

KNOWLEDGE SHARING PHASE ANALYSIS: MULTIPLE CASE STUDIES OF IT CONSULTING COMPANIES IN INDONESIA

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ABSTRACT

In this globalization era, companies are required to keep learning and changing. In the process of changing, companies need to be adaptive and innovative. Therefore, a company needs to cultivate and maintain its knowledge. Among other ways, it can be achieved by encouraging the process of knowledge sharing within the company. Hence, this study aims to determine the phases of knowledge sharing in IT consulting companies in Indonesia. In order to identify phases of company knowledge sharing, a framework to measure knowledge sharing phases has been developed by using Analytical Hierarchy Process (AHP) theory. This framework is then used to measure the phases of knowledge sharing in three IT consulting companies in Indonesia, namely Pusilkom, Altrovis, and Usmart. This study successfully develops a framework for measuring the phases of knowledge sharing that is adapted from previous research. After the measurement has been conducted, it is known that at the moment, these three companies have reached the stage of collaboration platform phase, with value of the order Altrovis (0.845), Usmart (0.802) and Pusilkom (0.758).

KEYWORDS

Knowledge, knowledge management, knowledge sharing, knowledge sharing phases, IT consulting companies, Indonesia

1. INTRODUCTION

Knowledge management is a significant competitive advantage for a company (Issa& Haddad, 2007). According to Eid (2009), knowledge is important in the long-term sustainability of an organization. Good knowledge management also delivers a successful and timely outcome (Ngoasong & Manfredi, 2007).

One of the most important processes of knowledge management is knowledge sharing (Issa& Haddad, 2007). According to Orr in Aulawi et al. (2009), the most important part of knowledge management within the company is to support its employees for sharing their knowledge. A knowledge sharing process also increases the knowledge accumulation within the company. In addition, the success of knowledge sharing will enhance the workers' ability, thus making the organization's performance better (Xiong & Deng, 2008).

Although many organizations have realized the importance of knowledge sharing, they unfortunately sometimes find it is difficult to implement knowledge sharing. Some employees sometimes are reluctant to share their knowledge (Issa& Haddad, 2007). Behavior to conceal knowledge, as well as reluctance to accept the knowledge of others too often impede the process of knowledge sharing (Ching-Lin in Aulawi, 2009). Apart from the workers, the managements of the organization itself sometimes do not understand how that knowledge sharing can be developed in their organizations.

Therefore, in order to determine knowledge sharing position within a company, a framework that measures certain factors is required. However, there are no such convenience framework that can be used to measure the knowledge sharing stage within organization. Hence, this study aims to develop a framework for measuring the phase of knowledge sharing within organization.

In order to see the applicability of our proposed framework, we use some companies as case studies. The case studies in this research are Pusilkom, Altrovis and Usmart, which are IT consulting companies in Indonesia. We select these companies as they are knowledge intensive companies, that fully rely on their past knowledge in serving their clients. By having the status of knowledge sharing stage of these companies, it is

expected that we can get insight of knowledge sharing characteristics of IT consulting companies in Indonesia, so that eventually we can provide some suggestions for improvement.

2. THEORETICAL BACKGROUND

2.1 Factors Affecting Knowledge Sharing

There are several studies conducted to determine the factors that influence knowledge sharing. These studies are summarized in Table 1.

Table 1. Summary of factors affecting knowledge sharing

Research	Factors Affecting Knowledge Sharing
(Brink P. v., 2003)	Social condition, organization condition, technology condition
(Issa & Haddad, 2007)	Organization culture, trust, information technology
(Xiong & Deng, 2008)	Effective communication, shared mindsets, training and leadership
(Jones, Cline, & Ryan, 2006)	Orientation to change; control coordination, and responsibility; basis of truth and rationality; motivation; orientation to work)
(Eid, 2009)	Learning culture, Information technology
(Supar et al, 2005)	Cultural factor, communication factor, organizational support.
(Cheng, 2010)	Organizational, individual, and technology factor.
(Lee J.-N. , 2001)	Culture, structure, and information technology.
(Al-Ma'aitah, 2008)	Cultural factors, information technology factors, organization support factors
(Wiewiora et al, 2010)	Trust (ability, benevolence, and integrity)
(Ngoasong & Manfredi, 2007)	Organization Culture teamwork, trust, senior management support), structure (centralization, knowledge-based reward system), people (self-efficacy), information technology.
(Islam, Ahmed, & Hasan, 2011)	Trust, communication, leadership

Specifically, our study relies upon the work of Brink (2003) which proposes framework for defining knowledge sharing phase. Brink (2003) defines factors that influence knowledge sharing into three groups, namely: social, organization and technology factors. Social factor comprises 6 sub-factors, namely: care, appraisal, empowerment, trust, competence leverage, and knowledge crew. Organizational factor comprises 10 sub-factors, namely: learning organization, organically structured organization, slack, integrated into daily work process, metrics, knowledge champion, climate of openness, communities, collaboration, and dialogue. Technological factors include knowledge repository, knowledge route-map and collaborative platform. The following are the explanation of each factor:

- Care: In an organizational context, care is defined as being warm, the employees know each other and have an interest, provide assistance when needed. It is the foundation for employee to be open-minded to others, creating a dialogue with another, and trust others employees.
- Appraisal: Appraisal is defined as an evaluation that motivate employees to conduct knowledge sharing activities. Employees need to get stimulation and motivation to encourage participation in knowledge sharing process.
- Empowerment: Empowerment is to immerse people into the changes that will affect them. Nonaka on the Brink (2003) believes that this will increase individual motivation to form knowledge sharing since every individual always tries to evolve his/her knowledge.
- Trust: Trust is defined as the belief among employees and employee trust in management. Trust is used to reduce uncertainty on an individual or object behavior.
- Competence leverage: Competence leverage can be defined as a person's ability to complete a task. Competence leverage depends on the knowledge, experience, natural talent, expertise and skills of each individual. Competence leverage supports new skills creation and knowledge transfer.

- Knowledge crew: Knowledge crew is part of the organization in charge of organizational knowledge. Knowledge crew provides structure and maintains a platform for knowledge creation and distribution within the company.
- Learning Organization: Learning organization is used to improve compliance and efficiency during times of change. Learning organization has a greater ability to learn, adapt, change and see all the experience gained (e.g., contact with customers, gathering information about competitors, and new ways to solve the problem) as an opportunity to make improvements.
- Organically Structured Organization :Organizational is seen as a learning creature and depending on the environment in which it lives. Some organizations have an open structure, and adaptive to their environment. Flexible structure supports cross functional teamwork, participatory design, authorizations, evolutionary developments, flat hierarchy, distribution of knowledge, minimum bureaucracy and formalization. All of these characteristics are the most profitable character to cooperate, collaborate, innovate, and learn within the organization.
- Slack: The variable is defined as the time required to hold knowledge exchange, usually when it is defeated by a certain time to meet the deadline. Knowledge sharing should not be stopped because of these obstacles. Organizations should help their employees by giving employees time to reflect, discuss the issues, and learn new competencies.
- Integrated Into Daily Work Process: Knowledge sharing will work the best if it has become part of organizational life. Therefore, systems that support knowledge sharing should work in a transparent and blend with the daily work process.
- Metric: Metric is used to gain insight into the effectiveness of the activities related to knowledge sharing. Metric measures "return on knowledge" within the organization. Knowledge sharing impact should be monitored since the beginning.
- Knowledge Champion: A knowledge champion is a member of the top management who understand and aware about knowledge sharing within an organization. A knowledge champion has the power to influence and give commands to make changes within the organization.
- Climate of openness: Climate of openness makes the members of the organization feel encouraged to create, express, share, and use knowledge. Climate of openness can affect a person to be open- minded and agree with the things that are not familiar. Climate of openness can be seen from the openness of the company to access the information.
- Community: An organization needs to support the teamwork, communities of practice, and other forms of social learning. This community consists of individuals from different company function, but has a sense of unity.
- Collaboration: Collaboration is more than just working together on the basis of compensation. Collaboration is defined as the interaction between employees at work. Collaboration can establish new organizational knowledge.
- Dialogue: Dialogue is defined as a flow of information by the employees. This leads to increased elaboration and frequency of communication between the different interests, and stimulate exploration within a group.
- Knowledge Repository: Knowledge repository is a knowledge database with a certain classification schemes or taxonomies used to organize. Knowledge repository assists grouping, sorting, visualization, searching, manipulating, and repairing knowledge database.
- Knowledge Route-map: Knowledge route-map is a guide, directory, and a pointer to the organization internal and external information sources and knowledge, both tacit and explicit. Knowledge route-map provides pointers to sources of knowledge, including those with special skills or provide a link to a document describing the results of research, best practices, lessons learned, diagnostic tools or a list of frequently asked questions.
- Collaborative Platform: Collaborative Platform is a function of information and communication technology that electronically facilitates group or teamwork for working together. Collaboration platform can encourage dialogue, debate, interaction, and creativity. Collaboration platform solves time and space constraints.

2.2 Knowledge Sharing Phase

There are five phases of knowledge sharing for an organization. The phases are:

- **Unawareness phase:** In this phase, there is no knowledge sharing at all. Organization does not realize the contribution of knowledge sharing as a competitive advantage. Knowledge sharing is not addressed in the vision and strategy of the organization.
- **Collaborative Platform Phase:** Organization that has reached collaborative platform phase is using the knowledge to compete and manage their business movement. Organization operation is focused on participatory decision-making and learning together, such as in the learning community. Key performance indicators for this phase are trust, care, appraisal, competence leverage, empowerment, climate of openness, and collaborative platform.
- **Knowledge Route-map Phase:** An organization that has reached knowledge route-map phase has realized the benefits of knowledge and made efforts to improve knowledge sharing in the company. In this phase, organization is not only focus on direct knowledge sharing (explicit knowledge) but also on indirect knowledge by using knowledge route-map. Key performance indicators in this phase are knowledge crew, climate of openness, slack, dialogue, community, knowledge champions, collaboration, and knowledge route-map.
- **Knowledge Repository Phase:** An organization that has reached the knowledge repository phase has potential value of information and knowledge. In its strategy, the organization has given huge attention to the management of information. It also gives big investment in information systems. Key performance indicators in this phase are system integrated into the daily work process and knowledge repository.
- **Organizational Learning Phase:** Organization that has reached this stage, has gained competitive advantage through collective learning in the organization. Knowledge sharing is perfectly done in this phase. Key performance indicator for this phase is organically structured organization.

2.3 Analytical Hierarchy Process (AHP)

AHP is a method that can be used to give priority (Mulyono, 1996). The AHP method was first suggested by Thomas L Saaty. According to Mulyono (1996), there are several steps to perform AHP. First is decomposition; in this stage, problem is determined. The second step is comparative judgment in which the assessment ratio between two variables is analyzed. Experts are asked to compare the importance of the two variables using 9-scale scores. The third step is synthesis of priority. For any matrix that has been obtained, one tries to get the eigen value vector to gain local priority followed by the next step, i.e., to look for global priority. Finally, the last step in conducting the AHP method is checking logical consistency. For counting the average weight for every factor we used the geometry mean, written by the formula:

$$G_m = \sqrt[n]{y_{11} \times y_{12} \times y_{13} \times \dots \times y_{1n}}$$

G_m = Geometric mean / combined evaluation

y_i = assessment of the respondents to the i (1/9-9 scale)

n = number of respondents

3. METHODOLOGY

The approach used in this study is a qualitative approach. As we have explained in the introduction section, this research aims to formulate framework for measuring knowledge sharing phase. For this purpose, we adopted the knowledge sharing factors of Brink (2003) and then recalculated weight of each factor by applying the principle of the Analytic Hierarchy Process (AHP). Variables are grouped according to the hierarchy into multiple layers of matrices. Afterwards, the AHP matrices are distributed to knowledge management experts and company executives.

Subsequently, in order to see the applicability of our proposed framework, we apply it to multiple case studies. We select three IT consulting companies, namely Pusilkom UI, Altrovis, and Usmart. For this

purpose, we collect data for assessing knowledge sharing phase using semi-structured interview in accordance with the proposed framework. The interview is conducted with the stakeholders of the company associated with the process of knowledge sharing while data collection is completed by direct observation of the data, systems, and knowledge sharing practices performed in the company.

4. RESULT AND ANALYSIS

4.1 Instrument for Measuring Knowledge Sharing Phase

Framework for measuring knowledge sharing phase is adopted from a framework by Brink (2003). The adoption is done by giving comparative judgments using expert opinion from company executives and knowledge management expert in Indonesia.

To get the weighted score for each variable using AHP, this research employs matrices for comparing one variable with another. According to the variable hierarchy, there are two layers and four matrices that are utilized. In the first layer of AHP, the matrix compares conditions that affect knowledge sharing, namely: social, organizational conditions, and technological conditions. The second layer compares factors that affect each condition in first layer.

Having performed the comparative judgment, we proceed to the next step, i.e., creating a synthesis of priority and checking the consistency. Both of steps make use of the *Expert Choice 11* software. Thus, the result of the weighting variable using AHP can be summarized in Table 2, the second column.

Table 2. Summarized of weighting variable using AHP

Factor	Weight	Ranking from Brink (2003)	Ranking from this Research
1. Care	0.162	1	2
2. Appraisal	0.098	2	3
3. Empowerment	0.098	5	4
4. Trust	0.179	4	1
5. Competence leverage	0.087	3	5
6. Knowledge crew	0.065	15	7
7. Learning organization	0.024	12	10
8. Organically structured organization	0.019	11	14
9. Slack	0.018	7	15
10. Integrated into daily work process	0.021	18	11
11. Metric	0.011	16	19
12. Knowledge champion	0.015	13	16
13. Climate of openness	0.020	6	13
14. Community	0.012	9	18
15. Collaboration	0.014	10	17
16. Dialogue	0.021	8	12
17. Knowledge route-map	0.067	17	8
18. Knowledge repository	0.039	19	6
19. Collaboration Platform	0.029	14	9

According to our experts' judgment, our research result differs from the work of Brink (2003) in the weight of each factor. Rank comparisons between our research and Brink (2003) are summarized in Table 2 in third and fourth column. Nevertheless, our findings are similar to the results of Brink in term of the importance of social factors that are ranked in first to fifth places. This suggests that the social condition influences knowledge sharing maturity stronger than organizational or technological condition.

However, there is a fundamental difference of our results in contrast with the work of Brink (2003). In Brink (2003), knowledge repository is a factor placed in 19th. However, in this study, knowledge repository is positioned in 6th. The difference is resulted from the fact in the case studies that knowledge repository has been used in each company's operational activities. Therefore, knowledge repository has significant impact to the knowledge sharing activity.

4.2 Maximum Value, Threshold, and Interval Every Phase

After the weights have been determined, the next step is to establish the maximum value, threshold, and an interval for every phase. The maximum value is obtained by providing the highest score for each factor. Threshold for each phase is obtained by multiplying the maximum value by 75%. The interval is determined using two values, lower limit and upper limit.

The lower limit of the phase is determined by the upper limit from the previous phase. Meanwhile, the upper limit of the phase is resulted from the addition of the lower limit value that phase and the maximum value for that phase.

If an organization reaches the threshold in a certain phase, then the analysis process can proceed to the next phase, until the last phase has been elapsed. However, if the threshold for a phase is not achieved, then the assessment stops at the current phase. In this way, the framework for measuring knowledge sharing phase is shown in Table 3.

Table 3. Framework for Measuring Knowledge Sharing Phase

Phase	Condition	Factor	Max	Threshold(T) And Interval (I)
Un-awareness	Undefined	Undefined	Undefined	Undefined
Collaborative Platform Phase	Social	<i>Trust</i>	0.753	T: 0.56475 I: 0--0.753
		<i>Care</i>		
		<i>Appraisal</i>		
		<i>Competence leverage</i>		
		<i>Empowerment</i>		
	Organization	<i>Climate of openness</i>		
		<i>Slack</i>		
		<i>Dialogue</i>		
		<i>Community</i>		
		<i>Knowledge Champion</i>		
	Technology	<i>Collaborative platform</i>		
Knowledge route-map phase	Social	<i>Knowledge Crew</i>	0.115	T: 0.086 I: 0.753--0.868
	Organization	<i>Metric</i>		
	Technology	<i>Knowledge Route-map</i>		
Knowledge repository phase	Social	-	0.088	T: 0.066 I: 0.868--0.956
	Organization	<i>System integrated into daily work process</i>		
	Technology	<i>Knowledge repository</i>		
Organization learning phase	Social	-	0.043	T: 0.032 I: 0.956--1
	Organization	<i>Organically structured organization</i>		
		<i>Learning organization</i>		
Technology				

4.3 Assessment to Our Case Studies

To assess each of these factors, this research uses Likert scale from one to five. Scale one means that the factor does not exist within the company, whereas scale five shows that the factors are completely met. Table 4 shows the comparison of the values obtained in the three case studies.

After obtaining the score for each company, the knowledge sharing phase is analyzed with the framework we have formulated. Our calculation shows that Altrovis achieves first rank maturity score of knowledge sharing, with a total score of 0.845. The second rank for the knowledge sharing maturity phase is achieved by Usmart with a total score of 0.802. The third rank is Pusilkom with a total score of 0.758. From the total score, it can be seen that the three companies have reached the same phase of the collaborative platform phase.

Table 4. The result of the assessment

	Factor	Pusilkom score	Altrovivis Score	Usmart Score
Social Condition	<i>Care</i>	5	5	5
	<i>Appraisal</i>	3	4	5
	<i>Empowerment</i>	4	4	4
	<i>Trust</i>	5	5	5
	<i>competence leverage</i>	3	4	4
	<i>knowledge crew</i>	2	1	2
Organization Condition	<i>learning organization</i>	3	4	4
	<i>organically structured organization</i>	4	4	5
	<i>Slack</i>	4	5	5
	<i>integrated into daily work process</i>	5	5	5
	<i>Metric</i>	3	2	3
	<i>knowledge champion</i>	2	4	1
	<i>climate of openness</i>	4	4	4
	<i>Community</i>	4	5	2
	<i>Collaboration</i>	5	5	5
<i>Dialogue</i>	5	5	5	
Technology Condition	<i>knowledge repository</i>	5	5	5
	<i>knowledge route-map</i>	2	3	2
	<i>collaboration platform</i>	5	5	4

Similarities among knowledge sharing practice on these three consulting companies in Indonesia are identified as follows:

- Each company exhibits high score for care and trust due to its size. When the size of a company is small, it is very likely its employees know each other. Employees can easily contact their colleagues. In addition, the organizational culture of these three companies occurs to be is cooperative, rather than competitive.
- In the beginning, each company aims to perform knowledge sharing activity within the company every week. However, this fails to execute because of the lack of commitment from its employees.
- The organizational structure of the IT consulting company is still relatively boundless. There are many cross functions occurred in the project execution. This characteristic, therefore, supports the possibility of knowledge sharing between employees.
- The employees at each company are accustomed to use technology. Most of the employees already have backgrounds in IT. Thus, there is no difficulty to use the system.
- There is no formal knowledge crew in each company. The knowledge sharing activity is handled by human resource department instead.

4.4 Implications of Research to IT Consulting Companies in Indonesia

IT consulting companies that want to succeed in implementing their knowledge sharing, first need to assess their position of knowledge sharing. The assessment is useful to see which aspects need to be improved, so that the company can make improvements more effectively.

Concerning implications on an IT consulting company, the company needs to make a knowledge crew within the company. Knowledge crew is a part of an organization that can manage on a regular basis or case-by-case basis knowledge sharing activities within the company.

For employees of the underlying IT consulting company, they need to manage their time schedule, i.e., choosing between working on his/her job description or joining knowledge sharing activity. Once, they synchronize their schedule, they can join knowledge sharing activity within the company.

5. CONCLUSION

This research aims to formulate and assess the knowledge sharing phase to match the characteristics of the IT consulting companies in Indonesia. Adjustment process is conducted with Analytical Hierarchy Process (AHP). The weight of each variable is obtained as follows: trust (0.179), care (0.162), appraisal (0.098), empowerment (.098), competence leverage (0.087), knowledge repository (0.067), knowledge crew (0.065), knowledge route-map (0.039), collaborative platform (0.290), learning organization (0.024), systems integrated into daily work process (0.067), dialogue (0.021), climate of openness (0.020), organically structured organization (0.019), slack (0.018), knowledge champion (0.015), collaboration (0.014), communities (0.012), and metrics (0.011).

For knowledge sharing phase assessment, all three companies of the case studies are in the same phase, namely the collaboration platform phase. They could not get to the next phase, i.e., the knowledge route-map phase, because it has not reached the threshold for this phase. Variables that should be improved by the companies are metric, knowledge route-map and knowledge crew. The main solution proposed by this research is to form a specific part of the company which has the responsibility in knowledge sharing within the company.

ACKNOWLEDGEMENT

We thank to IMHERE project officers for their support in disseminating the results of this research. The IMHERE project is fully supported by Directorate General of Higher Education, Ministry of National Education, the Republic of Indonesia.

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