Modeling Contextual Factors Affecting Online Participation in Communities of Practice (Cops) in Corporate Entities

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Abstract

Communities of practice (CoPs) play a critical role in delivery and sharing of knowledge. Apart from the easy expression of explicitly knowledge, the dynamic processes and complex interactions in online CoPs do mediate the creation and transfer of tacit knowledge as well. This is inferred from the many ways CoPs have revolutionalized the ways in which context-specific knowledge is shared virtually across the globe (Donna, 2007). However, sharing of knowledge, especially across and between far spaced domains such as cultures, systems and persona is difficult to accomplish due to the tacitness tendency of such knowledge (Nonaka & Takeuchi, 1995; Almeida, Song, & Grant, 2002; Doz, Santo & Williamson, 2001). This is largely because knowledge is also influenced by contextualised domain factors which have a strong bearing on sharing and participation. This paper investigated the factors affecting online participation in CoPs. A group of online participants were engaged from three multinational corporate entities. The study focused on a three level participation framework determined by; organizational culture, online systems and individual motivation. Systems emerged to be the highest cause of participation followed by motivation and lastly culture. Construct validities using contextual variables as covariates, such as ease of system use (system level), perceived leadership support (organization level) and intrinsic motivation(individual level) further revealed that a participation model can be derived. An adequate participation model fit emerged with: Chi-square (χ^2) of 14, the RMSEA at 0.0187 with a p-value of 0.979. The goodness of fit index was 0.995, the comparative fit index was 0.999 and the adjusted goodness of fit index was 0.984.

Keywords: modeling, online, domain, knowledge, context, sharing

Introduction

Knowledge exchange in highly performing companies is core. In large corporations and multinational entities, knowledge exchange mostly happens through virtual networks which are also referred to as online communities of practice (CoPs). Large virtual networks often consist of individuals with similar interests or expertise, and sharing normally occurs through online discussion forums. The problem however is that substantive knowledge sharing largely depends on participation levels as well as the context in which it is intended and shared. While certain individuals may opt to optimize the use of these networks, others find them not conducive. For example, Starbuck (1992) noted that in knowledge dependent and knowledge-intensive entities, the management hierarchical structures are not conducive for sharing knowledge. In such settings, individuals would usually use their knowledge as leverage to maintain status and gain job promotions. Sometimes, it is ambiguity in the shared bits and snippets of knowledge that hinders participation. At other times, it is the context and the systems and organizational culture disrupting and hindering such sharing.

This paper examined the factors that affect participation levels in CoPs and used modeling to derive a participation framework. The study was premised on two questions that mostly daunt knowledge managers. First, if we put them (CoPs) there, will (users) they come? Second, if they come, will they stay? But it was also guided by the nature in which knowledge exits, explicit and tacit forms.

Explicit knowledge can easily be identified, coded, and recorded in documents for easy access and use. *Tacit knowledge* is however, subjective and personal, therefore hard to codify and document.

Nonaka, Konno, and Toyama (2001) pointed out that, tacit knowledge is "deeply rooted in an individual's action and experience, as well as in the ideals, values, or emotions he or she embraces" (p. 14) which adds to the difficulty in sharing this type of knowledge. Consequentially, context-specific knowledge is even harder to share because ideals and values exist within a person's subconscious. Individuals sharing behaviour can thus be based on inherent ideals and values manifesting in ways not completely mastered to them.

In tacit knowledge sharing, in fact all what matters is simply creating space where people can share knowledge (Gill, 2004) and facilitate and encourage the "emerging relationships" found to be necessary in online communities (Nonaka & Konno, 1998, p. 40). It follows then that a culture that encourages formal and informal networks must be present to support online communities as the means of sharing tacit knowledge (Argote, McEvily, & Reagans, 2003; Holden, 2001).

Online Communities of Practice

The term *communities of practice* refers to more than one community and is abbreviated as CoPs, while the term community of practice represents one community and is abbreviated as CoP. For the purpose of this study, a number of communities will be under examination; therefore, the abbreviation of CoPs is used. Furlong and Johnson (2003) ascertain that CoPs have been recognized by many professionals, both in practice and in academia, as a core component of an organization's knowledge management initiative. CoPs are utilized for the sharing of know-how in order to create business and employee value. CoPs normally are formed around value-adding business activity but may not be formalized as such; however research and practice indicate that in most organizations CoPs are formalized in that they are supported by leadership and funded by the organization as the means by which employees share knowledge globally. According to Gongla and Rizzuto (2001), organizations have come to the realization that online CoPs add value to the business as they could help in achieving goals and objects; therefore, there is a need to better understand CoPs. Thus understanding what influences participation in these communities is crucial to the community's success and provides valuable insight into how these communities can continue to survive.

Information and knowledge Systems

Information technology acts as an enabler for online CoPs. However, if the systems are too cumbersome for employees to use or community members do not find the system useful, then participation levels decline. While Chung (2001) indicates that information technology can be an enabler to tacit knowledge sharing, Hildreth and Kimble (2002) argue that these systems have their limitations. By maintaining a low threshold on the ease of use of the system, it is expected that individuals will be motivated to use the system; the assumption is that this will lead to an exchange of tacit knowledge. Likewise, if sufficient knowledge and information are found in the online community, that community would be considered useful; therefore, an increase in usage would be realized (Hall, 2001). It improves mediated collaborations through team learning and reflexivity in technology Yi ou and Peiquan (2013). Reimy and Watanable (2011) realised further that well articulated systems are a precursor to organizational creativity and effective collaboration design.

Individual Participation Factors on Sharing

The individual component of participation in online communities is based on the value to the individual. The reason individuals participate in online communities can be perceived to be related to the sense of community felt by the participant; this sense of community satisfies the social need of the individual. McMillan and Chavis (1986) researched the sense of community concept in sociological and psychological studies, and they subsequently developed the Sense of Community Index (SCI), which has been tested in real-life situations. The concept can be applied to online communities, as it is envisaged that this will be a key determinant of participation in online communities. Likewise, competency-based trust may play a role in influencing individuals to participate in a particular community. According to Usoro et al. (2006), virtual communities that fail to develop trusting relations will restrict the development of knowledge sharing activities (p. 1). It is envisaged that there will be an overlap in these two influencing factors that will be under investigation. *Competency-based trust* could be perceived as a predecessor to *feeling a sense of community*.

The motivational factors that will influence participation are both intrinsic and extrinsic in nature. Many individuals will participate for the purpose of personal satisfaction gained from being an active participant in the community.

According to Hall (2001), some individuals choose to participate in community activities for the personal satisfaction felt through helping others. Some people may require extrinsic motivation, such as career advancement, in order for them to participate in an online community. Researchers investigating extrinsic rewards, such as those associated with career advancement, ascertain that tangible benefits, such as promotion, are strong motivators (Hall, 2001); however, additional research warns that while tangible reward may act as a temporary motivator, it may not be sufficient for long-term motivation (Herzberg, 2003). Therefore, the idea of career advancement could be identified as a temporary measure to increase knowledge sharing in online communities, but may not be sustainable for long-term participation.

Organizational Factors on Knowledge Sharing

The organizational aspects influencing participation in online communities are the *organizational culture* and the *perceived leadership support* by participants. An organization's culture may have detrimental effects on the organization's ability to share knowledge. A hierarchical corporate culture and a preoccupation with financial resources have been known to impede knowledge sharing; this vertical approach to communication is not sufficient to support sharing in online communities. For successful knowledge sharing to be achieved, organizational cultures should promote informal networks that communicate across the organization (Ghoshal & Bartlett, 1998). The organizational culture will either support or reject knowledge-sharing behaviours such as collaboration, relationship building, and personal interaction (De Long & Fahey, 2000) found to be necessary for successful online communities.

With the use of advanced technology, individual participation, and organizational support, online CoPs enable employees to virtually share insights and ideas across the globe. Nonaka (1991) emphasizes that organizations should provide processes that enable employees to share tacit knowledge; however, the main criterion is to create an organizational culture wherein knowledge can be shared. In creating this atmosphere, organizations have allowed CoPs to evolve into formalized groups that the organization recognizes as crucial for tacit knowledge sharing. However, organizations should realize that online CoPs may be considered primarily a social mechanism, the possible by-product of which is the sharing of tacit knowledge that increases organizational performance and deepens professionalism among employees.

The perceived leadership support of online community participants is expected to influence the use of online communities in an organization. Transformational leaders inspire followers to be leaders in their own right by motivating and providing meaning of work to those followers. Beng-Chong and Ployhart (2004) posited that there are four components to transformational leadership: "charisma or idealized influence, inspirational motivation, intellectual stimulation, and individualized consideration" (p. 611). By intellectually stimulating followers, these individuals strengthen capabilities and create new competencies, aiding followers in personal development which leads to general organizational creativity. Since transformational leaders are concerned about the achievements and further development of their followers, showing support for the organization's online CoPs would assist alleviating this concern. Online CoPs that are used for knowledge sharing should help to strengthen the knowledge and development of community members.

Research indicates that one of the key elements of a successful KM strategy is leadership support (Liebowitz, 1999). There is however limited research on the perceived leadership support when related to actual participation in an online community; however, one example found in the literature is that when the CEO strongly supported the development of CoPs, the program was successful (McDermott, 2002). This research study asked employees whether leadership support influences participation in an online community. The literature revealed that no studies have been conducted relating specifically to perceived leadership support of members using online CoPs; only more general works relating to leadership support of knowledge management initiatives.

According to Persaud, Kumar, and Kumar (2001), tacit knowledge is most useful when individuals are able to share this knowledge with others. Knowledge shared is the foundation for creating new knowledge. Nonaka and Nishiguchi (1991) suggested that there are different aspects of knowledge creation. Socialization and externalization are types of knowledge creation found to exist in organizations. The externalization and socialization of knowledge can be achieved through the use of communities of practice that are informal in nature. However, this could also apply to those online CoPs that have been formalized in the organization for the use of sharing, creating, and transforming different types of knowledge that would be useful to the larger organization.

Persaud, et al. (2001) investigated historical records and development departments of multinational corporations in an effort to understand the effectiveness of global knowledge sharing in terms of innovation. The idea emerged that supporting relationships and communities enhanced creation, sharing, and deployment of knowledge across the global organization (Persaud, et al.).

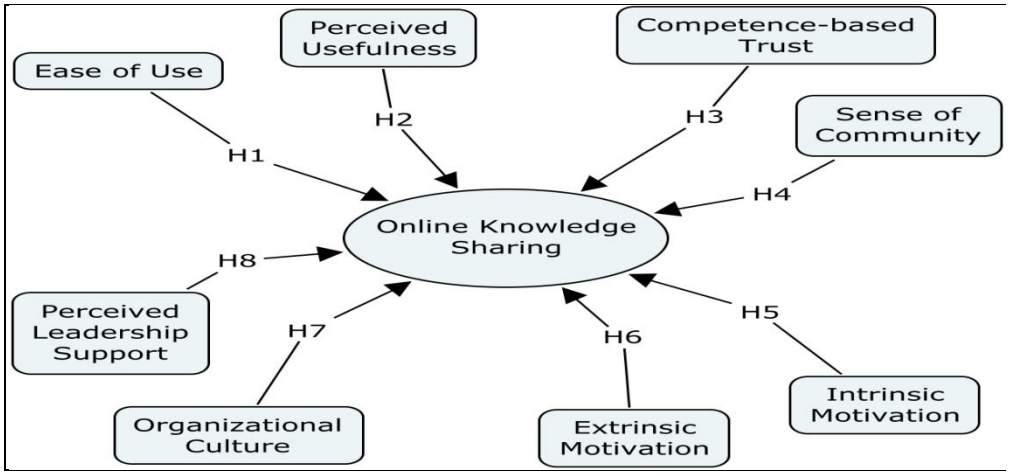
Problem Statement

While there is growing need for online CoPs due to increased affinity for knowledge sharing, there have been challenges on different fronts. In this paper, the main problem is that CoPs are generally underutilised and this raises questions that: If we put them (CoPs) there, will they (users) come and if they come, will they stay. Therefore, there is a need to understand why some individuals take advantage of these online communities to share knowledge while others do not. According to interviews with knowledge managers of three global organizations, online CoPs within global organizations often have nominal memberships in excess of 19,000; however, the active membership of these online communities is much smaller (J. McQuary, S. Rosenbaum, & A. van Unnik, personal communication, January 25, 2007). Second there are structural, contextual and methodical ways that can be implemented in systems to encapsulate our working behaviour. This entails, we can make CoPs more useful and there could be areas to look most to improve them. It was also noted that while virtual teams offer a wide range of potential benefits to organizations (Townsend et al., 1998), implementations will be at risk if organizations fail to adequately address the many challenges present in the virtual context (Iacono & Weisband, 1997; Victor & Stephens, 1994).

Conceptual Foundation

An online knowledge sharing conceptual framework was framed to represent a three level model in online CoPs as illustrated in figure 1 below:

Figure 1



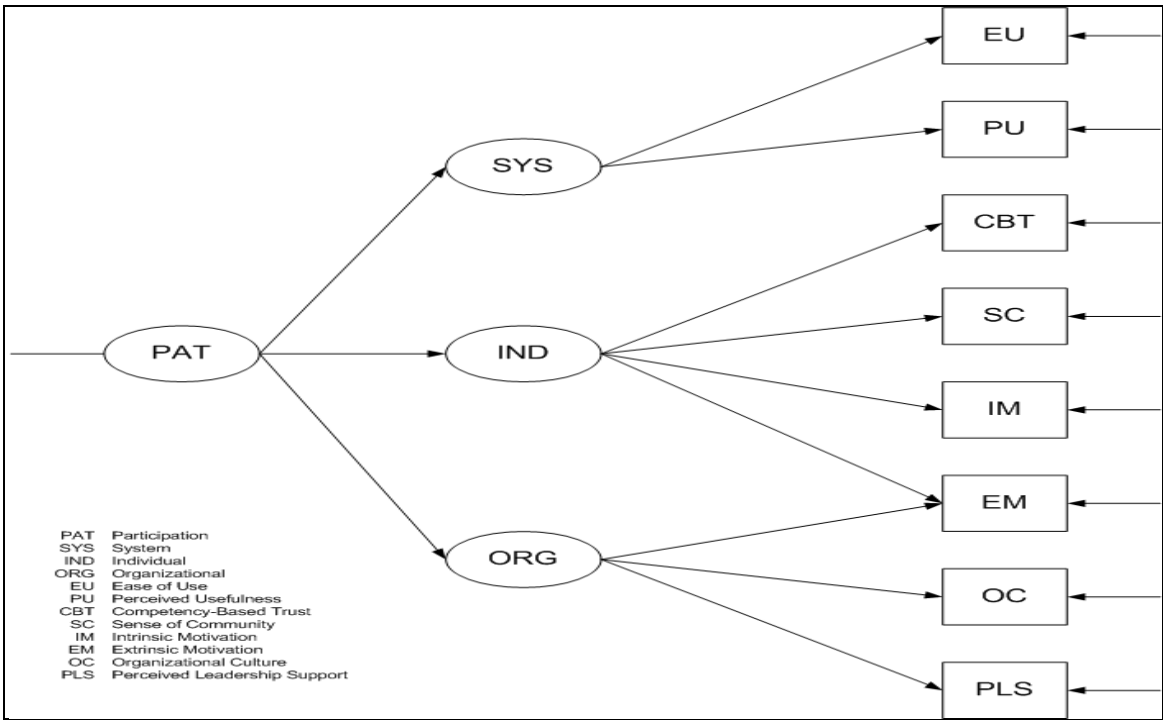
The main components in the conceptual foundation were abbreviated as: EU for easy of use, PU for perceived usefulness, CBT for community based trust, SC for sense of community, IM for intrinsic motivation, EM for extrinsic motivation, OC for organization culture and PLS for perceived leadership support.

The measures used for the constructs of knowledge sharing, ease of use, perceived usefulness, sense of community, competency-based trust, and extrinsic motivation (career development) were adapted from a previously used scale, the Competency Group Online Community Survey (Sharratt & Usoro, 2003). The survey was developed by Sharratt (2007), who adapted the constructs on ease of use and usefulness of the system on the survey instrument developed by Davis (1989). The sense of community constructs were adapted from an original survey of McMillan and Chavis (1986).

The competency-based trust portion of the survey was adapted from an instrument designed by McKnight et al. (2002), who used factor analysis to test the convergent and discriminate validity of the instrument.

Consequently the conceptual foundation could be translated into a measurement model as shown in figure 2 below:

Figure 2



The hypotheses were further derived as below:

Hypotheses

$H1_0$: There is no relationship between the EU of an online community system and the participation in that community.

$H1_1$: There is a positive correlation between the EU of an online community system and the participation in that community.

$H2_0$: There is no relationship between the PU of an online community and the participation in that community.

$H2_2$: There is a positive correlation between the PU of an online community and the participation in that community.

$H3_0$: There is no relationship between one's perceived CBT in the online community and the participation in that community.

$H3_3$: There is a positive correlation between one's perceived CBT in the online community and the participation in that community.

$H4_0$: There is no relationship between one's perceived SC and the participation in that community.

$H4_4$: There is a positive correlation between one's perceived SC and the participation in that community.

$H5_0$: There is no relationship between IM factors (personal satisfaction) and participation in an online community.

$H5_5$: There is a positive correlation between IM factors (personal satisfaction) and participation in an online community.

$H6_0$: There is no relationship between EM factors (career advancement) and participation in an online community.

$H6_6$: There is a positive correlation between EM factors (career advancement) and participation in an online community.

$H7_0$: There is no relationship between OC and participation in an online community.

$H7_7$: There is a positive correlation between OC and participation in an online community.

$H8_0$: There is no relationship between PLS and participation in an online community.

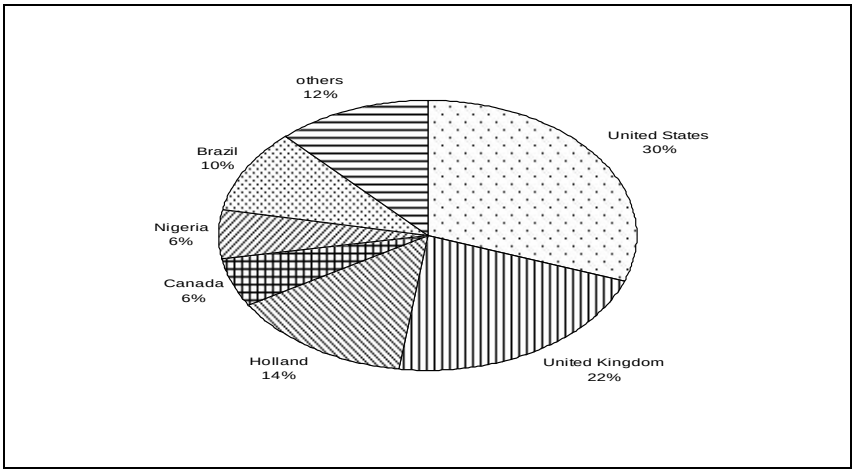
$H8_8$: There is a positive correlation between PLS and participation in an online community.

Method

The threefold approach to knowledge sharing guided our thinking in the manner the data were collected. A questionnaire instrument based on a Likert scale was used to capture the data. The questions reflected individual, system and organizational contribution to sharing. A survey-monkey was used to capture the data because all participants were virtually located and dispersed worldwide. The Likert scale anchors used in the survey were *strongly agree*, *agree*, *neutral*, *disagree*, and *strongly disagree*; they were coded as 1 through 5, respectively. The data were downloaded into the excel spread sheet and later exported to SPSS for initial analysis. It was then exported to LISREL for modeling purposes.

Respondents were spread in three multinational corporate entities. The survey had a response rate of 33%. Of the 1000, 30 % of the participants were from USA, UK 22%, Holland 14%, Brazil 10%, Nigeria, 6%, Canada 6% and the rest from other countries 12% as illustrated in figure 3 below.

Figure 3

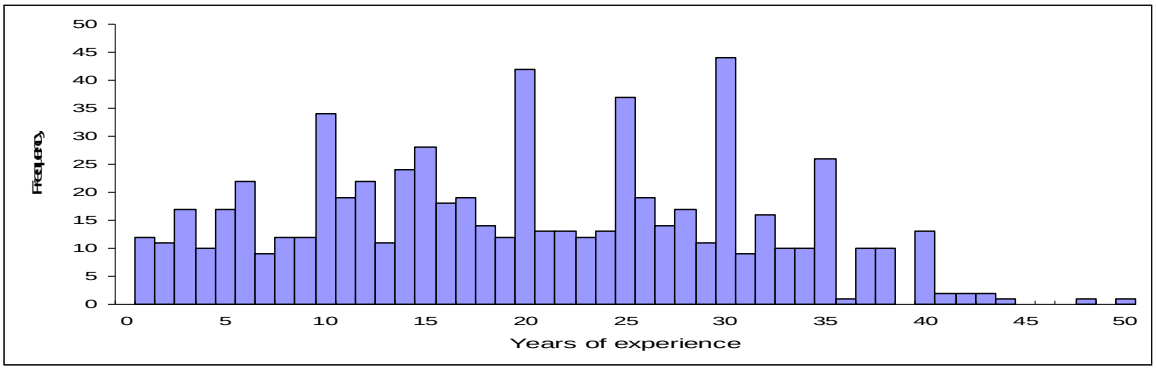


Statistical Analysis

The number of years of experience of the employees distributed mostly between 2 years and 40. There were however, few above 40. The demography showed years of experience had little or no influence on participation. This is depicted in the figure 2 below.

Distribution of years of experience against participation levels:

Figure 4



Validation of Instrument

The survey used for the study was verified by using Cronbach's alpha, which is used to determine the reliability of the instrument. Cronbach's alpha measures the consistency of the raw data in order to determine the inferences that can be made about the survey instrument (Simon, 2006). Cronbach's alpha for ease of use was 0.905, which means 90% reliability for those questions represented by the EU construct. The perceived usefulness portion of the survey yielded 0.941, which shows an even higher reliability measure with 94%.

The CBT Cronbach's alpha was 0.797, indicating an 80% reliability measure for those questions addressing competency-based trust. For sense of community, the measure was 0.900, revealing 90% reliability; for intrinsic motivation, reliability was 86%, represented by a Cronbach's alpha of 0.858.

The reliability measure reported by the extrinsic motivation questions yielded a Cronbach's alpha of 0.761, which represents a 76% reliability measure. The lowest of the reliability scores was from the organizational culture segment of the survey, reporting a Cronbach's alpha of 0.728 and resulting in a 73% reliability measure. Perceived leadership support has a reliability measure of 85%, as indicated by a Cronbach's alpha of 0.852. The reliability measure of participation was 86% and is represented by 0.860 on the alpha test.

Structural Equation Modeling (SEM)

The ultimate goal of SEM is to test theoretical constructs using sample data. Typically, variance-covariance matrices are used during the analysis as opposed to using correlation matrices. This is done basically to reduce errors and enhance stability and precision in the analysis process.

Table 1: Covariance Matrix, Means, and Standard Deviations Used in Testing the Model

	EU	PU	CBT	SC	IM	EM	OC	PLS
EU	0.468							
PU	0.264	0.555						
CBT	0.192	0.260	0.352					
SC	0.193	0.265	0.211	0.308				
IM	0.172	0.243	0.180	0.223	0.374			
EM	0.095	0.168	0.111	0.128	0.148	0.326		
OC	0.086	0.091	0.104	0.083	0.064	0.080	0.282	
PLS	0.146	0.191	0.157	0.167	0.117	0.165	0.185	0.496
Mean	3.694	3.528	3.769	3.510	3.838	3.067	3.639	3.016
Std. Deviation	0.686	0.745	0.595	0.555	0.613	0.571	0.530	0.704

The mean on all the observed variables was between 3.016 and 3.769. For a Lickert scale of 1 to 5 the measures were slightly skilled upwards but within acceptable range with lowest standard deviation at 0.530 and the highest at 0.745.

Table 2: Factor Loading Estimates of the Latent Variables against the Observed Variables and the Factor Loadings between Observed Variables

Parameter of	Against	Estimate	Std. Error	*t*-value
PAT	SYS	0.950	0.063	15.104
PAT	IND	0.924	0.044	21.024
PAT	ORG	0.570	0.066	8.673
SYS	EU	0.439	N/A	N/A
SYS	PU	0.599	0.037	16.353
SYS	CBT	0.312	0.075	4.175
IND	CBT	0.141	0.071	1.989
IND	SC	0.507	N/A	N/A
IND	IM	0.440	0.022	20.293
IND	EM	0.142	0.027	5.182
ORG	EM	0.205	0.029	7.014
ORG	OC	0.300	N/A	N/A
ORG	PLS	0.611	0.061	10.064

The first three latent to latent relationships discussed the first level part of the model. It revealed that systems where the primary influencer of participation with PAT and SYS (system level) scoring 0.950 and the t statistic of 15.104 at 95% confidence interval. This is followed by individual motivation (at individual level) with a loading of 0.924 with a t statistic of 21.024 measured at 95% confidence interval. Organizational level was the least influencer of participation with factor loading of 0.570 and t statistic of 8.673, also measured at 95% confidence interval.

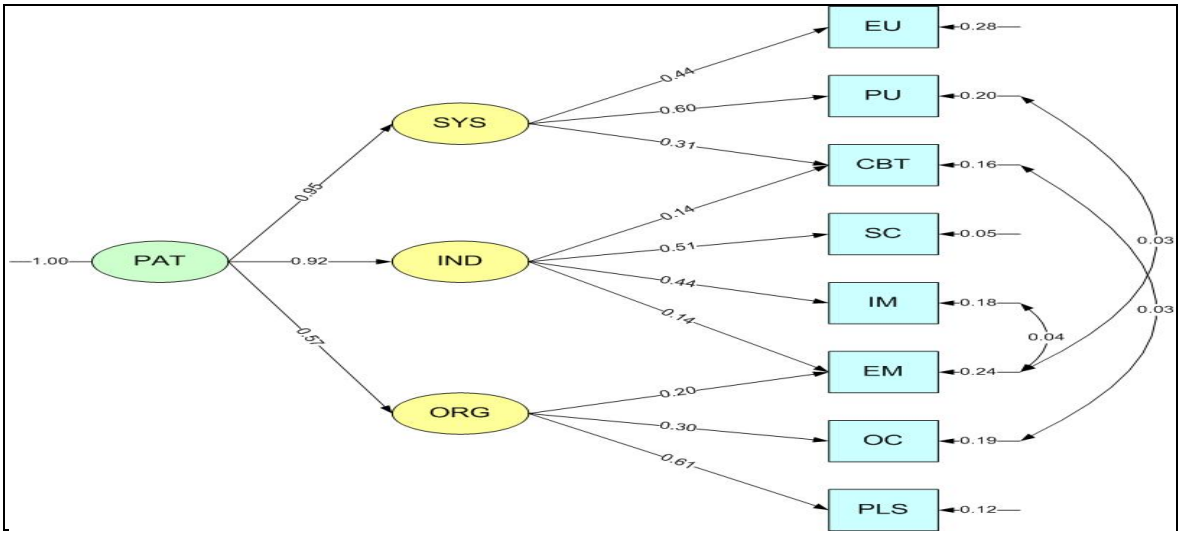
The latent to observed variables revealed that Ease of Use (EU) loaded with 0.44 on system (SYS) with t value of 15.104. It implies EU moderately influences participation. Hence the Null Hypothesis was rejected and Alternative accepted.

Perceived Usefulness (PU) loaded with 0.60 on system level (SYS) with a t value of 19.044. This was sufficient evidence to reject the null hypothesis and accept the alternative that PU has high influence on system usage. Competent based trust how ever scored 0.312 and t statistic of 4.175. It signifies that PU did not significantly affect usage of CoPs. The Null Hypothesis was therefore accepted and the alternative rejected. Perceived usefulness of the system did not lead to the eventual system use.

Sense of Community had 0.51 loading on individual (IND). This was significant evidence to reject the null hypothesis and accept the alternative. The sense of belonging to a community had a moderate influence that could lead to the individual's participation. This was followed by intrinsic motivation (IM) which loaded moderately at 0.44 and the t value of 20.293. The null hypothesis was hence rejected and the alternative accepted. Extrinsic motivation (EM) did not significantly influence individuals to participate in CoPs. EM had a factor loading of 0.142 on IND with a t statistic of 5.182. The null hypothesis was therefore rejected and the alternative accepted.
At the organization level, perceived leadership support (PLS) had a significant influence on the organizational (ORG) participation. PLS loaded 0.611 with a t statistic of 10.064 and therefore the null hypothesis was rejected and the alternative accepted. Organizational Culture (OC) loaded 0.30 with ORG. The Null hypothesis was hence accepted and the alternative rejected. This meant that, OC had not significantly influenced organization participation. Lastly, extrinsic motivation (EM) loaded with 0.205 on ORG with a t statistic of 7.014. It means EM did not significantly influence organization participation and therefore the Null Hypothesis was accepted and the alternative rejected. SYS was most critical followed by IND and lastly ORG

The final model extracted after some modification is presented below:

Figure 5



An adequate participation model fit emerged with: Chi-square (χ^2) of 14, the RMSEA at 0.0187 with a *p*-value of 0.979. The goodness of fit index was 0.995, the comparative fit index was 0.999 and the adjusted goodness of fit index was 0.984.

Conclusion

Knowledge based organizations must seek understanding of the changing complexities involved in global knowledge sharing in order to enhance their online communities of practice. In this research it was revealed that systems are the main influencers of participation and hence innovation in systems it key to knowledge delivery. This was largely explained in terms of perceived usefulness. People who perceive the systems to be useful are mostly likely to participate and share knowledge in CoPs. The ease of use is also still an important factor in participation. Higher participation levels can be attained by improving system integration to infuse and integrate extended cultures. In tacit knowledge sharing it is imperative for global organizations to create space where people can share knowledge (Gill, 2004) in order to facilitate and encourage the "emerging relationships" found to be necessary in online communities.

Apart from systems, personal or individual level factors are second such as sense of community and intrinsic motivation. It can be deduced that people who feel a sense of belonging in the system are likely to be dedicated participants in knowledge sharing. It is revealed that intrinsic motivation further influence participation significantly. This highlights the importance of intrinsic motivation to performance as well.
Organization culture was the least though it also affected participation significantly. At the organization level (ORG), perceived leadership support (PLS) was largely the influencing factor to participation.

References

Argote, L., McEvily, B., & Reagans, R. (2003). Managing knowledge in organizations: An integrative framework and review of emerging themes. *Management Science, 49*, 571–582.

Almeida, P., Song, J., & Grant, R. M. (2002). Are firms superior to alliances and markets? An empirical test of cross-border knowledge building. *Organization Science, 13*, 147–161.

Beng-Chong, L. & Ployhart, R. E. (2004, August). Transformational leadership: Relations to the five-factor model and team performance in typical and maximum contexts. *Journal of Applied Psychology,* 89(4), 610-621.

Chavis, D. M., & Pretty, G. M. H. (1999). Sense of community: Advances in measurement and application. *Journal of Community Psychology, 27*, 635–642.

Chung, W. (2001). Identifying technology transfer in foreign direct investment: Influence of industry conditions and investing firm motives. *Journal of International Business Studies, 32*, 211–229.

De Long, D. W., & Fahey, L. (2000). Diagnosing cultural barriers to knowledge management. *Academy of Management Executive, 14*(4), 113–127.

Doz, Y., Santo, J., & Williamson, P. (2001). *From global to metanational: How companies win in the knowledge economy*. Boston: Harvard Business School Press.

Furlong, G. P., & Johnson, L. (2003). Community of practice and metacapabilities. *Knowledge Management Research & Practice, 1*, 102–112.

Gill, K. S. (2004). Exploring human-centredness: Knowledge networking and community building. Retrieved May 20, 2006, from http://www.cmis.brighton.ac.uk/research/seake/cna/conference/proceedings/docs/Karamjit%20Gill.pdf.

Gongla, P., & Rizzuto, C. R. (2001). Evolving communities of practice: IBM Global Services experience. *IBM Systems Journal, 40*, 842–862.

Ghoshal, S., & Bartlett, C. A. (1988). Creation, adoption, and diffusion of innovations by subsidiaries of multinational corporations. *Journal of International Business Studies, 19*, 365–388.

Hall, H. (2001). Input-friendliness: Motivating knowledge sharing across intranets. *Journal of Information Science, 27*, 139–146.

Hendrix, D. M. (2007). Focusing on behaviors and learning at Shell. *Knowledge Management Review, 10*(3), 8–13.

Herzberg, F. (2003). One more time: How do you motivate employees? *Harvard Business Review, 81*(1), 86–96.

Hildreth, P. M., & Kimble, C. (2000). Communities of practice in the distributed international environment. *Journal of Knowledge Management, 4*(1), 27–38.

Hildreth, P. M., & Kimble, C. (2002). The duality of knowledge. *Information Research, 8*(1). Retrieved February 15, 2007, from http://informationr.net/ir/8-1/ paper142.html

Iacono, C.S. and Weisband, S.P. (1997). "Developing Trust in Virtual Teams," Proceedings of the Thirtieth Hawaii International Conference on System Sciences, Hawaii.

Liebowitz, J. (1999). Key ingredients to the success of an organization's knowledge management strategy. *Knowledge and Process Management, 6*, 37–40.

McDermott, R. (2002). Measuring the impact of communities. *KM Review, 5*(2), 26–29.

McMillan, D. W., & Chavis, D. M. (1986). Sense of community: A definition and theory. *Journal of Community Psychology, 14*, 6–23.

McKnight, D. H., Choudhury, V., & Kacmar, C. (2002). Developing and validating trust measures for e-commerce: An integrative typology. *Information Systems Research, 13*, 334–359.

Nonaka, I. (1991). The knowledge-creating company. *Harvard Business Review, 69*(6), 96–104.

Nonaka, I., & Nishiguchi, T. (Eds.). (2001). *Knowledge emergence: Social, technical, and evolutionary dimensions of knowledge creation*. New York: Oxford University Press.

Nonaka, I., & Konno, N. (1998). The concept of "Ba": Building a foundation for knowledge creation. *California Management Review, 40*(3), 40–54.

Nonaka, I., & Takeuchi, H. (1995). *The knowledge-creating company: How Japanese companies create the dynamics of innovation.* New York: Oxford University Press.

Nonaka, I., Konno, N., & Toyama, R. (2001). Emergence of "Ba": A conceptual framework for the continuous and self-transcending process of knowledge creation. In I. Nonaka & T. Nishiguchi (Eds.), *Knowledge emergence.* New York: Oxford University Press.

Persaud, A., Kumar, U., & Kumar, V. (2001). Harnessing scientific and technological knowledge for rapid deployment of global innovation. *Engineering Management Journal, 13*(1), 12–18.

Remy, M., Dai, S. (2011). Innovative knowledge management: Concepts for organizational creativity and collaboration design (pp. 157-176)

Sharratt, M., & Usoro, A. (2003). Understanding knowledge-sharing in online communities of practice. *Electronic Journal of Knowledge Management, 1*(2). Retrieved December 10, 2006, from http://www.ejkm.com/volume-1/ volume1-issue-2/issue2-art18-sharratt.pdf.

Sharratt, M. (2007). *Antecedent factors to knowledge sharing in an online community of practitioners*. Manuscript in preparation.

Simon, M. K. (2006). *Dissertation and scholarly research: Recipes for success*. Dubuque, IA: Kendall/Hunt.

Starbuck, W. H. (1992). Learning by knowledge-intensive firms. *Journal of Management Studies, 29*, 713–740.

Townsend, A., DeMarie, S. and Hendrickson, A. (1998). "Virtual Teams: Technology and the Workplace of the Future," Academy of Management Executive, Vol. 2, No.3, pp.17-29.

Usoro, A., Sharratt, M., & Tsui, E. (2006). An investigation into trust as an antecedent to knowledge sharing in virtual communities of practice. *Computing and Information Systems, 10*(3). Retrieved December 10, 2006, from http://cis.paisley .ac.uk/research/journal/V10/Usoro.doc.

Victor, B. and Stephens, C. (1994). "The Dark Side of the New Organizational Forms: An Editorial Essay," Organization Science, Vol. 5, No.4, pp. 479-482.

Yi , O., Peiquuan, J and Theo, H. (2013). International Journal of Knowledge-Based Organization (pp.22-39).