THE DEVELOPMENT OF KNOWLEDGE SHARING CULTURE IN CONSTRUCTION INDUSTRY

Lisa Low Seow Wei and Abdul Hakim Mohammed

Department of Property Management
Faculty of Geoinformation Science and Engineering
Universiti Teknologi Malaysia
81310 UTM SKUDAI, Johor Darul Ta'zim
E-mail: dirisawei@yahoo.uk, hakim@fksg.utm.my

Abstract

This research seeks to shed light on the factors that stimulate the development of organization knowledge sharing culture. The issue of intention to knowledge management is as important as having positive attitudes and commitment towards effective knowledge sharing culture. This is because right organization characteristics along with right work practices conducive to knowledge sharing influence the employees' behavior. The objectives of this study are to: (a) identify the factors that promote the development of knowledge sharing culture, (b) identify the best practices for each factor that promotes the development of knowledge sharing culture, and (c) investigate the degree of relationship between the factors and the development of knowledge sharing culture. For the purpose of this study, Sarawak construction firms will be taken as respondents. The companies selected must have experienced in handling of a construction contract with value of RM1 million. The study will be carried out by using two major approaches that are questionnaire survey and case studies. Descriptive analysis and one-sample t test will be applied to analyze the factors and their significant relationship in promoting knowledge sharing culture. The final product of this study is composed of strategies, guidelines and tools for effective knowledge sharing practice within organization.

Key Words: Descriptive analysis, factor, knowledge sharing culture, one-sample t test, practice

1.0 Introduction

To survive in the knowledge economy, organizations need to do better tomorrow than yesterday and constantly be on the lookout for how to correct and prevent problems and make continuous improvement to achieve business sustainability. Knowledge management makes sense to first organize what people know as a division and then to share it, which led to a whole host of cultural issues. Besides that, "knowledge management highlights the importance of a sharing culture in order to support and foster knowledge management focus (Alavi, 1999; Davenport and Prusak, 1998; Zack, 1999)." Knowledge management focuses on ways of sharing and storing the knowledge of individual, as a mean of improving the competency, speed, efficiency and profitability of larger whole.

However, “knowledge mobilization depends upon an organization culture that promotes overlapping behaviors such as information sharing and joint experimentation (Swan et al., 2000).” To create and share knowledge, people must have access to each other and be able to exchange their ideas. Organizations need to ensure that employees make use of the system that the organization employed by bringing people together in person is a vital role too. “As stated by McDermott and O’Dell (2001) however strong your commitment and approach to knowledge management, your culture is stronger.”

This is because it would be meaningless to have strategy knowledge management systems if not actualized in practice. Furthermore, practices are the most visible symbol of culture, and they provide the most direct way for changing behaviors needed to support knowledge. “The most difficult but also the most important facilitating condition seems to be the culture, which is not only necessary but is essential to providing the trust among the actual knowledge workers to collaborate effectively as described by Svenja et al., 2003).”

“KPMG (2000) noted that the application of knowledge management in the construction industry, as in other industries in the world, is more inclined towards organizations with a large turnover. Possible reasons point towards the higher need for these organizations to implement knowledge management due to their greater size, and the higher turnover would mean that they possibly have the most capability and resources to do so and potentially can reap the greatest benefits from knowledge management.” Consequently, the construction industry demands priority from all governments because it has a significant effect on the efficiency and productivity of other industry sectors. Thus the construction process generates management problems and opportunities at the level of the firm which may differ in scope, scale, time and the type of appropriate solutions from those met in firms of other industries.

“Studies by Royal Commission (1992) and Latham (1994) in different countries have shown that the construction industry generally performs poorly, when compared to other industries.” “Love et al., (1998) indicated that a major contributory factor to the industry's poor performance has been found to be its fragmented nature, which in turn has resulted in a lack of coordination and integration between the different disciplines involved in various stages of the project procurement process.” “Construction projects are generally complex and for this reason, delays and disputes which involve project completion time, quality workmanship, payment, contact documentation, construction information and site supervision are always present (Donald, 1992).”

In Malaysia, the construction industry’s products generally are of low quality. This is manifested everyday from complaints made by the consumers through newspapers, television, radio and

complaints to the authorities. "The indication of low quality can be gauge by the products that is 'not as expected', 'not up to standards', 'not comfortable', 'not friendly', and in addition to products that failed, defects here and there and so on. These issues are far too many in Malaysian built environment (Elias Ismail, 2000)." Hence, there is a need for discipline knowledge management that will direct all efforts to improve quality in all stages, from design to handover in order to meet the requirements within the time constraint, budget and to the client specifications. To achieve quality, the builders have to engage the workers having the right skill to execute a particular trade through effective execution of knowledge sharing culture.

Quality, cost and time frequently seem to conflict with one another, necessitating trades offs in the construction sector. These conflicts exist because traditional cost accounting practices do not always consider the hidden costs of poor quality. Traditional accounting practices measure product costs at the end of the manufacturing process. This process identifies and captures a limited amount of savings by focusing on scrap, rework, testing, etc. If quality of this cost opportunities were identified in every process stage and be recorded for future reference, the savings would be greater. The development of knowledge sharing culture in the construction industry is therefore to achieve improvement for better quality assurance within the sector.

"As commented by Dato Prof Hj. Abdul Rahman bin Abdullah, Chief Executing Officer from Construction Industry Development Board Malaysia (CIDBM), one way to develop and upgrade the industry is from the aspect of upgrading or improving its product. Construction is a service sector business; the product refers to the quality of service it provides. There is no doubt that quality in any construction relies on all parties involve like the clients, developers, designers, consultants and builder but in assuring quality the prominent success factor is the performance of the builders himself through the ability of his site managers, site supervisors and workers in translating and executing project information and drawings."

Unlike any other industries, the construction industry has hidden reservoirs of intelligence that remain largely untapped and unionized. Construction sector which is fragmented and characterized by small and medium size firms provide an interesting avenue for tapping into this hidden asset to capitalize on what collective organizations know. Subsequently, this study deemed crucial to retain the knowledge within the construction organization via knowledge sharing; as material and symbolic exchanges are generalized, information and communication technologies serve multiple purposes to effectively elaborate and spread new knowledge for economic and social growth.

This research attempts to identify the determinants that promote the development of knowledge sharing culture among organizations in the construction sector. To materialize the development

of knowledge sharing culture within the construction industry, it will be helpful to clarify the linkage between the organization culture, practices and individuals' behaviors in the construction industry that promote the development of knowledge sharing culture. "The linkage is that organization culture bearing certain characteristics that influences the work practices, and the work practices in turn influence employees' behaviors (De Long, 1997; Tushman and O'Reilly, 1997)." This means that right organization characteristics along with right work practices conducive to knowledge sharing influence the employees' behavior.

Obviously, the issue of intention to knowledge management is as important as having positive attitudes and commitment towards effective knowledge sharing culture. Therefore, the goal of the present study is to contribute to the understanding of the factors determining the development of organization knowledge sharing culture by exploring the factors that influence employees' active participation in these communities. Having observed the determinants, the retention of workers with valuable knowledge may be just a key element of an organization's knowledge management strategy as its attempts to induce its workers to share their knowledge.

2.0 Aim And Objectives

In recognition to the issue stated earlier, this research aims to identify the factors required for the development of organization knowledge sharing culture in the construction industry. Since the development of knowledge sharing culture is meant for the improvement of the construction management performance and the achievement of the client's satisfaction, it requires the understanding of the influencing factors for the development of knowledge sharing culture. Initially, the factors such as organization behavior that influence organization practice which in turn influence employee behavior in developing organization knowledge sharing culture will be identified. Subsequently, the objectives of this study are as below:

i. Identify the factors that promote the development of knowledge sharing culture.
ii. Identify the preferred practices for each factor that promote the development of knowledge sharing culture.
iii. Investigate the degree of relationship between the factors and the development of knowledge sharing culture.

3.0 Knowledge Sharing Culture

Knowledge management which is about a whole lot more than just getting tacit knowledge transformed into explicit knowledge. It is also about more than just building huge repositories of

knowledge and best practices. Through knowledge sharing between the person leaving and the person coming in can make a world difference to an organization. This is because knowledge sharing is every bit important to knowledge management as capturing, storing and distributing information, ideas, experiences and knowledge.

In knowledge management, knowledge is considered as part of the production resources which must be shared, applied and improved so as to generate creative ideas to a particular problem or challenges (Wang, 1999). Knowledge sharing is not merely a neutral exchange of information that will affects working relationships, distribution of power, patterns of influence and alters how individual define their responsibilities (Willett, 2002). Knowledge sharing is refers as "activities of transferring or disseminating knowledge from one person, group organization to another (Lee, 2001).

"Consequently, knowledge management has narrowed the definition of knowledge sharing as being essentially a process of capturing a person and organization's expertise wherever it resides and distributing it to wherever it can help produce the biggest returns for the individual and organization (Krogh, 2000)." "According to Wang (1999) knowledge sharing is the conversion between tacit knowledge to explicit knowledge and vice versa whiles the knowledge 'oscillates' from individuals to the organizations and back."

Sharing which is always voluntary happen to be the challenge in developing an environment where people both want to share what they know and make use of what others know. "To convince experts to share their knowledge, organization needs to make them aware of why it is important to share knowledge (Frances Horibe, 1999)." This way will make them feel that they are important and be willing to share their knowledge.

For knowledge sharing to work, organizations first have to have a culture that open and accept sharing. "Stoddart (2001) argues that knowledge sharing can only work if the culture of the organization promotes it." "Studies by De Long and Liam (2000), shows that culture influence knowledge sharing by as much as 80%." Consequently, to effectively develop organization knowledge sharing culture, there need to be change in the culture of the organization strategy, structure, support mechanism, management development, communication, trust, motivation and learning. These approaches are all based on the fundamental premise that it is management's role to do the motivating and foster employees toward knowledge sharing culture.

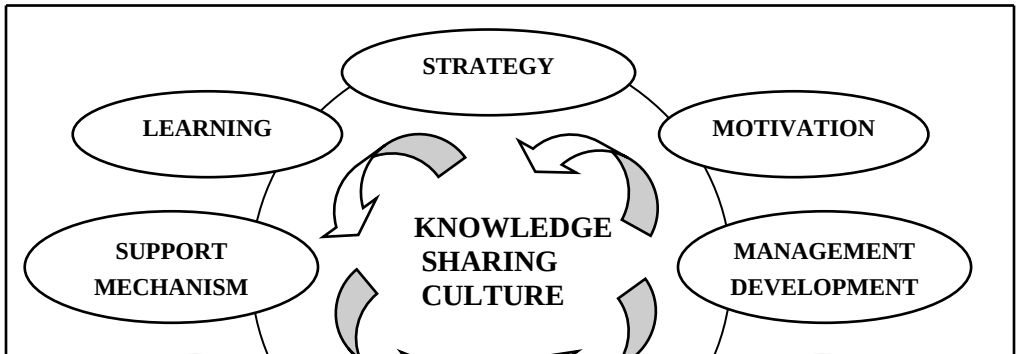

Figure 1.1: Factors that facilitate the development of knowledge sharing culture

Strategy

"Bob Buckman remarked, the most valuable employee is one who becomes a source of knowledge and actively shares that knowledge with other people (Scarbrough, 1998)." In this context, arguably, one of the most important items for the effective sharing of knowledge is a clear and conscious knowledge strategy. "In some companies, the strategy centers on the computer. Knowledge is carefully codified and stored in the databases, where it can be accessed and used easily by anyone in the company. This is called codification strategy. In other companies, knowledge is closely tied to the person who developed it and is shared mainly through direct person to person contacts. The chief purpose of computers at such companies is to help people communicate knowledge not to store it; which is known as personalization strategy (Hansen et al., 1999)."

A clear focus is vital for the success of knowledge management to both the organization and the employees. If values and missions are not share, employees will use their own values and sense of mission as the way to guide their work behavior and there has been little or no effort to align them to the knowledge sharing culture. "A lack of clear connection between knowledge sharing and business goals, cause the knowledge management system to fail (McDemott, O'Dell, 2001)."

"Clarke and Staunton (1989) provide a model of the knowledge management process that could be useful for mapping human resource knowledge. The four concepts are construction, embodiment, dissemination and use of knowledge. The implementation of knowledge mapping will help in learning and sharing of knowledge and it is one of organization's major responsibilities to spell out in their personal work and their office work plans."

“Scarbrough (1998) and Gross (2001) show that manager’s involvement is also important for knowledge sharing.” “This is because a leader is usually viewed as a charismatic person who is prepared to take risks and brings about long term changes in people attitudes, behaviors and culture (Adair, 1988).” Leadership is therefore an obvious asset to the managerial skills in developing organization knowledge sharing culture. “Managers can create a culture that supports change by looking for new and improved ways of working; creating a vision that emphasizes change and revealing a positive attitude towards change (Arad et al., 1997; Tushman and O'Reilly, 1997).”

Structure

An important part of organization structure is the knowledge infrastructure. “A knowledge infrastructure is the sum of those organizational structures and guidelines, as well as technical and non-technical expedients, of which the organization has disposal. These structures, guidelines and expedients support will facilitate the learning process within the organization. With them, the goals of the organization are to be reached in the most efficient way (Gareth, 2004).”
Organization structure and processes should be redesigned in such a way that encourages knowledge sharing among the employees through teamwork. “Effective teamwork is partly based on team members' skills and abilities and partly on the shared values within the group (Shattow, 1996; Tushman and O'Reilly, 1997).” “As regards the influence of organization culture on a structure, values like flexibility, freedom and cooperative teamwork will promote creativity and innovation (Arad et al., 1997).” Flexibility refers to the ability to adapt and work effectively within a variety situations with various employees. “As environment changes, organization changes and markets rise and fall, flexibility is as critical for the success in organization knowledge sharing culture as it is in other areas (Elliot and O’Dell, 1999).”

“The literature study revealed that the degree to which employees have freedom and authority to participate in decision making to solve problems determines the level of empowerment (Arad et al., 1997).” This is because the degree to which employees have freedom to participate in their work will exert their effort to learn and share. “Besides that, empowerment is the process of giving employees at all levels in an organization’s hierarchy the authority to make important decisions and to be responsible for their outcomes (Gareth, 2004).”

Management must consider the specific knowledge of employees when they assign decision making authority in the organization. “Linking decision authority and specific knowledge can be accomplished either by ensuring that employees with decision authority acquire the necessary

knowledge or by granting decision authority to employees whom have that required knowledge (Brickley et al., 2003)."

Organization structure is therefore to facilitate people to make their knowledge, their information, their capacities and their attitude productive. It is widely acknowledge that increased employees responsibility leads to increased quality. When employees are given the opportunity to oversee the work process, they are in a better position to apply their own special abilities and ideas to improve the process they know best. In particular, the attitude and behavior of the people working within the organization structure can influence the level of effectiveness which in turn influences productivity and efficiency.

Support Mechanism

Information technology (IT) has been closely associated to knowledge management and knowledge sharing. "This is because IT provides platform not only for storage and access of information but also for communication (McCampbell et al., 1999; Chabrow, 1999)." Therefore to materialize the concept of knowledge sharing culture, organization should put emphasize on their IT infrastructure and tools such as mail, telephone, facsimile, Internet, Intranet, e-mail with pictures reference, video conferencing, and telephone conferencing. However, people are responsible for using the tools and performing operations.

"Study by Elliot and O'Dell shows that firms with effective Internet and Intranet structure has a positive effect on knowledge sharing." This is because by using Internet and Intranet to communicate and exchange ideas, the chances of knowledge sharing to take place will be improved. Besides that, Internet gives everyone common, easy access to anything.

"Smith (2001) agues that the availability of information technology tools (software) play key roles in knowledge management." Consequently, the application of project management software, software for technical estimation and CAD software are useful for construction organization learning and sharing efforts.

"The construction industry involves several disciplines with a complex network of communications between these disciplines (Egan, 1998)." Consequently, the entire construction supply chain demands a supportive document management system to communicate and archive information (records of what was done, when, by whom etc.) throughout the lifecycle of the construction project.

“According to Turk (2000), construction information technology refers to the equipment, applications, and services that are used by organizations to assist human communication, commitment negotiation, problem solving and decision making, and spans over several civil engineering disciplines.” The application of decision support system and standardized IT solution are therefore beneficial in distributing knowledge within the industry. “As a conclusion, information technology is therefore a supportive mechanism and an important resource for successful innovation (Shattow, 1996).”

Management Development

“The involvement of many organizations in a project provides a strong basis for conflicts during the construction process, largely due to domain of consensus, accessibility of information, interdependency of tasks, and individual performance (Fisher, 1989).” “Tolerance of conflict and conflict handling constructively are values that support creative and innovative behavior in organizations (Mumford et al., 1997; Robbins, 1997; Judge et al., 1997).”

The way in which an organization handled mistakes will determine whether their employees feel free to act creatively and innovatively in their knowledge sharing effort. “Mistakes can be ignored, covered up, used to punish someone or perceived as a learning opportunity (Brodtrick, 1997).” If staffs are encourage discussing their mistakes openly, a culture of “openness and seeking help” could lead to the creation of knowledge learning and sharing.

“The acceptance of risk taking as “part of the job” and the belief that accidents “happen to others” have been identified as sources of unsafe behavior on many construction sites (Lingard, 2002).” These attitudes will only be changed if employers demonstrate that risk taking is unacceptable and safe working is a non negotiable condition for employment. “This requires high safety standards, safety issues driven by senior managers, effective systems, continuous training and education programmed to alter attitudes and behaviors, and effective induction and communication strategies to ensure an awareness of occupational health and safety issues and their importance to the project management team (Martin et al., 2003).”

Communication

“BP (British Petroleum), one of the recognized leaders in knowledge management, described how they managed to gradually change their organization culture to promote sharing through other

business initiatives, such as introducing a safety culture that encourages communication and sharing (Martin, 2002)." "However, in organization, written communication is the most formal, official and lasting form (Hedberg, 1981)."

"Story telling is used as a technique for sharing knowledge (Ellis, 2001)." This is because most employees spend more time talking and listening; so, oral communication is also crucial to an organization. The practice of story telling tends to spoke individual's personal tacit knowledge. "This transfer is an encouragingly critical process, because people are better able to hear stories critically than less narrative forms of communication (Paul Jeffcutt, 2004)."

"An open-door communication policy, including open communication between individuals, teams and departments to gain new perspectives, is therefore necessary to create a supportive culture (Filipczak, 1997; Samaha, 1996)." At the same time employees must feel emotionally free and safe to develop trust among them and with their organization to be able to learn and share knowledge which in turn is promoted by open communication.

"Bruce (2004) remarked that face to face interaction is one of the oldest and still one of the most effective, means of sharing relevant and current information." Furthermore, face to face interaction with the person with the right skills and knowledge is considered to be the best source valuable for the future development of a company.

"Honest communications are important to create an environment in which people are willing to contribute their intellectual capital to company's stores (Sonnenberg, 1994)." Therefore, not only the manager must be an excellent communicator but also both the employees and upper management must communicate their objectives by addressing the language issue in a way that fits their culture.

Feedback is information given in response to some action taken which is helpful and reinforces employees to learn and share when it reiterates what has happened and makes a useful statement. "Feedback may be as simple as a checkmark on the top of a page or as complex as a long point by point rebuttal message (Van Fleet, 1991)." For this reason, feedback is important for both effective learning and sharing.

In short, communications is the process by which information is exchanged between individuals through a common system of symbols, signs, or behavior. By developing more effective communication networks, organizations strive to create more willing and effective coordination of diverse activities. "In addition, poor communication was found to be the reason for a generally

low level of trust between managers and employees in a study conducted by the consulting firm, Watson Wyatt Worldwide, 1998."

Trust

In today's knowledge economy, it is more important to build trust between employee and employer; in order to motivate and retain knowledge workers. "Without very high trust, organization will never get maximization of brain potential (Geoffrey, 1997)." No knowledge management strategy will succeed, unless organizations care about the knowledge that exists within their organizations; and unless they care about their employees; only then, little effective of knowledge sharing culture will happen.

"On the other hand, guidance means constantly giving maps and signposts, so that, learners know where they are and how to get to where they want to be (Peter Grainger, 1994)." Support in this context means providing help and encouragement whenever it is needed and in a way that motivates employees to continue to participate in the knowledge environment.

"Trust and confidence in construction leadership makes for a more cooperative knowledge sharing environment (Goman, 2002)." For construction project to be completed on time, every member of a team must feel confident that they can trust the other team members and can make a real contribution. In this way, team members' knowledge, views and contribution will be shared among themselves.

"Good long term relationships provide employers and employees with incentives to invest trust in their organization (Sonnenberg, 1994)." Long term relationship gives managers more time to learn about the skills, work habits, interests and abilities of individual employees, making it easier to match jobs and employees within the construction industry.

"Most people won't risk sharing what they know without a good reason or a feeling of trust (Ellis, 2001)." Good knowledge management initiatives create trust that helps to break down cultural barriers and alter the way individuals and groups share knowledge. Building trust throughout a company is the key to create a knowledge oriented corporate culture, a positive environment in which employees are encouraged to make decisions that are efficient, productive, and innovative.

Motivation

“Motivation as defined by Robbins (1993) as the “willingness to exert high levels of effort toward organizational goals, conditioned by the effort's ability to satisfy some individual need.” The way a company rewards its employees contributes heavily to their satisfaction and retention. This is because individuals understand that in exchange for their effort and commitment, the company will help to develop their potential. Subsequently, rewarding people for their work is an important aspect of attracting, retaining and tapping knowledge workers.

“Ching and Yang (2000) studies found that incentives are needed to encourage knowledge sharing. Individuals are motivated to share their knowledge if they are rewarded.” “Some organizations have tried to incorporate learning into the pay system by rewarding how much employees know (Frances Horibe, 1999).” It is going to link learning to a tangible reward.

“Giving recognition for knowledge sharing shows that the company feels sharing is important and demonstrates that the time and energy people spend sharing knowledge “counts” in their performance and career (McDermott and O’Dell, 2001).” Personal recognition will be effective to learning and sharing of knowledge; when money is taken for granted and plaques gather dust.

Personal recognition is a powerful way to reward employees one to one. Formal award programs can have the same power too. “Many companies spend a lot of time and effort setting up these programs. “Employee of the Month” certificate, “Most Valuable Contribution” plaques, instant awards, all have a process in place to hand them out, but doing it well can be difference for the program to create the pride its intended to (Frances Horibe, 1999).”

“In the 1970s, Trench (1978) who suggested that construction management could improve the industry’s effectiveness by giving consideration to the motivational potential of some of the ingredients in the work environment such as money, job satisfaction, a sense of belonging and a future.” Although Trench’s comments may appear rather simplistic, he does touch on a crucial matter, that is, the notion of the work environment.

“A well designed and safe working environment will enable better use to be made of employee’s abilities and will most cases help to provide satisfaction of human needs (Krogh, 2000).” Comfortable working environment relates closely to cleanliness which should be stress on by the management. The physical office space layout, design and configuration will encourage employee interactions; which in turn enhance employee’s willingness to learn and share knowledge with others.

Learning

“Learning is being able to use information that is remembered through understanding its relevance to people experience (Trevor, 1992).” People are motivated to learn when they recognize that they can benefit personally from the learning. Learning is therefore extremely important to people who want cutting-edge skills.

“Senge (1990) has defined organization learning as the process through which managers seek to improve organization members’ desire and ability to understand and manage the organization and its environment so that they make decisions that continuously raise organization effectiveness.” “On the other hand, a learning organization is an organization that purposefully designs and constructs its structure, culture and strategy so as to enhance and maximize the potential for organization learning to take place (Dodgson, 1993).”

“Organizations ultimately learn through individuals (Senge, 1990; Dodgson, 1993).” And yet, it is widely recognized that organization learning is more than the sum of individual learning. “Individuals in organization come and go, but an organization itself retains certain knowledge, structures, routines, and values over time (Hedberg, 1981).” “According to March (1991), the interaction of individual and organizational learning is described as a form of mutual learning: organizations learn from individuals, and individuals are socialized to organizational articles of faith through instruction, indoctrination, and exemplification.”

The key to successful organization learning is to understand the skills of their employees’ current posses and the additional skills they will need in the near future. “Then organization can define the learning needs of each individual or group and arrange training to bridge the gap (Munro Faure, 1996).” Employees must be trained in new skills and encouraged to apply them on the job.

Mentor support is a useful aid to develop learning. The role of the mentor is to advise, coach, coax, encourage, support, empathize with and generally assist learners. Mentors might be fellow learners, colleagues, supervisors or managers. “A learning agreement between mentor and learner will set out what each expects of the other with a timetable of objectives and outcomes (Samuel A. Malone, 1997).”

“Coaching in the workplace is one of the best ways to keep morale high (Peter Grainger, 1994).” When a manager offers criticism, he or she should give feedback on how performance can be improved and suggest that employees should coach each other. Encouragement, teaching and coaching will increase dramatically when all team members offer them.

"Job rotation is another effective learning method that refers to the planned movement of people between jobs over a period of time and for one or more of a number of different purposes (Ben Bennett, 2003)." Basically, the goals of job rotation schemes should be clear and aligned with the organization's business needs at a corporate level that is to enhance knowledge enrichment. An organization culture that supports a continuous learning orientation should encourage learning and sharing of knowledge more efficiently. The most effective and efficient way to do that is to set up activities during which people can learn together.

4.0 Research Methodology

In the studies of organization learning and knowledge management referred to, case studies which involve interviews and questionnaire survey are frequently found. Although questionnaires do not penetrate the topic as deeply as case studies do; it is difficult to find one method that gives both depth and scope. Consequently, a combination of various qualitative and quantitative methods was therefore resorted in this investigation.

This study include a broad range of contactors serving the construction industry, in Sarawak, which should give a deep understanding of the facilitating and enabling conditions to develop organization knowledge sharing culture. The techniques of data analysis which included descriptive analysis and one-sample *t* test had been made known of the purpose of analysis for the data collected from questionnaire survey.

5.0 Conclusion

This paper firstly deals with the concept of knowledge sharing culture and its critical success factors. It also examines the preferred practices of knowledge sharing as illustrated in the Figure 1.2. At the end, the factors that promote the development of knowledge sharing culture will be identified, which can be followed by organization to motivate their employees to share knowledge and build an effective knowledge sharing culture within the organization.

Reference

Adair John (1988). Developing Leaderships: The Ten Principles. London: McGraw-Hill.

Alavi, M., Leidner, D. (1999). Knowledge Management Systems: Issues, Challenges and Benefits. Communications of the Association for Information Systems, 1(5).

Arad, S., Hanson, M. A., Schneider, R. J. (1997). A Framework for the Study of Relationships between Organizational Characteristics and Organizational Innovation. The Journal of Creative Behavior. 31(1): 42-58.

Ben Bennett (2003). Job Rotation. Training Strategies for Tomorrow. 17(4): 73.

Brickley, J. A., Clifford, W. S., Jerold, L. Z. and Willett J. (2003). Designing Organizations to Create Value: From Strategy to Structure. New York: McGraw- Hill Companies.

Brodtrick, O. (1997). Innovation as reconciliation of competing values. Optimum. 27(2): 1-4.
Chabrow, E. (1999). Transferring Knowledge. Information Week. 731. Page 5.
Ching, C. L. and Yang, J. (2000). Knowledge Value Chain. The Journal of Management Development. 19(9): 783-794.
Clarke, P. and Staunton, N. (1989). Innovation in Technology and Organization. London: Routledge.
Dato Prof Haji Abdul Rahman bin Abdullah (1995). The Advent of the Construction Industry Development Board (CIDB): Building A Sustainable Construction Industry. Proceedings of Seminar Quality and Safety in Construction Industry – Latest Development. 25th March. Johor Bahru, Skudai: Universiti Teknologi Malaysia. 1-8.
Davenport, T.H. and L. Prusak (1998). Working Knowledge: How Organizations Manage What They Know. Boston: Harvard Business School Press.
De Long, D., Davenport, T., and Beers M. (1997). What is a Knowledge Management Project? Working Paper, Ernst & Young Center for Business Innovation. Available at: www.bus.utexas.edu/kman/pubs
De Long, W. and Liam, F. (2000). Diagnosing Cultural Barriers to Knowledge Management. The Academy of Management Executive. 14(4): 113-127.
Donald, S. B. and Boyd, C. P., Jr (1992). Professional Construction Management. 3rd Edition. New York: McGraw-Hill, Inc.
Dodgson, M. (1993). Organization Learning: Review of Some Literatures. Organization Studies. 14(3): 375-94.
Elias Ismail (2000). Research and Development in the Construction Industry. Proceedings of Malaysian Construction Industry Achievement Seminar - International Construction Week ICW 2000. 12th September. Kuala Lumpur: Kuliyyah of Information and Communication Technology, International Islamic University Malaysia, 365-372.
Elliot, S. and O'Dell C. (1999). Sharing Knowledge and Best Practices: The Hows and Ways of Tapping Your Organization's Hidden Reservoirs of Knowledge. Health Forum Journal. 43(3): 34-37.
Ellis, K. (2001). Dare to Share. Training. 32(2): 74-80.
Filipczak, B. (1997). It Takes all Kinds: Creativity in the Workforce. Training. 34(5): 32-40.
Fisher, N. (1989). Marketing for the Construction Industry: A Practical Handbook for Consultants, Contractors and Other Professionals. London: Longman.
Frances Horibe (1999). Managing Knowledge Workers: New Skills and Attitudes to Unlock the Intellectual Capital in Your Organization. Canada: John Wiley & Sons Canada Limited.
Gareth, R. Jones (2004). Organizational Theory, Design and Change. Fourth Edition. New Jersey, Upper Saddle River: Pearson Education Inc.
Geoffrey, C. (1997). The Changing Art of Becoming Unbeatable. Fortune. November 24. 229.
Goman, K. C. (2002). Five Reasons People Don't Tell What They Know, Destination KM: Viewpoint (June). Available at: http://www.destinationkm.com.
Gross, A. E. (2001). Knowledge Sharing – The Crux of Quality. American Society for Quality. 452-457.
Hansen, M. T., N. Nohria and T. Tierney (1999). What's Your Strategy for Mapping Knowledge? Harvard Business Review. 77(2): 106-16.
Hedberg, B. (1981). How Organizations Learn and Unlearn. In: Nystrom, P.C., Starbuck, W.H. Handbook of Organizational Design, 1, New York: Oxford University Press, NY. 73-79.
KPMG (2000). The Knowledge Management Research Report 2000. KPMG Consulting England.
Frances Horibe (1999). Managing Knowledge Workers: New Skills and Attitudes to Unlock the Intellectual Capital in Your Organization. Canada: John Wiley & Sons Canada Limited.
Judge, W. Q., Fryxell, G. E., Dooley, R. S. (1997) The New Task of R&D Management: Creating Goal-Directed Communities for Innovation. California Management Review. 39(3): 72-85.
Krogh, V. G., Kazuo Ichijo and Ikujiro Nonaka (2000). Enabling Knowledge Creation: How to Unlock the Mystery of Tacit Knowledge and Release the Power of Innovation. New York: Oxford University Press.
Latham, M. (1994). Constructing the Team, Final Report of the Government / Industry Review of Procurement and Contractual Arrangements in the UK Construction Industry. London: HMSO.

Lee, J. (2001). The Impact of Knowledge Sharing, Organizational Capacity and Partnership Quality on IS Outsourcing Success. Information and Management. 323-35.
Lingard, H. (2002). The Effect of First Aid Training on Australian Construction Workers' Occupational Health and Safety Knowledge and Motivation to Avoid Work Related Injury or Illness. Construction Management and Economics. 20: 263-73.
Love, P.E.D., Gunasekaran, A., Li, H. (1998). Concurrent Engineering: A Strategy for Procuring Construction Projects. International Journal of Project Management. 16(6): 375-83.
March, J.G. (1991). Exploration and Exploitation in Organization Learning. Organization Science. 2(1): 71-87.
Martin, J. (2002). Building Knowledge through People. UK Excellent, British Quality Foundation. February / March.
Martin, L., Andrew D. and Helen L. (2003). Human Resource Management in Construction Projects. New York: Spon Press.
McCampbell, A. S., Clare, L. M. and Gitters, S. H. (1999). Knowledge Management: The New Challenge for the 21st Century. Journal of Knowledge Management. 3(3): 172-179.
McDermott, R. and O'Rell, C. (2001). Overcoming Cultural Barriers to Sharing Knowledge. Journal of Knowledge Management. 5(1): 76-85.
Mumford, M. D., Whetzel, D. L., Reiter-Palman, R. (1997). Thinking Creatively at Work: Organization Influences on Creative Problem Solving. The Journal of Creative Behavior. 31(1): 7-17.
Munro Faure, Leasley (1996). The Success Culture: How to Build Organization with Vision and Purpose. London: Pitman Publishing.
Paul, Jeffcutt (2004). The Foundations of Management Knowledge. London: Routledge.
Peter, Grainger (1994). Managing People: Your Self-Development Action Plan. London: Kogan Page.
Robbins, S.P. (1997). Essentials of Organizational Behavior. 5th ed. New Jersey, Upper Saddle River: Prentice-Hall.
Royal Commission (1992). Royal Commission into Productivity in the Building Industry in New South Wales. Sydney: New South Wales Government.
Samaha, H. E. (1996). Overcoming the TQM Barriers to Innovation. HR Magazine. 41(6): 145-9.
Samuel, A. Malone (1997). How to Set Up and Manage a Corporate Learning Centre. England: Gower Publishing Limited.
Senge P. M. (1990). The Fifth Discipline: The Art and Practice of the Learning Organization. New York: Doubleday.
Scarbrough, H. and Pan, S. L. (1998). A Socio-Technical View of Knowledge Sharing at Buckman Laboratories. Journal of Knowledge Management. 2(1): 55-66.
Shattow, M. (1996). Out of the Blue. Electric Perspectives. 21(3): 44-54.
Smith, E. A. (2001). The Role of Tacit and Explicit Knowledge in the Workplace. Journal of Knowledge Management. 5(4): 311-21.
Sonnenberg, F. K. (1994). Managing with a Conscience: How to Improve Performance through Integrity, Trust and Commitment. United States of America: McGraw-Hill Inc.
Stoddart, L. (2001). Managing Intranets to Encourage Knowledge Sharing: Opportunities and Constraints. Online Information Review. 25(1): 19-28.
Svenja, F., Alfred, J. B. and Daniel D. (2003). Knowledge Management and Networked Environments: Leveraging Intellectual Capital in Virtual Business Communities. American Management Association (AMACOM).
Swan, W. et. al. (2000). Viewing the Corporate Community as a Knowledge Network Corporate Communications: An International Journal. 5(2): 97-106.
Trench P. (1978). Construction: A Vehicle for Regeneration. Building Technology and Management. July / August. 1-9.
Trevor, B. (1992). Training To Meet the Technology Challenge. England: McGraw-Hill Book Company Europe.
Turk, Z. (2000). Construction IT: Definition, Framework and Research Issues. In:
Fischinger, M. ed. Faculty of Civil and Geodetic Engineering on the Doorstep of The Millennium.Ljubljana: Faculty of Civil and Geodetic Engineering, Ljubljana. 17-32.

Tushman, M.L., O'Reilly, C.A. III (1997). Winning through Innovation: A Practical Guide to Leading Organizational Change and Renewal. Boston, MA: Harvard Business School Press.
Van, Fleet, D. D. (1991). Behavior in Organizations. Houghton: Mifflin Company.
Wang, F. H. (1999). Knowledge Management. China: Economy Shan Xi Publisher.