
- **Hypothesis 8:** Level of general involvement in the community positively affects level of active contribution to the community.
- **Hypothesis 9:** Active contribution to the community positively affects level of general involvement in the community.

Last, members' personality plays an important role in deciding whether they are willing to make active contributions to the community. It is believed that people who are active in their physical lives will be similarly more active in the virtual environment and will be more willing to make contribution to the community. Thus, the following hypothesis was proposed:

- **Hypothesis 10:** People with active personalities in their normal physical lives have higher level of active contribution to the online community compared with people who are less active.

The specifications of the hypotheses and their directions were developed based on the literature review and are summarized in Figure 1.

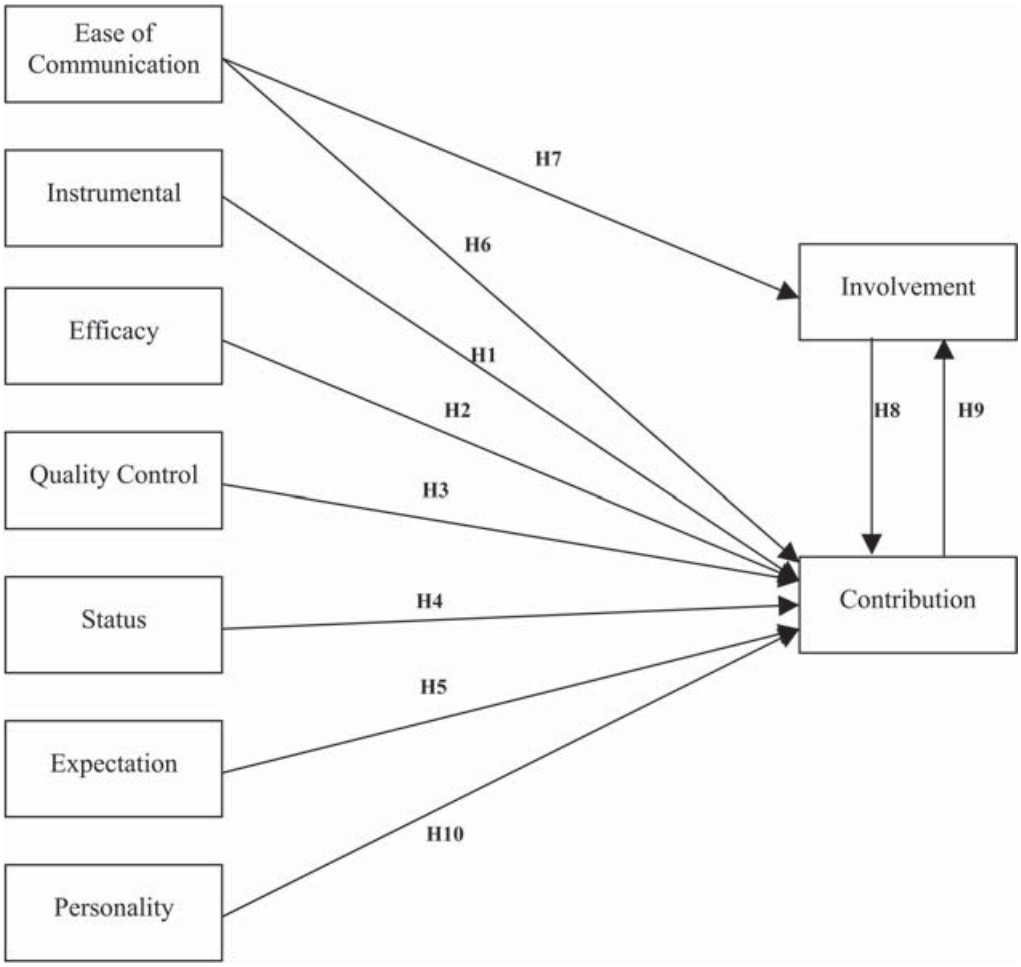

Figure 1. The hypothesized model of online community involvement and contribution

Table 5. Fit indices, parameter estimates and determination coefficients for the hypothesized and alternative models

Goodness-of-fit statistics	*Hypothesized model*	*Alternative model*
df	5	3
χ^2	5.38	5.32
χ^2/ df	1.08	1.77
GFI	.99	.99
NFI	.99	.98
CFI	.99	.99
RMSEA	.02	.04
Paths	*Standardized coefficients*	*Standardized coefficients*
Instrumental → Contribution	.23*	.25**
Efficacy → Contribution	.21*	.20*
Quality Control → Contribution	.00	–
Status Gaining → Contribution	.03	–
Expectancy → Contribution	.18*	.19*
Ease of communication → Contribution	.20**	.20**
Personality → Contribution	.13*	.12*
Involvement → Contribution	.57***	.57**
Ease of communication → Involvement	.11*	.11*
Contribution → Involvement	.60**	.60**
% of Variance explained		
Involvement	.20	.20
Contribution	.47	.47

Notes: *p < .05; **p < .01; ***p < .001.

Evaluation of the Hypothesized Model

Amos 3.6 (Arbuckle 1997) was used to test the hypothesized model and the results are summarized in Table 5. The hypothesized model fits the data well and all relationships are in the hypothesized directions, thus providing evidence for the nomological validity of our model. Also, the independent variables accounted for a substantial proportion in the variance of the criterion variables ($R^2_{involvement} = .20$ and $R^2_{contribution} = .47$). Significant positive relationships ($\alpha = .05$) were found between instrumental, efficacy, and expectancy motivations and level of active contribution, thus H_1, H_2, and H_5 were supported. In contrast, the direct paths from quality control and status gaining motivations to level of contribution were not significant at $\alpha = .05$, so H_3 and H_4 were not supported. The effects of ease of communication and general involvement on level of active contribution as well as the effects of level of contribution on general involvement were significant ($\alpha = .05$) as hypothesized, thus H_7, H_8, and H_9 were supported. The hypothesized path from personality to level of contribution was found to be borderline significant ($p = .06$); thus, H_{10} was partially supported. An alternative model was evaluated to compare the performance and robustness of the hypothesized model against "plausible" alternative models (Hair at al. 1998; Morgan and Hunt 1994). In this model all non-significant paths were removed from the hypothesized model and the model was re-estimated (see Figure 2). The rationale for doing so is to provide a more parsimonious representation of the data. As shown in the "alternative model"-column of Table 5, the alternative model has very good fit statistics: χ^2 equal to 5.32 (d.f. = 3), a GFI of 0.99, a NFI of 0.98, a CFI of 0.99, and a RMSEA equals to 0.04. By comparing the two models, one can notice that the alternative model is preferable to the hypothesized model because: (i) the alternative model demonstrates the same explanatory power as indicated by similarity in fit indexes for both models; (ii) the alternative model is parsimonious; and, (iii) the alternative model has a greater number of significant paths (Morgan and Hunt 1994).

Discussion

The results of this study offer important implications for the development and maintenance of online communities. In particular, the results of the study demonstrated that members' active contribution to the

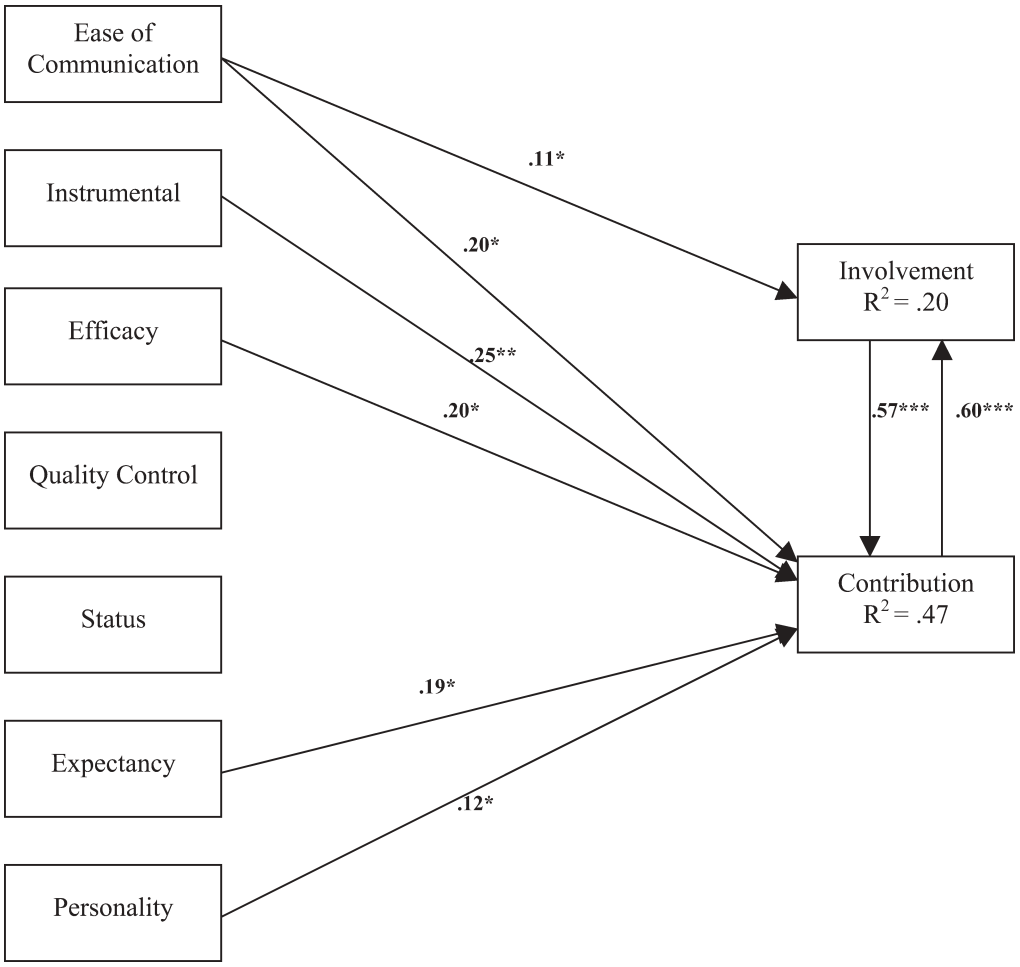

Figure 2. The alternative model

community can be understood by looking at three major groups of determining factors, i.e., their motivation to contribute, the ease of communication in the virtual environment, and members' characteristics. In particular, the study demonstrated that efficacy is a major factor affecting members' active contribution to online communities, and this further confirms the strong social aspects of any kind of communities, including online communities. The results of the study also indicate that the possibility of future reciprocation (expectancy) is another major motivation driving an individual's contribution. This might be an indication that the likelihood of providing public goods may be increased to the extent individuals are likely to interact with each other in the future and to the extent that there is some way to keep track of past actions (for example, by making sure contributions are seen by group as a whole or by providing archives of past actions and contributions). Thus, identity persistence might be an important feature in encouraging contributions based on reciprocity. For example, identities should be registered to particular users and stable across time, so that a record of past actions and contributions could be kept. Another feature that would encourage reciprocity over time might be a well-defined and defended group boundary. If the population of a group is extremely unstable, then there is the temptation to come into a group and take advantage of its resources and then leave. In addition, the results suggest that online communities should be developed in a way that community members can obtain benefits by making active contributions which, in turn, encourages them to continue participating themselves.

Understanding the motivation to contribute to online communities from the perspective of social capital creation and appropriation is also important to managers/organizers of online communities. Like physical capital or human capital, social capital needs maintenance. Social bonds need to be periodically renewed and reconfirmed or else they lose efficacy. Use of social capital in the community should be encouraged since it may depreciate with non-use but it does not depreciate with use (Putnam 1995). It should be understood that the process of social capital creation and appropriation, coupled with the dynamism of communication and a spirit of collaboration, can help

strengthen and sustain the online community (Preece 2002). Social capital also encourages collaboration and cooperation between members of groups for their mutual benefits (Putnam 1995), and consequently life in communities with a rich supply of social capital is easier than in communities with low social capital. However, a key ingredient for developing social capital is the development of trust. Community organizers, therefore, should examine how online communication technologies can be more used to support/foster trust within the community. For example, it might be appropriate to appoint trustworthy moderators who would lightly review communications before posting. Moderation, however, should be done carefully, since the knowledge that messages and conversations are being moderated often changes the nature of the communication, though research findings in this area are sometimes contradictory (Sproull and Kiesler 1991; Whittaker 1996).

In addition to motivation, ease of communication in the virtual environment has been found to be a significant facilitator contributing to active contribution. This finding poses challenges for achieving the goal of developing widely available online communities and community networks. Online community developers should focus on developing technologies accessible to a wide range of users on a variety of devices, and at the same time to make certain that the software supports sociability; that is, effective social interaction online. The design should also suit the skills and expectations of the users and supports their discussion. For example, private communication channels can be designed around most members' communication needs, since it has been found to be useful for discussing topics of narrow interest, or of a personal nature or for contentious one-to-one debate (Whittaker and Sidner 1996). Studies have also found that there are limits to the amount and kind of information that any one individual will make available to the public at large, so private forms of communication are needed (Kautz *et al.* 1997). One-to-one communication is also known to be liked by women and girls (Tannen 1994), so making this facility easily available may help to encourage them into online communities in the first place.

It should be recognized that motivations to contribute to online travel communities are difficult to model as different motives can be associated with the same action, and the same action may be explained by different motives. For example, the motive might be love and caring for one person or one might contribute to an online community in order to gain some future advantage for the giver – a selfish motive. Or, it might be based on a learned norm or moral code. Even the actor may not be sure of the motive and in fact, it may be affected by the reaction of the recipient (Schmid and Robison 1995). This complexity and diversity in motivations not only makes empirical research in this area difficult, but also may pose serious challenges for an online community as to how to balance the needs of online community so that members can be drawn to the community and evolved to become active in the community, and how to place the right combinations of mechanism to make this happen. In this process, community developers should realize that the social ecology of human groups is delicate. Just as in ecosystems of animals and plants, the dynamics of social ecology is such that many variables are inter-related and impact upon one another. Change one and there can be a ripple of change through the whole system in ways that may be unexpected. The dynamics of online communities mediated by computer networks may be even more sensitive because they lack many of the physical cues that are used in face-to-face communication. It is hoped that this study can stimulate further research so that we can have a better understanding of this phenomenon.

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