Knowledge Management System Features Analysis Using Soft System Methodology: A Case Study of an Agency in the Ministry of Religious Affairs in Indonesia

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Abstract: One of indicators used to measure the work performance in the office of research, development and training (Balitbangdiklat) in the Ministry of Religious Affairs in Indonesia is the utilization of research results as the policy-making basis by a technical working-unit in the ministry. In fact, until the late 2014 the utilization of research results had not met the target. The non-existence of knowledge sharing system for researchers is predicted to be one of the factors that cause the low quality of the research which in turn leads to the under-using of the research results. This study aims to analyze the knowledge management system model and design its prototype. This study uses soft system methodology approach combined with supporting theories such as Burnett's knowledge audit and the theory of culture organization by Cameron and Quinn. This research resulted in 11 activities in the conceptual model, six functional features and a non-technical mechanism design for the organization in implementing the knowledge management system.

Key words: Knowledge management system, soft system methodology, knowledge audit, OCAI, features, analysis

INTRODUCTION

The Ministry of Religious Affairs has established strategic programsto achieve an effective, efficient and accountable bureaucracy that is able to maintain the availability of professional services. One of the indicators used to measure the achievements of the programs is the increase in the utilization of the research results as the basis of the policy making. The research and development and education and training agency (Balitbangdiklat) is a unit in the Ministry of Religious Affairs that has main task to conduct research. As an agency supporting the achievement of the performance of the Ministry of Religion, Balitbangdiklat has set Performance Indicators Program (IKP) on the strategic plan and the training and development agency 2010-2014. One of the indicators is the increase use of the research and development result by the government as policy making materials (IKP1).

At the end of 2014, a performance evaluation set in Balitbangdiklat strategic plan 2010-2014 towards the achievement of the programhas been conducted. The evaluation results showed that the use of the research and development as a policy-making does not meet the predetermined targets. The comparison between the target and achievement for IKP1 from 2010 until 2014 shows that the achievement of IKP1 did not succeed to achieve the target and was inclined to decrease from year to year.

This shows that there isa problem in the utilization of the research result in Balitbangdiklat. The technical unit (directorate general) at the Ministry of Religious were rarely using the published research results. One of the main reasons is because the research results quality did not meet the expectations of the technical unit. The low quality in the research results is due to the non-existence of the knowledge management systems to support the research sharing process. Therefore, this research questions raised in this study is defined as follows: "What are the features of the knowledge management system to support research sharing process that is suitable for researchers in Balitbangdiklat at the Ministry of Religion?" This study aims to identify features of the knowledge management system in accordance with the needs of the researchers at Balitbangdiklat at the Ministry of religious affairs.

Literature review: Knowledge Management (KM) is defined as a set of activities to discover, capture, share and apply knowledge in a cost effective as to increase the impact of such knowledge to the achievement of the organization. KM process itself can be seen from various angles. According to Nonaka and Takeuchi, knowledge management process was defined as a spiral model of sustainable activity toward the flow of knowledge including socialization, externalization, combination and internalization (Bobadilla *et al.*, 2013). Knowledge Management System (KMS) was also defined as a system

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based on information and communication technology, developed to support the management of knowledge assets in organizations (Robillard and Walker, 2014). Another perspective from Becerra-Fernandez *et al.* (Curty and Zhang, 2013) is that knowledge management system was defined as the integration of technology and mechanisms, designed to support the primary processes of knowledge management. In accordance with previous definitions, knowledge management systems can be classified into 4 systems, namely, knowledge discovery system, knowledge capture systems, knowledge sharing and knowledge application system.

Knowledge audit and knowledge map used to develop an understanding of how knowledge is being used in the organization (Schafer *et al.*, 1999). This audit knowledge activity is performed to analyse and identify types of knowledge that is important for the organization, along with its source.

OCAI is a tool used for diagnosing organizational culture (McCarey *et al.*, 2006). OCAI as a research instrument contains questionnaires which consist of 6 section each of which represents key dimension of organizational culture, namely dominant characteristics, organizational leadership, management of employees, organizational glue, strategic emphases and criteria of success. The assessment will direct the organization culture under study into one of four types of organizational culture described by Cameron and Quin (McCarey *et al.*, 2006) namely hierarchical culture, market culture, clan culture and culture ad hoc bureaucracy.

Soft systems methodology is an approach to resolve issues in a complex situation that is unstructured and normally happen in an organizational setting. It was first developed by checkland and poutler. This approach is carried out based on the holistic analysis and systems thinking (Delone and McLean, 2004) as follows:

Defining the situation considered problematic: The identification of problematic situations which attract attention.

Expressing a problematic situation in the form of rich picture: The purpose of this step is to get creative understanding of a problematic situation.

Choose a concept that may be relevant in the form of root definition: Create root definitions to capture the essence of the relevant system that was tested by analysis CATWOE.

Arrange these concepts into a conceptual model: Forming a conceptual model based root definition described with activity models are required to achieve the transformation.

Comparing the conceptual model to the real world: manage discussions about real-world situations that made possible the emergence of a variety of perspectives that may have been hidden.

Formulate a change from a situation that is the problem being addressed: The formulation of suggestions for corrective action improvement and change in real-world situations.

Implement a process of change: Action on the proposed changes identified as a result of thorough discussion and analysis.

MATERIALS AND METHODS

This study uses a combination of three methods to capture Knowledge Management Systems (KMS) requirements namely Soft System Methodology (SSM), knowledge audit and Organizational Culture Assessment Instrument (OCAI). SSM is used as the methodology for KMS development life-cycle because it is considered fit elicit requirements from the target users (the researchers) and their context (the organization). Researchers are the human component and the key characteristic of a research organization. SSM will be very helpful in capturing the soft problems of culture and people in the organization as the basis to derive KMS requirements. Meanwhile, knowledge audit is used to analyse and visualize the critical areas of knowledge in the organization. As complement, OCAI is used to assess the type of the organizational culture of Balitbangdiklat. The research framework used in this study is derived from the framework of Checkland soft system methodology (Kalakota and Whinston, 1997), Fig. 1 depicts the research framework.

Data was collected through various means namely interviews, questionnaires, observations and documents studies. Interviews were conducted to capture
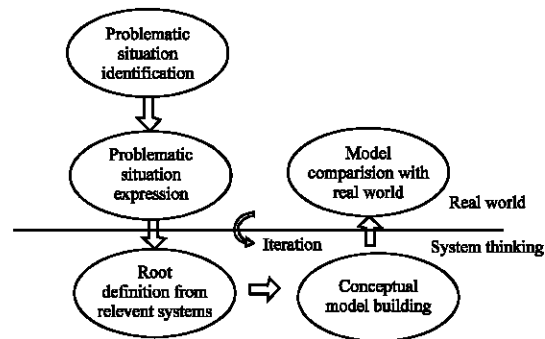

Fig. 1: Research methodology framework

problematic situations in the organization related to knowledge management activities. The subjects of the interview were three echelon II officers and three echelon III officers. Distribution of the questionnaires were conducted in two batches. Questionnaires in the first batch were used to obtain data related to knowledge audit and to evaluate the organizational culture using OCAI instrument. Meanwhile, questionnaires in the second batch were used to validate the identified features. Balitbangdiklat as eschelon 1 unit has 3 centers (eschelon 2 unit) for research and development, namely Puslitbang which are located in Jakarta and 3 local offices (eschelon 3 unit) of research and development, namely Balai Litbang which are located in Jakarta, Semarang and Makasar. Thus, the target respondents were from those 6 units. The target samples for the first batch was 162 people and the target samples for the second batch was 30 people. Aside from the interviews and questionnaires, observations were conducted in order to complete the previously acquired data. The observations focused on examining the interaction among researchers related to knowledge sharing activities, e.g., discussions. Last but not least, documents studies were also conducted to analyse organization's documents that support the design of KMS such as the strategic plan of Balitbangdiklat of the ministry of religious affairs.

In the first batch, from 162 distributed questionnaires, 102 questionnaires were returned and 100 of them were valid. The demographic of the respondent's areas follows: the majority of respondent were 40-44 years old (26%), followed by an age range of 35-39 years (19%). The last two age groups were in the age range of 55-59 (9%) and 60-64 years (9%). As for the educational background, most respondents (61%) had completed master education, followed by bachelor (32%) and doctoral education (7%). There were 76% male and 24% female respondents. Most respondents (researchers) were Peneliti Muda (Junior Researchers), i.e., 36%, followed by 23% of Peneliti Pertama (freshman researcher) 31% Peneliti Madya (Senior Researcher) and 10% Peneliti Utama (Principal Researcher). As for research experience, there were 32% researchers having <5 years researching experience, 31% researchers having 5-10 years researching experience, 18% researchers having 11-20 years researching experience and 19% researchers having >20 years. Most respondents were researching at the Balai Litbang (67%) while the rest were doing their activities at the Puslitbang (23%).

RESULTS AND DISCUSSION

The result of this study obtained from interviews, questionnaires and observations is described as follows

(Table 1). Analysis of organizational culture was conductedusing OCAI instrument by distributing questionnaires. Analysis of OCAI shows that the score of the organization in term of culture is as follows: 29.29 for clan, 20.85 for adhocracy, 23.54 for market and 26.32 for hierarchical. Thus, it can be concluded that the dominant organizational culture at Balitbangdiklat of the Ministry of Religion is clan. In the clan culture, employees consider that the organization has a family-friendly research environment. The important principlesin the clan culture are commitment and tradition; thus it emphasizes on the development of the human resources. The types of leader in a clan culture are facilitator and mentor.

Based on the data gathering and business process identification, we conducted the PQR analysis as shown in Table 2. The result of the CATWOE analysis is shown in Table 3 as follows: CATWOE and PQR analysis are then combined into a single formula to construct the root definition which can be described as follows: a system owned by O and operated by A to do X by Y to customer C in order to achieve Z within the constraints E. Based on that definition, we defined the root definition as follow: knowledge management system owned by the Balitbangdiklat (O) and operated by researchers of Balitbangdiklat (A) to undertake research related knowledge management for both reference and research results that are still scattered and not well documented (X) so that it requires integrated knowledge sharing systems and repository (Y) for researchers and Balitbangdiklat management staff (C) so that they can produce good research product to support decision making at the technical unit (Z) even though there are constraints such as research budget and recruitment moratorium.

The final conceptual model represents the KMS prototype to be built. There are several stages in developing a KMS prototype namely the identification of the conceptual model activities the identification of the KM process and the identification of KMS features as well as the non-technical mechanism design of KMS.

The result of the identification process in knowledge audit is mapped to the KM process to produce KMS features. The identified features are validated by comparing the conceptual model that has been designed which is the prototype with real-world conditions. The real-world conditions are the expectations of researchers regarding with the features in KMS. Validation is done by distributing questionnaires to 30 researchers of Balitbangdiklat in the ministry of religious affairs. Among 30 questionnaires distributed there were 10 questionnaires were returned. The result of the validation process is shown in Table 4.

Table 1: Knowledge audit analysis

Aspect	Analysis result
Useful knowledge	There are 17 knowledge types in Balitbangdiklat. The knowledge needed by researchers is the knowledge of the latest research on religion and society and knowledge of the theory of social and religious life
Knowledge sources	The most widely used sources of knowledge are books, journals, internet, discussion among researchers, formal education, training and experience (tacit)
Knowledge type	Audit questionnaire showed that 82% knowledge has been documented (explicit) and the remaining 18% has not been documented (tacit)
Knowledge repository	The result of the audit shows that the knowledge is still stored in the form of physical documents such as books and journals
Knowledge sharing process institution	The 64% of knowledge resides in the researchers and institution (the knowledge is shared) 21% of knowledge reside in the only 9% of knowledge resides in the researcher only as for the frequency of knowledge sharing: 37% respondents said that they occasionally share knowledge 26% respondents said that they frequently share knowledge 20% respondents said that they rarely share knowledge 11% respondents said that they always share knowledge

Table 2: PQR analysis

Variables	Description
X	Perform knowledge management for research, to manage both the references and research results that are still scattered
Y	Integrated knowledge-sharing system and knowledge repository
Z	Producing good research product to support decision making by the technical units

Table 3: CATWOE analysis

Variables	CATWOE analysis
Costumers	Researchers and Management Staff of Balitbangdiklat
Actors	Researchers of Balibangdiklat
Transformation	Knowledge related to research is still scattered and not yet documented >Integrated knowledge sharing system and knowledge repository
Worldview	Good research product to support decision making at the technical unit
Owner	Balitbangdiklat
Environment constraint	Research budget, moratorium of researcher's recruitment

Table 4: Validation result

Features	Fit the expectation	Unfit the expectation
Knowledge directory	V	-
Forum	V	-
Blog	V	-
Wiki	V	V
Document manager	V	-
E-training	V	-

CONCLUSION

Based on the analysis and discussion, we derive the following conclusions: using knowledge audit there are 17 knowledge types used to support research process identified in Balitbangdiklat of ministry of religion affairs. The knowledge is in explicit form and still scattered.

Using OCAI analysis, it is found that Balitbangdiklat of Ministry of Religion Affairs has a clan organizational culture. The KM process mapping with organization knowledge produces six KMS features namely knowledge directory, forum, blog, wiki, document manager and e-Training. For future study, an investigation on how the non-technical aspect of KMS implementation, i.e., the people could support and champion the KMS Implementation.

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