

# Computer Network Analysis in Knowledge Sharing

PERERA T.D.P.

Faculty of Engineering, Universidad Finis Terrae, Santiago, Chile

E-mail: PereraP@gmail.com

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## ABSTRACT

In this study, the main aim was to investigate the effectiveness of computer network analysis relative to the practice of knowledge sharing. Findings indicated that the use of a knowledge network analysis (KNA) approach exhibits reliability in terms of identifying knowledge sharing bottlenecks. In particular, the inference arose from the fact that the same bottlenecks portrayed at the organization were supported by findings from observations and interviews. However, the critical observation was that KNA is more focused on symptoms, rather than the underlying causes of prevailing outcomes.

**Keywords:** Knowledge network analysis (KNA), bottlenecks and critical observation.

## INTRODUCTION

Globalization continues to characterize the contemporary world. This outcome accounts for the resultant need for invention, innovation and creativity within the workplace environment. According to Back, von Krogh and Seufert (2005), interaction at the workplace fosters learning in which individuals acquire new forms of knowledge and skills. In affirmation, a case study by Helms, Ignacio, Brinkkemper and Zonneveld (2010) indicated that knowledge sharing at the workplace is critical to the achievement of goals and objectives.

Helms, Ignacio, Brinkkemper and Zonneveld (2010) acknowledged that there is a direct correlation between knowledge sharing and learning, as well as innovation in the workplace. Therefore, knowledge sharing correlates with creativity in such a way that it enables task force groups to acquire additional skills that other experts seem to possess. This study focuses on the issue of knowledge sharing in relation to computer network analysis.

During knowledge sharing management, innovation and spurred innovativeness arise (Deng & Poole, 2008). Previous, knowledge management issues focused on issues of disseminating, storing and codifying information. However, recent developments have seen the approaches deviate to involve socialization. Through socialization, employees are perceived as key assets in the organization as they exhibit attitudes, skills and experience

From the affirmations, social interaction fosters knowledge sharing at both group and individual

levels. It is also worth noting that knowledge networks arise from social interaction processes. This observation concurs with assertions by Helms and Buysrogge (2005). In the latter study, the criticality of ICT application in the current world was affirmed to account for the need to embrace knowledge sharing.

## LIMITATIONS OF NETWORK ANALYSIS

Helms et al. evaluated critical limitations of using network analyses in exploring the issue of knowledge sharing, with knowledge networks on focus. A case study approach was adopted in which focus was an international product software developer. With a mixed studies approach (that uses qualitative and quantitative aspects), results were compared to gain insight into some of the shortcomings that arise from using a network analysis approach while exploring knowledge sharing within knowledge networks.

Prior to the review of literature, theoretical background was provided. Specifically, the Social Network Analysis (SNA) was used in which Sociologists were perceived to associate personal and environmental variables with the nature of human character. As such, the SNA approach was critical in analyzing trends, probable challenges and implications of social relations.

The assertion that personal relations shape human behavior were affirmed by Huysman and Wit (2004), who concurred that social interactions complement internal factors in determining human behavior. As such, the use of an SNA approach in studying aspects of

knowledge sharing in contexts such as workplaces was critical to the case study.

Whereas the SNA technique was relevant to the study, it faltered in such a way that it could not give insight into the role of changing needs of workplace groups and geographical locations on human character. Instead, the theory would assume uniformity in social contexts and generalize outcomes to all populations (regardless of prevailing geographical and population factors).

**RELATED WORK**

In the case study, a review of some of the past scholarly studies regarding the concept of knowledge sharing and the application of SNA was provided. Affirmations by Cheuck (2006) indicated that knowledge sharing and the application of the SNA had been used at the British Council.

From the review of literature, SNA was perceived to give insight into the nature of knowledge sharing but could not account for challenges that result during such interactions. In addition, Cross et al. (2001) documented that SNA aids in understanding the nature of data flow at departmental and organizational levels. Indeed, the documentation suggests that SNA aids in understanding the manner in which individuals interact.

Whereas SNA was portrayed to foster an understanding of the nature of interaction in contexts such as workplaces, it was affirmed that it fails to account for internal factors that determine the manner in which individuals interact. This outcome points to the fact that literature exists regarding the role of SNA in understanding human interactions but some of the challenges faced during process applications are yet to be explored vividly.

**METHODOLOGY**

Given that this study examined an international product software developer, a case study technique was adopted. A Knowledge Network Analysis aided in identifying perceived barriers in

knowledge sharing, besides using a qualitative study to assume a mixed studies approach.

Notably, a mixed studies approach was adopted to ensure that outcome comparison is done between qualitative and quantitative research outcomes. It is also worth noting that desirability bias was eliminated by conducting qualitative and quantitative research independently but on the same organization.

On one hand, the use of a KNA technique sought to provide quantitative data outcomes. On the other hand, the qualitative approach was based on data outcomes by Bosua and Scheepers (2007) in which qualitative aspects were examined. The resultant implication was that both qualitative and quantitative data outcomes were compared towards understanding weaknesses in the KNA technique.

The study focused on the wholesale and distribution business line within an international product software developer. Notably, issues under exploration included the manner in which individuals learnt from each other and the frequency of such forms of interaction, as well as mechanisms used in such processes of knowledge transfer. Furthermore, the study focused on the employees’ function, department and level of expertise. The eventuality saw the outcomes converted into an adjacency matrix and an attributable table in which network analysis would be done.

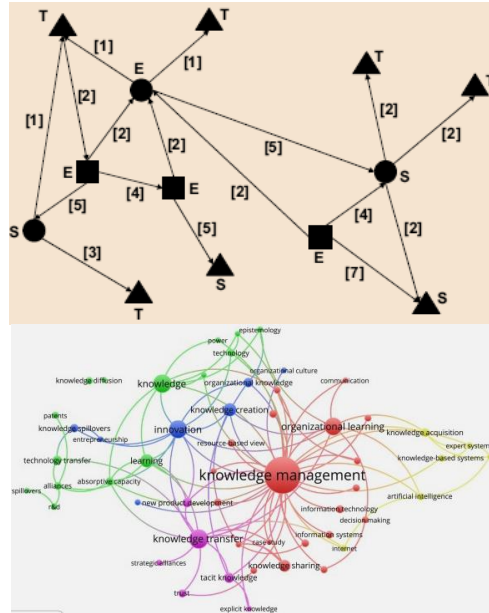
**RESULTS AND DISCUSSION**

The firm, which was headquartered in the Netherlands, was found to operate in Canada, the U.S. and 10 European countries. The end of the year 2006 saw the firm constitute about 2,700 employees. However, the study focused on a sample of 99 employees. Some of the fact that necessitated the use of a single product line included the section’s involvement in all activities of software product implementation, sale and development. In addition, most of the knowledge transfer processes were projected to occur in the selected line.

**QUANTITATIVE DATA OUTCOMES: THE KNA APPROACH**



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figure

From a sample of 99 participants, 80 responses were received. The number of responses received was considered adequate for making inference. Specifically, data collection involved a LimeSurvey approach, an online survey tool. Findings suggested that levels of interaction among trainees, specialists and experts exhibit a positive correlation with the extent to which knowledge is shared. The implication is that the departure of a central individual would lead to critical losses in the level of knowledge transfer. Additional outcomes indicated that levels of knowledge sharing exhibit reliance on the nature of human interaction at firm levels.

### QUALITATIVE RESEARCH OUTCOMES

An interview approach was adopted in such a way that open-ended questions were used to establish the participants' comments regarding the aspect of knowledge sharing at firm level. In addition, storytelling sessions were held alongside document usage in which release notes, guidelines, help files, designs, knowledge documents, emails and presentations aided in data collection.

The use of documents was crucial for the exploration and better understanding of concepts, alongside the use of KSEM graphs. Despite the fact that a slow response rate was observed, qualitative data outcomes suggested that employees would score both bottlenecks in face-to-face knowledge sharing situations.

Specifically, this form of outcome in face-to-face situations arose from the issue of employee proximity to other individuals with whom they could share knowledge.

Comparing SNA and KNA, the two approaches are complementary in such a way that KNA accounts for the understanding of contexts within which behavioral manifestations (regarding knowledge sharing) are observed while SNA empowers KNA towards improving correctness in outcome interpretation.

The study approach is highly reliable and strongly recommended because it combined qualitative and quantitative aspects, upon which a mixed studies approached aided in comparing results from in depended studies, shunning possibilities of subjectivity and desirability bias.

Within the context of UAE, the Abu Dhabi National Oil Company (ADNOC) is recommended as an ideal firm for adopting a similar approach, prompted by the manner in which globalization pressure necessitates inventive, innovative and creative firms and, processes of social interaction and knowledge sharing towards competitiveness.

### CONCLUSION AND RECOMMENDATIONS

Indeed, study outcomes pointed out that there is a need for a mechanism that would go beyond exploring symptoms to discern specific factors that shape the nature of the identified bottlenecks. Furthermore, the authors

recommended the need to formulate an approach that would identify multiple contexts in relation to the knowledge sharing process. A specific approach that was recommended for adoption was the knowledge sharing dimension, perceived to extend features in the KNA approach.

Besides adopting the knowledge sharing dimension as a crucial technique for explaining causes of behavioral outcomes, it was recommended that artefact networks may aid in providing solutions to the bottlenecks identified. Therefore, the most effect approach to understanding issues in knowledge sharing was perceived as that which combines KNA with other qualitative techniques such as KSEM. Apart from the combination's identification of probable causes of the bottlenecks identified, it was affirmed that the combination would extend the abilities of the KNA approach.

## REFERENCES

1. Back, A., von Krogh, G. & Seufert, A. (2005). *Putting knowledge networks into action: Methodology, Development and Maintenance*. Springer
2. Bosua, R. & Scheepers, R. (2007). Towards a model to explain knowledge sharing in complex organizational environments. *Knowledge Management Research & Practice*, 5, 93-109.
3. Cheuck, B. (2006). Using Social Networking Analysis to Facilitate Knowledge Sharing in the British Council. *International Journal of Knowledge Management*, 2(4), 67-76.
4. Cross, R. et al. (2001). Knowing what we know: Supporting knowledge creation and sharing in social networks. *Organizational Dynamics*, 30(2), 100–120.
5. Deng, L. & Poole, M.S. (2008). Learning through ICT-enabled social networks. *International Journal of Information Technology and Management*, 7(4), 374 - 391.
6. Helms, R. & Buysrogge, C. (2005). Knowledge Network Analysis: a technique to analyze knowledge management bottlenecks in organizations. In *Proceedings 6th International Workshop on Theory and Applications of Knowledge Management (D.C. Martin Ed.)*. Copenhagen, Denmark, pp. 410-414. Available at: <http://doi.ieeecomputersociety.org/10.1109/DXA.2005.127>.
7. Helms, R. (2007). Redesigning Communities of Practice using Knowledge Network Analysis. In *Hands-On Knowledge Co-Creation and Sharing: Practical Methods and Techniques (A.S. Kazi, L. Wohlfart & P. Wolf Eds.)*. Knowledgeboard. Available at: <http://igitur-archive.library.uu.nl/math/2009-0109-200624/UUindex.html>.
8. Helms, R., Ignacio, R., Brinkkemper, S. and Zonneveld, A. (2010). Limitations of Network Analysis for Studying Efficiency and Effectiveness of Knowledge Sharing. *Electronic Journal of Knowledge Management*, 8(1), 53-68
9. Huysman, M. & Wit, D.D. (2004). Practices of managing knowledge sharing: towards a second wave of knowledge management. *Knowledge and Process Management*, 11(2), 81-92.
10. Liebowitz, J. (2005). Linking social network analysis with the analytic hierarchy process for knowledge mapping in organizations. *Journal of Knowledge Management*, 9(1), 76 - 86.
11. Ma, D., Liu, M., Yang, H., Ma, X., Zhang, C. Diagnosis and surgical treatment of carotid body tumor: A report of 18 cases(2010) *Journal of Cardiovascular Disease Research*, 1 (3), pp. 122-124. DOI: 10.4103/0975-3583.70905