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Factors Affecting Volunteer Participants' Performance in the Virtual Community: The Case of Knowledge Sharing Website

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ABSTRACT

Virtual community has gained much attention from academia and practice due to its great outcomes and potentials. One of the major issues here is how the virtual communities made such enormous outcomes with little control and reward, as wikipedia or Linux did. This study assumes that the voluntary participant's performance has a direct impact on the productivity of the virtual community, and tries to find factors affecting the participant's performance in the virtual community. We employ as theoretical bases Expectancy Theory, Goal Setting Theory, and literatures related with volunteers' motivation. This study conducts the email survey from participants of knowledge service community of NHN, a leading Korean online company. We find that high-performing participants have individual ability, goal congruence, and the greater level of effort motivated by personal or collective functions.

Keywords (Required)

Virtual Community, Expectancy Theory, Motivation, Performance, Knowledge Sharing

INTRODUCTION

Virtual community has gained much attention from academia and practice due to its great outcomes and potentials. For example, Nature, a science journal, published an article that claimed to compare the accuracy of the Britannica with that of Wikipedia(www.wikipedia.com), the Internet encyclopedia that allows anyone, regardless of knowledge or qualifications, to write and edit articles on any subject (Jim Giles, 2005). The article said that users can use the Wikipedia, as an encyclopedia without serious worry for the accuracy, because the results show that it does not have great difference from Britannica in the accuracy. The Wikipedia has only 5 years history and made by every general users rather than by selected experts. Raymond (1999), one of the leaders in open source phenomena, mentioned that the development process made by users who are networked only in the Internet line is really amazing and it is getting to be more strong software development method than previous way.

One of the major issues here is how the virtual communities generate such enormous innovation and performance with little control and reward, as wikipedia or Linux did (von Hippel and von Krogh, 2003; Kogut and Metiu, 2001). As software developers' performance has a direct impact on software development productivity(Rasch & Tosi, 1992), this study assumes that the voluntary participant's performance directly affects the productivity of the virtual community, and tries to find factors affecting the participant's performance in the virtual community.

To address the issue, we employ as theoretical bases Expectancy Theory, Goal Setting Theory, and literatures related with volunteers' motivation. The practice of virtual community is so diverse, such as open source development, encyclopedia publishing, medical innovation, crime solving, textbook and space exploration (Goetz, 2003). From the candidates, this study chooses knowledge service community of NHN (<http://kin.naver.com>), a leading Korean online company, similar to knowledge service in Yahoo (answers.yahoo.com). The reason is that it is easy to measure participants' performance. In the service, questioners can evaluate the quality of answers written by participants. Each question is independent from other questions. We use the evaluation as a participant's performance, because high performing in the knowledge service means that the answers satisfy the questioners well.

This study conducts email survey from participants of the knowledge service community. We find that high-performing participants have individual ability, goal congruence, and the greater level of effort motivated by personal or collective functions.

PERFORMANCE IN THE VIRTUAL COMMUNITY

As we learned in the Wikipedia case, many virtual communities become a more mainstream and commercially viable form (Fitzgerald, 2006). So, research on the performance of virtual community is getting to be more important. Previous research, however, has been focused on other topics, such as, the motivation (e.g., why do they participate without monetary reward?), control (e.g., how is it coordinated without control?) or diffusion (e.g., how does it compete with proprietary product?) (Bonaccorsi and Rossi, 2003; von Krogh and von Hippel, 2006).

Virtual community is a group of people who are voluntarily gathered to gain a certain goals in IT supported virtual space (Lee et al., 2002). So, the individual performance is critical, if the community providers, like Wikipedia or Linux, want to make a commercially viable output from the virtual community.

There is a large body of theoretical and empirical literature related with the individual job performance. For example, expectancy theory or goal setting theory is related with volunteers’ motivation and their performance. Also, some researchers mentioned that individual characters or talents affect job performance (McGarry, 1984; Curtis, et al., 1988).

Expectancy theory

Expectancy theory refers to a set of decision theories of work motivation and performance (Vroom, 1964). The theory mentioned that performance can be described as a function of effort-level, ability, and role perceptions (Lawler and Suttle, 1973). Main assertion of the theory is that highly motivated individuals will exert higher effort levels and consequently will tend to perform at higher levels than their less motivated contemporaries. Expectancy theory has been widely used to explain relationship between motivation and behavior in work and organizational settings (Ferris, 1977). The motivation of individual to perform at a particular level of effort is related two factors: the individual’s probability estimates that specific outcomes or rewards will follow from exerted effort, and the perceived valences of specific rewards or outcomes associated with performing at that level of effort (Vroom, 1964). Although the efforts will lead to increased performance, the theory also postulates that an individual’s job performance is a joint function of the ability to perform the job, the role perceptions with respect to the job and the motivation to perform (Lawler and Suttle, 1973). The increase in the effort will not guarantee the performance, if the ability or understanding of job requirement is not satisfied.

Hypothesis Development

The purpose of this paper is to find factors affecting volunteers’ performance in the virtual community. From the expectancy theory, we suggested that high-performing participants have individual ability, goal congruence, and the greater level of effort motivated by personal or collective motive (figure 1).

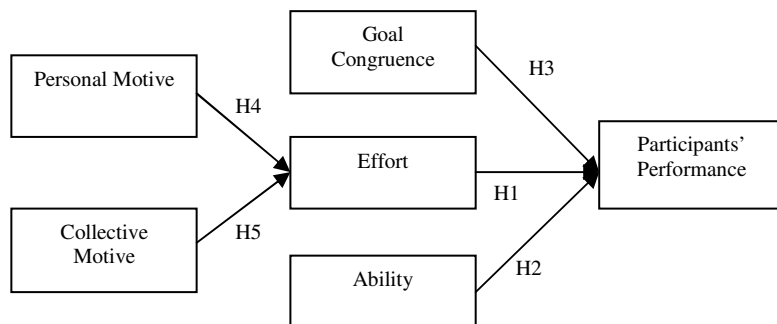


Figure 1. Research Model

Participants' performance, the dependent variable, refers to the degree of contribution the participants made in the virtual community. In the Wikipedia, the performance may be measured by the richness or accuracy of contents users made, because the purpose of the community is to make online encyclopedia. On the contrary, Wasko & Faraj(2005) use helpfulness of contribution in the online legal service. In the same manner, we use the helpfulness of contribution as a dependent variable, because our domain is also knowledge service.

In the expectancy theory, the level of effort affects the participants' performance (Lawler and Suttle, 1973). Especially, the participants' efforts are critical in a virtual community, because virtual community works only by voluntary participants, with little control. A virtual community will get high quality of output, only when the participants do well. For instance, Katz(1964) assert that three behavioral requirements are essential to make high performing organization, such as, joining and staying, carrying out their role assignments, and innovative and spontaneous activities. The third one represents behaviors that go beyond specified role requirements and puts forth extra effort on a job.

H1: Effort is positively related to participants' performance in a virtual community.

As mentioned before, individual performance is also related to his/her ability (Lawler and Suttle, 1973). Here, ability refers to the person's native intellectual capabilities or the quality of his or her formal education or training, which is necessary to the virtual community.

H2: Ability is positively related to participants' performance in a virtual community.

Goals can be a powerful motivator for both individuals and groups (Locke and Latham, 1990). In the goal setting theory, difficult and specific goals lead to higher levels of performance than do easy or vague goals (Lock et al., 1981). Yet, research on the goal-performance relationship in a group needs to consider person-organization fit of the goal (Kristof-Brown and Stevens, 2001). In the expectancy theory, role perception refers to how well individuals understand their role in the organization (Rasch and Tosi, 1992). The participants, however, participate in the virtual community just voluntarily. It means that they participate to the virtual community just when they want to do something. That is, they may do something different from what community providers want. Therefore, important thing is how their purpose is close to the purpose of virtual community.

For example, although a virtual community has a specific goal (e.g., Wikipedia want to make online encyclopedia), the participants may focus on the different aspects of the goal (e.g., someone use Wikipedia as a marketing tool). Goal congruence refers to the similarity of goal between participants and the virtual community. The goal congruence can improve individuals' attitudes and performance in collective activities (Kristof-Brown and Stevens, 2001).

H3: Goal congruence is positively related to participants' performance in a virtual community.

Understanding what motivates efforts of participants is a central theme in the research on the virtual community. Motivation is kinds of a psychological state, whereas the outcome or results of that state is behavior (Mitchell and Daniels, 2003). People work harder when they are motivated. So, the motivation of the efforts also needs to be investigated to increase understandings of our issue. The motivation for exerting efforts (contribution to the virtual community) has been a core issue in the open source or virtual community related research (von Krogh and von Hippel, 2006). Lots of researchers suggested diverse motivation types, such as fun, enjoyment, reputation, learning, social relationship, and career building (Raymond, 1999; Ghosh et al., 2002; Hertel et al. 2003; Clary et al., 1998). Also various theories are used to explain the phenomenon, such as social exchange theory (Wasko and Faraj, 2005), Theory of Reasoned Action (Brock et al., 2005), social movement (Klandermans, 1997), and functional approach (Clary et al., 1998).

Each of these motivations has been studied independently in the different types of community and user group. So, we need to unify and classify them, as Rossi (2004) classified the different motivations as intrinsic or extrinsic. Krshnamurthy (2002) describes image of virtual community, as 'cave' or 'community', saying that the virtual community is more like 'cave' rather

than ‘community’. This study proposes two types of motivation according to the images, collective motive and personal motive. Personal motive is related with perceived usefulness of their participation, and collective motive is about membership or relationship with others.

Klandermans (1984, 1997) distinguishes three different motivations for social movement participation, such as, collective motive, normative motive, and reward motive. Each motivation originates from different types of costs or benefits. The collective motive is related to the collective benefit, and the reward motive results from selective incentives pertaining to more personal costs and benefits. The normative motive, little related to the virtual community, is from the expected reactions of significant others to one’s participation in collective action. Here, distinction between collective and selective incentive is the criteria of the classification (Olson, 1965). Highly motivated individuals will exert higher effort levels (Ferris, 1977), in the both cases of personal and collective.

Collective motivation derives from sense of community, which is the feeling that members have of belonging, a feeling that members matter to one another and to the group, and a shared faith that members’ needs will be met through their commitment to be together (McMillan, 1976). Bagozzi and Dholakia (2006) name the collective motivation “we-intention”, which is formulated when participants think of themselves as “us” or “we” and remain jointly ready to act in activities to accomplish the group’s collective goals. Also they assert that it will have a positive impact on the level of effort in a collective action.

On the contrary, the personal (reward) motivation is from expected costs and benefit (Hertel et al., 2003). Note that it is individualistic or utilitarian approach to group action. For example, there are loss of knowledge power and codification effort as a cost, and organizational reward, image, reciprocity, knowledge self-efficacy and enjoyment as a benefit (Kankanhalli et al., 2005).

H4: Personal motivation is positively related to effort in a virtual community.

H5: Collective motivation is positively related to effort in a virtual community.

RESEARCH MEHODOLOGY

To test the proposed research model, we use survey method for data collection, and examined hypotheses by applying the partial least square (PLS) method to the collected data.

Sample

Data were collected from participants of knowledge service community in NHN, a leading Korean online company. The participation in the community is voluntary, and the members have access to the community for knowledge sharing. Participants have to log into the system in order to participate, and their participation history and several statistics are visible.

We sent an email to randomly selected participants. We provided about 2\$ online coupon to the respondents. Among the 1200 surveys distributed in the knowledge community, 282 responses were obtained yielding a response rate of 23.5 percent. Most of 210 respondents were males (82.7%) and in the age group of 20 to 29 years (40.2%). Table 1 shows the demographics of respondents.

Table 1. Demographics

Age	Sex		Total
	Male	Female	
Below 20	49(19%)	17(6.7%)	66(26%)
20 to 29	86(33.9%)	16(6.3%)	102(40.2%)
30 to 39	40(15.7%)	6(2.4%)	46(18.1%)
40 to 49	23(9.1%)	2(0.8%)	25(9.8%)

Above 50	12(4.7%)	3(1.2%)	15(5.9%)
Total	210(82.7%)	44(17.3%)	254(100%)

Measurement and data collection

As we mentioned before, the participants’ performance refers to the level of contribution a participants made in the virtual community. The participants’ performance was measured by a single item, “the rate of selected answers” supported by target community provider. Questioners can choose a best answer from the list of answers made by other participants, and “the rate of selected answers” is the percentage of selecting answers. If the rate is high, the degree of participants’ contribution will be high.

Table 2 gives scale items of each independent variable.

Table 2. Scale Items

	Item	Source
Ability (ABI)	Level of expertise (from novice = 1 to expert = 5) I have enough knowledge to share	Mabe and West(1982) Adapted from Darsonon and Indahwati (2005)
Effort (EFF)	How much effort do you make to be highly effective performer? How much effort do you make to participate to the community?	Adapted from Vroom(1964)
Goal Congruence (CON)	Extent to which their personal goals were compatible with the goals of the community	Adapted from Kristof (1996)
Personal Motive (PER)	Knowledge share for learning Knowledge share for Career concern	Adapted from Shah (2006)
Collective Motive (COL)	I want to help others in any way I can I want to be friendly with others I want to be fully involved in the community	Rioux & Penner (2001)

Data analysis and results

We chose partial least square (PLS) structural equation analysis to test the hypotheses. PLS is a structural equation modeling technique that allows to analyze, simultaneously, measurement and structural models (Gefen et al., 2000).

Measurement model

The reliability or internal consistency of given constructs is calculated using the Composite Reliability. If the value of Composite Reliability exceeds 0.7, we can accept the reliability (Fornell and Larcker, 1981). Convergent validity and Discriminant validity is evaluated by AVE (Average Variance Extracted). AVE values need to be greater than 0.50 (Fornell and Larcker, 1981) to get the convergent validity. On the other hand, to evaluate discriminant validity, the square root of the AVE may be compared with the correlations among the latent variables (Chin 1998). The result in table 3 shows the discriminant validity: the square root of AVE for each construct is greater than the levels of correlations involving the construct.

Table 3. Composite Reliability, Square Root of AVE Values

	Composite Reliability	PER	ABI	EFF	CON	PER	COL
Performance (PER)	1.000	1.000					
Ability (ABI)	0.879	0.167	0.886				

Effort (EFF)	0.952	0.416	0.335	0.952			
Goal Congruence (CON)	1.000	0.494	0.174	0.436	1.000		
Personal Motive (PER)	0.773	0.053	0.135	0.380	0.365	0.731	
Collective Motive (COL)	0.849	0.092	0.362	0.519	0.330	0.556	0.811

* Shaded numbers in the diagonal row are Square root of the AVE

Structure model

Proposed hypotheses were tested with bootstrapping technique in PLS (Chin and Frye, 1996). The results of the analysis are depicted in the table 4. The explanatory power of the structural model is evaluated by looking at the R² value in the final dependent construct. The R² for the ‘participants’ performance’ was 0.294. Hypotheses 1 and 2 are supported, that is, ‘effort’ and ‘goal congruence’ are positively related with ‘participants’ performance’. ‘Ability’, however, has no significant relationship with the performance. The R² for the ‘effort’ was 0.281. Both personal and collective motivation has positive and significant relationship, as we anticipated.

Table 4. Hypotheses Test

Hypotheses	Path coefficient	T-value
H1: EFF → PER	0.242	4.252**
H2: ABI → PER	0.018	0.479
H3: CON → PER	0.386	5.909**
R ² =0.294		
H4: PER → EFF	0.132	2.167*
H5: COL → EFF	0.445	7.098**
R ² = .281		

*P<0.05, ** P<0.01

CONCLUSION

The objective of this study is to find factors affecting participants’ performance in the virtual community. Accordingly, we presented three factors, such as, effort, ability, and goal congruence, based on the expectancy theory and goal setting theory. We, also, classify the motivation as personal and collective motivation. Our results provide support for most of our hypothesized relationships. The ability, however, does not have significant relationship with performance.

This paper makes two important contributions to the virtual community literature. First, our theoretical model and empirical evaluation increase the understanding of how motivation, participation (effort), and performance work in the virtual community. Previous research little concern to the performance in the virtual community, but this issue become more important, as virtual community generate more reliable output.

Second, we classified motivation as personal and collective motive. This classification is based on the Krshnamurthy (2002)’s finding that open source community has two types of behaviors, ‘cave’ and ‘community’. This classification can help future research related to the behaviors in the virtual community.

REFERENCES

1. Bagozzi, R. P. and Dholakia, U. M. (2006) Open source software user communities: a study of participation in linux user group, *Management Science* (52:7) pp 1099-1115

2. Bock, G., Zmud, R., and Kim, Y.(2005) Behavioral intention formation in knowledge sharing: examining the roles of extrinsic motivators, social psychological forces, and organizational climate, *MIS Quarterly* (29:1) pp. 87-111
3. Bonaccorsi, A. and Rossi, C.(2003) Why Open Source Software can Succeed, *Research Policy* (32), pp 1243-1258
4. Chin, W. W.(1998) Issues and opinions on structural equation modeling, *MIS Quarterly* (22:1), pp 7-16
5. Clary E. G., Snyder, M., Ridge, R. D., Copeland, J., Stukas, A. A., Haugen, J., et al.(1998) Understanding and assessing the motivations of volunteers: A functional approach, *Journal of Personality and Social Psychology* (74), pp 1516-1530
6. Constant, D., Sproull, L., and Kiesler, S.(1996) The kindness of strangers: The usefulness of electronic weak ties for technical advice, *Organization Science* (7:2), pp. 119-135
7. Curtis, B., Krasner, H., and Iscoe, N.(1988) A field study of the software design process for large systems, *Communications of the ACM* (31:11), pp. 1268-1287
8. Darsonon and Licen Indahwati (2005) Examining information technology acceptance by individual professionals, *Gadjah Mada International Journal of Business* (7:2), pp. 155-178
9. Ferris, K.(1977) A test of the expectancy theory of motivation in an accounting environment, *The Accounting Review* (52:3), pp. 605-615
10. Fitzgerald, B.(2006) The Transformation of Open Source Software, *MIS Quarterly* (30:3), pp 587-598
11. Fornell, C., and Larcker, D.(1981) "Evaluating structural equation models with unobservable variables and measurement error, *Journal of Marketing Research* (18), pp. 39-50
12. Ghosh, R. A., R. Glott, B. Krieger, G. Robles (2002) Free/libre and open source software: Survey and study. Report, International Institute of Infonomics, University of Maastricht, Maastricht, The Netherlands
13. Goetz, T.(2003) Open Source Everywhere, *Wired* (11)
14. Hertel, G., S. Niedner, S. Hermann.(2003) Motivation of software developers in open source projects: An internet-based survey of contributors to the linux kernel, *Res. Policy* (32) pp 1159-1177
15. Jim Giles, (2005) Internet encyclopaedias go head to head, *Nature* 438,
16. Kankanhalli, A., Tan, B. C. Y., and Wei, K.(2005) Contributing Knowledge to Electronic Knowledge Repositories: An Empirical Investigation, *MIS Quarterly* (29:1), pp 113-143
17. Katz, D. (1964) The Motivational Basis of Organizational Behavior, *Behavioral Science* (9:2), 1964, pp 131-146
18. Klandermans, B.(1984) Mobilization and participation: Social psychological expansions of resource mobilization theory, *American Sociological Review* (49), pp 583-600
19. Klandermans, B.(1997) The social psychology of protest, Oxford, UK: Basil Blackwell
20. Kristof, A. L. (1996) Person-organization fit: An integrative review of its conceptualizations, measurement, and implications. *Personnel Psychology*, 49, 1-49.
21. Kristof-Brown, A. L., and Stevens, C. K.(2001) Goal congruence in project teams: does the fit between members' personal mastery and performance goals matter?, *Journal of Applied Psychology* (86:6), pp. 1083-1095
22. Kogut, B. and Metiu, A.(2001) Open-Source software development and distributed innovation, *Oxford Review of Economic Policy* (17:2), pp 248-264
23. Krishnamurthy, S.(2002) Cave or Community? An empirical examination of 100 mature open source projects, *First Monday* (7:6)
24. Lawler, E. and Suttle, J.(1973) Expectancy theory and job behavior, *Organizational Behavior and Human Performance* (9:3), pp. 482-503
25. Lee, F., Vogel, D. and Limayem, M.(2002), Virtual Community Informatics: What We Know and What We Need to Know, *35th Hawaii International Conference on System Sciences*, pp 2863-2872
26. Locke, E. and Latham, G.(1984) A theory of goal setting and task performance, Prentice Hall, Englewood Cliffs, NJ

27. Locke, E., Saari, L., Shaw, K., and Latham, G.(1981) Goal setting and task performance: 1969-1980, *Psychological Bulletin* (90:1), pp. 125-152
28. Maslow, A. H. (1943) A theory of human motivation, *Psychological Review*, 50, 370-396
29. McGarry, F. (1984) What have we learned in the last six years?, Proceedings of the Seventh Annual Software Engineering Workshop (SEL-82-007), NASA Goddard Space Flight Center, Greenbelt, MD
30. McMillan, D. (1976) Sense of community: An attempt at definition, Unpublished manuscript, George Peabody College for Teachers, Nashville, TN
31. Mitchell, T. R., D. Daniels. (2003) Motivation. Handbook of Psychology. Industrial and Organizational Psychology, Vol. 12. Wiley, New York, 225-254
32. Olson, Mancur.(1965) The logic of collective action. Public Goods and the Theory of Troups, Cambridge, Ma: Harvard University Press
33. Rash, R. H. and Tosi, H. L.(1992) Factors affecting software developers' performance: An integrated approach, *MIS Quarterly* (16:3), pp 395-413
34. Raymond, E. R.(1999) The Cathedral and the Bazaar: Musings on Linux and open Source by an Accidental Revolutionary, *Sebastopol, CA: O'Reilly & Associates Inc.*
35. Rioux, S. M. and Penner, L. A. (2001) The causes of organizational citizenship behavior: A motivational analysis, *Journal of Applied Psychology* (86:6), pp. 1306-1314
36. Rossi, M. A. (2004). Decoding the "Free/Open Source (F/OSS) software puzzle:" A survey of theoretical and empirical contributions. *Retrieved September 20*
37. Shah, S. K. (2006) Motivation, governance and the viability of hybrid forms in open source software development, *Management Science* (52:7), pp. 1000-1014
38. Von Krogh, G. and von Hippel E.(2006) The Promise of Research on Open Source Software *Management Science* (52:7), pp 975-983
39. Von Hippel, E. and von Krogh, G.(2003) Open Source Software and the "Private-Collective" Innovation Model: Issues for Organization Science," *Organization Science* (14:2), pp 209-223
40. Vroom, V. (1964) Work and Motivation, Wiley, New York, NY
41. Wasko, M. and Faraj, S.(2005) Why Should I Share? Examining Social Capital and Knowledge Contribution in Electronic Networks of Practice, *MIS Quarterly* (29:1), pp. 35-57