ASSESSING KNOWLEDGE MANAGEMENT SYSTEMS' SUCCESS BASED ON TECHNICAL AND SOCIAL FACTORS

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ABSTRACT

Knowledge Management System (KMS) has been developed and implemented in Indonesia organizations but the success of KMS has not been determined and evaluated. This study aims to propose a KMS success model based on technical and social factors, and also to analyze the factors that influence the success. The method of data collection is using survey by distributing questionnaires conventional and online to three organizations that have already implemented KMS. The results from data processing are found that system quality, knowledge quality, user commitment, use, and user satisfaction significantly influence KMS success. System quality and knowledge quality indirectly influenced use.
Keywords*: knowledge management, KMS, KMS success, socio-technical system.*

1. INTRODUCTION

Competitive advantage is the key for a nation to advance in globalization. Competitive advantage is pushed by knowledge-based-economy era. In this era, knowledge became a power to develop and compete with the other nations. Some organizations in Indonesia have already implemented knowledge management and also installed knowledge management system.

Knowledge management systems (KMS) have important role in helping organizations manage their knowledge effectively and efficiently (Tsai and Chen, 2007; Lai, 2009). Ford, Chevron, and Texas Instrument got the benefit from KM implementation and have saved million dollars (Bose, 2004). But the implementation of KMS is not always match with the goal of the organizations. Researchers found that of the 288 organizations that had KMS, 85% organizations were failed to get the expected benefits from KMS (Koenig, 2001). Another survey in industries, the estimation failure rate of technology implementations for business process reengineering efforts is 70% (Malhotra, 2005). Although the chance of failure is still high, KMS have been adopted and considered important in several industries (Nantapanuwat et al, 2010).

Therefore, it becomes important to determine factors that affect the success of KMS. The previous researches only focused on technical side of the systems (Halawi et al, 2008; Wu and Wang, 2006; Jennex and Olfman, 2005). The social factors on KMS success have not been fully examined in information system and knowledge management research (Tsai and Chen, 2007). Social factors have important role equal to technical factors on KMS success. KMS is one of information system class that is built based on technical and social perspective as socio-technical system (Assegaf and Hussin, 2012; Lusa and Sensuse, 2012). Social and technical factors are critical for KMS success but there is little research about KMS success from technical and social factors (Al-Busaidi and Olfman, 2005). The need to study KMS success from this perspective should be conducted. This research proposes a model about KMS success based on technical and social factors.

2. THEORETICAL BACKGROUND

2.1. Knowledge Management and Knowledge Management System

Knowledge management (KM) has become a hot issue of business management in the super-competitive age (Tsai et al, 2010). Because knowledge-

based resources are usually difficult to imitate and socially complex, the knowledge-based view of the firm posits that these knowledge assets may produce long-term sustainable competitive advantage (Alavi and Leidner, 2001). Knowledge is a fluid mix of framed experience, values, contextual information, expert insight and grounded intuition that provides an environment and framework for evaluating and incorporating new experiences and information (Davenport and Prusak, 1998). The position of knowledge is critical in the organizations and knowledge is the center of KM.

Organizations need KM to manage knowledge and bring the benefit (Alavi and Leidner, 2001). The definition of KM from APQC (as cited in Goel et al, 2010) is a conscious strategy of getting the right knowledge to the right people at the right time and helping people share and put information into action in ways that will improve organizational performance. Alavi and Leidner (2001) suggested some implementation strategies to build KM. The strategies are based on the perception to view knowledge. These are some example of the strategies from Alavi and Leidner (2001):

1. If knowledge is viewed as an object or is equated with information access, then knowledge management should focus on building and managing knowledge stocks.
2. If knowledge is a process, then the implied knowledge management focus is on knowledge flow and the processes of creation, sharing, and distribution of knowledge.
3. The view of knowledge as a capability suggests a knowledge management perspective centered on building core competencies, understanding the strategic advantage of know-how, and creating intellectual capital.

One of fundamental enabler for KM is information technology (IT). KM technology can contribute significantly to the evolution and application of knowledge for implementing strategies and practices that are more environmentally and socially sustainable (Goel et al, 2010). This KM technology is called KMS. Because this research is focused on knowledge as process so the definition of KMS is IT-based systems developed to support and enhance the organizational processes of knowledge creation, storage/retrieval, transfer, and application (Alavi and Leidner, 2001). Therefore, KMS support and integrate KM activities in the organizations.

2.2. Information System Success and Knowledge Management System Success

From a technical perspective, KMS may not appear radically different from other forms of information systems (IS) (Tsai and Chen, 2007; Tsai et al, 2010). Although the form of KMS is same with the other IS, the functions are different. One of the function is to manage knowledge that the level of knowledge is higher than information, whereas the other IS focus on information. KMS focuses on discovering knowledge that responds to the changing environment and takes into account an implicit knowledge that plays an essential role in an organization's competitive advantage (Galandere-Zile and Vinogradova, 2005).

The determination of KMS success is related to the IS success. The IS success model that is applicable and empirically tested is DeLone and McLean IS Success Model (2003). Several prior studies on KMS success were also based on the DeLone and McLean model (Nantapanuwat et al, 2010). The dimensions on this model are system quality, information quality, service quality, use, user satisfaction, and net benefits. DeLone and McLean (2003) proposed that these six dimensions of success are interrelated rather than independent and there are possible causal interrelationships among the dimensions of success.

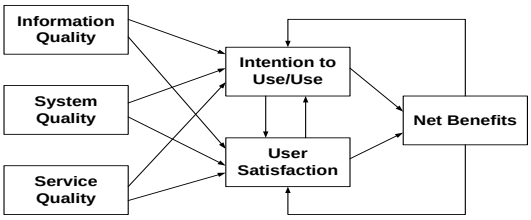

Figure 1. The DeLone and McLean IS Success Model (2003)

DeLone and McLean (2003) argued that intention of use is an attitude, whereas use

is a behavior, attitude and their links with behavior are notoriously difficult to measure. Besides, intention of use implies in itself an attitude or a will towards a system which is not yet in use, while use implies that a system is already existed and being adopted (Nantapanuwat et al, 2010).

Jennex and Olfman (2005) proposed a KMS success model that was based on DeLone and McLean IS Success Model (2003). The model is composed of system quality, knowledge/information quality, service quality, intent to use/perceived benefit, use/user satisfaction, and net benefits. This model is complex because it used two approaches to build the model. The two approaches are process/task approach and infrastructure/generic approach (Jennex and Olfman, 2005).

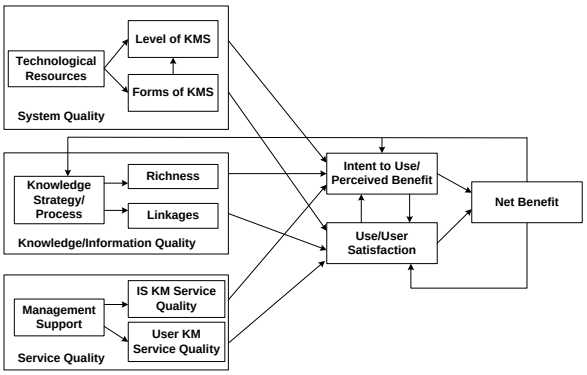

Figure 2. Jennex and Olfman KMS Success Model (2003)

Nantapanuwat et al (2010) developed a KMS success model and considered two factors that affect success that are technical and social factors. The model consisted of technical factors (knowledge quality, system quality, and service quality), social factor (trust), use, user satisfaction, and KMS success. Their research added trust in social factor and applied use (Nantapanuwat et al, 2010). Alavi and Leidner (2001) issued about trust can be developed to enhance the individual's use of knowledge in a KMS. Trust was proven affects KMS success as social factor (Nantapanuwat et al, 2010).

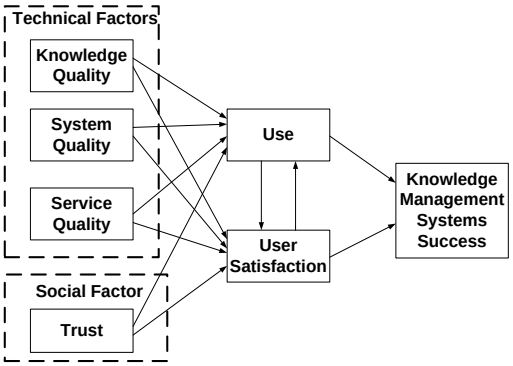

Figure 3. Nantapanuwat et al KMS Success Model (2010)

Further researches about KMS success should consider social factors. As Tsai and Chen (2007) suggested that organizations must take into consideration of social factors to ensure success when designing and implementing KMS. The other social factor that should be taking into consideration is user commitment. Malhotra and Galletta (2003) argued that user commitment has important role as antecedent of KMS success to affect the use of system. Commitment has been discussed in the IS/IT literature but has almost exclusively focused on the dedication of the individual to the organization rather than to the system or plan being implemented (Shaw and Edwards, 2004).

This research uses Nantapanuwat et al model (2010) as reference model, adds user commitment, and prefer to apply use because the KMS as research object are already existed and implemented.

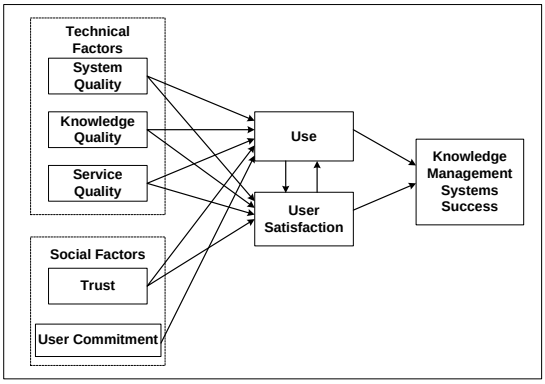

Figure 4. This Research Model of KMS Success

Thirteen hypotheses were developed from the model. Prior researches found the impact of system quality, knowledge quality,

and service quality to use and user satisfaction (Wu and Wang, 2006; Halawi et al, 2008; Nantapanuwat et al, 2010). Jennex and Olfman (2005) pointed that the quality of technical infrastructure is one of KMS critical success factors. The higher of system infrastructure and operational characteristics will affect use and user satisfaction. The rich knowledge quality is essential to knowledge utilization (Al-Busaidi, 2012). Having good knowledge will lead to high use and user satisfaction. Service quality as mentioned by DeLone and McLean (2003) is an important factor in IS success so it will affect the KMS success too.

- Hypothesis 1: The system quality will positively affect the use of KMS.
- Hypothesis 2: The system quality will positively affect the user satisfaction of KMS.
- Hypothesis 3: The knowledge quality will positively affect the use of KMS.
- Hypothesis 4: The knowledge quality will positively affect the user satisfaction of KMS.
- Hypothesis 5: The service quality will positively affect the use of KMS.
- Hypothesis 6: The service quality will positively affect the user satisfaction of KMS.

Trust reduces knowledge users' fears of using others' knowledge (Al-Busaidi, 2012). If trust is developed then it will enhance individual's use in a KMS (Alavi and Leidner, 2001). Nantapanuwat et al (2010), found the relationship between trust to use and user satisfaction.

- Hypothesis 7: The trust on KMS will positively affect the use of KMS.
- Hypothesis 8: The trust on KMS will positively affect the user satisfaction of KMS.

The impact of user commitment to use has not proven yet. But user commitment become antecedent of KMS success and is expected to affect use of KMS (Malhotra and Galletta, 2003).

- Hypothesis 9: The user commitment on KMS will positively affect the use of KMS.

The increase of use will lead to greater user satisfaction and vice versa (DeLone and McLean, 2003). Halawi et al (2008) and Nantapanuwat et al (2010) found this vice versa relationship.

- Hypothesis 10: The use of KMS will positively affect the user satisfaction.
- Hypothesis 11: The user satisfaction of KMS will positively affect the use.

The use and user satisfaction are important to KMS success. Prior researches found that the use and user satisfaction lead to the KMS success (Wu and Wang, 2006; Halawi et al, 2008; Nantapanuwat et al, 2010).

- Hypothesis 12: The use of KMS will positively affect KMS success.
- Hypothesis 13: The user satisfaction of KMS will positively affect KMS success.

3. RESEARCH METHOD

3.1. Instrument Development

The instrument is developed from KMS literature. In order to prevent the respondents from choosing the neutral-point, the items in questionnaire use six-point Likert scale from strongly disagree (1) to strongly agree (6). The instrument is also piloted on 30 respondents before the data collection is initiated. This pilot test conducted to evaluate that each question in questionnaire can be understood by respondents.

Table 1. Definition of Constructs

Construct	Definition	Reference
System Quality	How good the KMS is in terms of its operational characteristics	Wu and Wang, 2006; Nantapanu-wat et al, 2010; Halawi et al, 2008
Knowledge Quality	The opinion of knowledge provided by KMS and the richness of knowledge	Nantapanu-wat et al, 2010; Al-Busaidi, 2012
Service Quality	The opinion of the quality of IT and IS staff support to the system's end user	Nantapanu-wat et al, 2010; Al-Busaidi, 2012

Table 1. Definition of Constructs

Construct	Definition	Reference
Trust	The confidence on the knowledge you use from the KMS that is contributed by other	Nantapa-nuwat et al, 2010
User Commitment	The degree of commitment of the knowledge worker toward the KM program and related system and processes based on the effect of social influences on his or her behavior	Malhotra and Galletta, 2003
Use	The extent of the KMS being used	Wu and Wang, 2006; Nantapa-nuwat et al, 2010
User Satisfaction	The sum of one's feelings of pleasure or displeasure regarding KMS and response to the use of the output of KMS	Wu and Wang, 2006; Nantapa-nuwat et al, 2010; Halawi et al, 2008
KMS Success	The valuation of the benefits of the KMS users	Wu and Wang, 2006; Nantapa-nuwat et al, 2010; Halawi et al, 2008

3.2. Data Collection and Sampling

Data collection method for this study uses survey. The target respondents are employees that already used KMS from the organizations which already implemented KMS. Three organizations became place to gather respondents. There are two approaching way to collect data, using conventional way which distributed questionnaires to each organizations and online survey. The questionnaire has 43 questions and the method to calculate sample size is based on Hair et al (2006) which the sample size is at least five times the total of observed variables, this study's minimum sample size is 215. For conventional way, the distributed questionnaires are 357 and received 287 responses but only 137 questionnaires are useful for data processing. The online survey only received 37 responses. The total questionnaires that useful are 220.

4. RESULT AND DISCUSSION

The data processing used structural equation modeling with two-phased approach. First, using CFA to estimate the measurement model and test the validity and reliability of the instrument. The second, testing the overall model fit and hypotheses using structural model. The LISREL 8.72 was used as statistical program for data processing.

4.1. Measurement Model

There is a second order construct in the model, which is user commitment. User commitment has three first-order factors consisted of compliance, identification, and internalization. After measuring validity, compliance as factor in the second-order construct didn't pass minimum standardized loading estimates. Hair et al (2006) stated that minimum standardized loading estimates are 0.5 or higher, and ideally 0.7 or higher. The result for reliability test is good. The construct reliability of observed variables are higher than 0.7 and the variance extracted are also higher than 0.5 (Hair et al, 2006). The goodness-of-fit indexes for measurement models are range from good fit to perfectly fit.

4.2. Structural Model

The goodness-of-fit of structural model is good after some adjustments. Although some goodness-of-fit in the absolute-fit measures didn't pass the critical value, the criterions on incremental-fit and parsimonious-fit measures passed the critical value. It is indicated that the structural model exhibited a good fit with the data.

The result of hypotheses testing can be seen in the Figure 5. The hypothesis H1 is not supported but hypothesis H2 is supported. These implied that system quality didn't positively affect use of KMS, only

significantly affected user satisfaction. The t-value of path didn't pass the critical value with significance level for 0.05. Although system quality didn't affect directly to use but the relationship from user satisfaction bring indirect effect to use so the hypothesis H1 is supported.

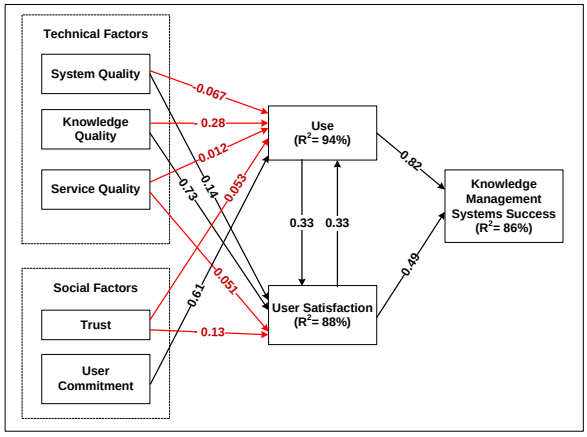

Figure 5. Hypotheses Testing Results

This is implied that system quality of KMS are not in good level. When interviewing some respondents and knowledge officers, the organizations didn't pay attention to the system technology update and there is no adequate human resources that can handle the problem of KMS. The other cause is different pattern of usage and skills of each user which low quality systems will meet basic requirement for some people, while the others might demand for high quality system (Nantapanuwat et al, 2010).

Knowledge quality didn't affect use positively so hypothesis H3 is not supported. Hypothesis H4 is supported which knowledge quality affected user satisfaction. The path coefficient for H4 is relatively high; this is indicated that knowledge quality ensures the user satisfaction but negatively affected use of KMS. The path from user satisfaction made the relationship from knowledge quality to use become positive indirectly, therefore hypothesis H3 is supported.

Prior studies proved the relationship of knowledge quality to use positively but there are some conditions in the organizations that made this result. In PT B, it is found that the knowledge content on KMS rarely updated and the business competition environment in their sector is very tight. They need updated knowledge and their knowledge-cycle process was slow to update. Whereas in PT A, their KM division was strict to the knowledge content that uploaded in the KMS. Some knowledge-contributors cannot freely and pressured to upload their knowledge. If their content is rejected, they didn't have any motivation to contribute again. At Bank C, there are some issues that their employees didn't aware the KMS is existed and has much usefulness. Overall, the employees from three organizations have tendency to use another form system in need to search knowledge. Malhotra and Galletta (2003) stated that the failure of KMS because the employees prefer to search and share knowledge at the outside organizations than in the internal.

The hypotheses H5, H6, H7, and H8 were not supported because the significance level didn't meet critical value. The service quality and trust didn't affect use and user satisfaction. It is found the system service is fall behind the users' expected. The training and consultation were not enough. Moreover the operational-level employees didn't have more chance to get guidance. The three organizations still use top-down approach so the information passed down from top to down level. There are many lost information at the low level and operational employees didn't understand to use system.

The trust on KMS didn't affect use and user satisfaction significantly. The respondents trust the knowledge in KMS but cannot trust everything on KMS. Trust is multi-dimensional construct (Tsai and Chen, 2007). McKnight et al (1998) as cited in Tsai and Chen (2007) categorize trust into five degrees. This study only looked from personality-based trust.

The hypothesis H9 is supported and user commitment has higher path coefficient on use of KMS. The three organizations suspected that their employees only want to use KMS if there are extrinsic rewards or incentives. But this study proves that the commitment based on extrinsic reward didn't affect use. The employees' commitment lies on identification and internalization level. These implied that the employees also need intrinsic reward and peer's influence.

It is expected that use and user satisfaction has vice-versa relationship which hypotheses H10 and H11 were supported. The R^2 value of use and user satisfaction is relatively high. The variance of use is explained 94% by independent variables and user satisfaction is explained 88% by independent variables.

Use and user satisfaction affected KMS success which hypotheses H12 and H13 were supported. The R^2 value of KMS success is high which the variance of KMS success is explained 86% by independent variables. The empirical results from this study provide sufficient determination for KMS success. There are nine of thirteen hypothesized relationships were supported with the indirect effects on path relationship among system quality and knowledge quality to the use of KMS.

5. CONCLUSION

These study objectives are to propose a KMS success model based on technical and social factors, and also to analyze the factors that influence the success. User commitment was added as social factors which become antecedent of KMS success from literature review. The nine hypotheses were supported from thirteen hypotheses. Service quality and trust didn't affect the use and user satisfaction on KMS. Trust will be relevant with using other perception on defining the trust on KMS.

This study raises the importance to view KMS as a socio-technical system rather than view it separately as only technical system or social system. The result of this research is indicated that knowledge quality has higher influence on KMS user satisfaction and user commitment has higher influence on KMS use. However, this research has limitations. There are small sample size and disregarded the other view on trust that cause trust didn't influence the use and user satisfaction. The future research could add the other social factors which affect KMS success and could use model in other contexts.

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