Evaluation model of knowledge management systems implementation using factor analysis and regression analysis at the corporation

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Abstract. The ability to manage knowledge is becoming increasingly important in today's knowledge economy, especially for companies. In order to obtain the effectiveness of the process of sharing knowledge within the company, it is necessary to evaluate the implementation of the knowledge management system that is currently running. The purpose of knowledge management is to change the paradigm of existing knowledge in employees into knowledge that can explicitly become corporate or organizational knowledge, so that the company can be used to improve employee performance because there are sufficiently managed references or knowledge or experience or expertise that has been collected and disseminated by previous employee. The data obtained were then analyzed using the factor analysis method, and the results that five factors can affect employee performance through knowledge management systems implementation, these are the factors: human resources ability, effective information, knowledge management systems, Quality for Users, accurate information transfer, and adequate IT Infrastructure. Furthermore, from these five factors by using linear regression analysis a mathematical model can be built which can be simulated to illustrate the results of the evaluation.

1. Introduction

Knowledge sharing is an important process for all of the organization to get the effectiveness of knowledge management process. According [1], innovation in the development of knowledge in an organization requires the transfer of knowledge and experience from each individual to other individuals in the organization's community. Knowledge management has been carried out research on various aspects by several researchers who define the existence of knowledge in a collection of insights, understandings, experiences and practical knowledge of each individual in an organization [2]. For knowledge sharing theory, it is based on the concept of knowledge development with the SECI model (Socialization, Externalization, Combination, and Internalization), where socialization is the process of transferring knowledge from one person to another in the form of communication knowledge through conversation that arises from sharing activities in creation knowledge based on direct experience. While for externalization is the process of transformation from tacit knowledge to explicit forms [3]. With externalization, tacit knowledge existing within the individual issued and formulated into other media that can be easily learned by other individuals. Combination is a process of merging existing explicit knowledge in order to create new knowledge that is not limited among individuals in an organization. Internalization is the process of transformation of the shape Explicit knowledge to Tacit forms. In the learning process which is then followed by continuous training and carried out gradually, new knowledge will form in the individual. This process is actually what we
want to achieve in the dissemination of sustainable science. [4].

Knowledge management systems is used by employer to share knowledge and experience that they have to another employer [5]. In order to knowledge sharing process that already exist in organisation can work effectively, it needs an activity evaluation by examining how existing knowledge management processes through Knowledge Management System (KMS) in order to transform tacit knowledge into explicit knowledge so that the knowledge possessed by each individual can be transferred to another individual through the process of knowledge sharing and knowledge presentation [6], and through effective knowledge management is expected to improve the performance of its employees and the knowledge that can be properly maintained so as to provide benefits to the company [7]. KMS become the main means of execution of processes that existing the Knowledge Management itself, the analysis is needed to find out the extent to which existing processes affect the performance of KMS. The results of analysis of existing evaluation is expected to be a material that will have an impact on the future development of the organization [8].

2. Methodology
Analysis method that can be used for evaluate KMS at the organization is by using Factor Analysis. These are the step of analysis factor for analyze the data in order to become a model to evaluate KMS by determine new factors and indicators to choose what the best factors and indicators that can affect the employer performance through KMS: Determine what factors will be used to evaluate the KMS related to the knowledge management. These factors are: People Perspective, Process Perspective, and Technology Perspective; Determine the indicators that can be used to evaluate KMS implementation in order to get analysis result for assess the KMS implementation; Testing the data questionnaire that has been given to the respondents by using analysis factor in order to can get new factors and indicators that can be affect the employer performance; Making a conclusion what is the factors that can affect the employer performance through KMS implementation to improve employer performance and management of knowledge at the organization.

3. Result
After we test the data by using analysis factor method, we can know what is the factor and indicator that can be affect the employer performance. These are the new factors and indicators:

First new factor, consist of:
1. KMC7 = KMS provides opportunities for employees to share knowledge and experience.
2. KMC6 = Knowledge is shared as Standard and operating procedure, working instruction, customer handling, and tenant services through KMS helps employees to minimize the problems.
3. SEC12 = KMS creates an interaction in the process of sharing knowledge and gain new knowledge
4. SEC14 = KMS facilitate employees in finding needed information related to handling tenant complaints.
5. SEC11 = KMS create a process of sharing knowledge within the organization.

Second new factor, consist of:
1. SEC13 = The use of KMS facilitate employees in acquiring and developing knowledge.
2. SEC110 = The process of "learning by doing" that is shared through KMS help create new knowledge.

Third new factor, consist of the following indicators:
1. KMI1 = Organizational culture is able to create more value for the company through the implementation/use of KMS
2. SEC16 = KMS is a media sharing appropriate information for employees.

Fourth new factor, consist of:
1. KMI6 = Distribution of information can occur quickly and accurately through the sharing of knowledge in KMS.
Fifth new factor, consisting of the following indicators:

1. **KMI7** = The physical environment includes the KMS as supporting the process of knowledge sharing applications that can be used by employee.
2. **SECI5** = Data and information delivered via KMS easy to understand.
3. **SECI7** = KMS make employees able to create an innovation and develop new ideas.

After analyze the data by using analysis factor method, conducting a factor analysis of the data obtained, we get some new factors and indicators to improve employer performance and management of knowledge at the organization. Those new factors and indicators will be used to evaluate KMS implementation at the organization. This is the chart that can be represent the new factors and indicators.

![Diagram of indicators and factors](image)

**Figure 1.** Indicators and Factors to improve employer performance
Simulation model that can be used to evaluate KMS implementation at the organization shown five new factors. That five factors can affect employer performance through KMS implementation, these are the factors: Human Resources Ability \( (X_1) \), Effective Information \( (X_2) \), KMS Quality for User \( (X_3) \), Accurate Information Transfer \( (X_4) \), and Adequate IT Infrastructure \( (X_5) \). Please see the model to evaluate KMS implementation below:

\[
Y = 8.289 - 0.004X_1 + 0.110X_2 + 0.015X_3 + 0.019X_4 + 0.180X_5
\]

With the minimum and maximum values:

\[-2.867 \leq X_1 \leq 1.935\]
\[-2.552 \leq X_2 \leq 1.965\]
\[-2.385 \leq X_3 \leq 2.511\]
\[-2.928 \leq X_4 \leq 2.213\]
\[-2.989 \leq X_5 \leq 2.029\]

4. Discussion

Increasing awareness of the user in utilizing KMS as media sharing through the provision of equal opportunities for employees in terms of sharing knowledge and experience-experience that. There are five factors that can be affect employer performance. Based on the results of data processing, the most influential factor is human resources ability, people role which is employer role at company is important aspect, if employer doesn’t know how to share their knowledge and experience by using media sharing such as KMS, so it’s impossible for company to improve their employer performance. The quality of information that is said to be effective as a whole or an Effective Information with emphasis on the data and information in the form of knowledge that is constantly developed and enriched and experience – the experience of the employees who can assist in decrease problems that may occurred in the company as tenant complaints. KMS quality for user including data and information that always update can influence employer to join sharing their knowledge and experience to another employer. Because of KMS quality, user can get more info and knowledge to create a new
knowledge for corporate innovation. Beside that, accurate information transfer is important, it’s because of the real time information distribution can make sharing process more effective and efficient. Adequate information technology infrastructure is an important point in the implementation of KMS, without the support of infrastructure, the implementation of KMS not be run only by relying on the human resources aspect alone. It required a supporting application that can support the sharing of knowledge and experiences in order to create innovation and development of new ideas in order to create new knowledge.

5. Conclusion
Based on the research that has been conducted, the factors-factors that can affect the performance of employees and knowledge management at the organization is as follows:

1. Factors that may influence or affect employer performance by implement KMS at the organization are human resources ability, this factor is important because without human resources role, KMS can’t be effectively. If user can’t operate KMS include how to find and create a knowledge, so it’s impossible to share knowledge without human resources skill.
2. The second factor is effective information, the effective information including knowledge and experience from employer will create an innovation.
3. Third factor is KMS quality for user, especially how to make customer intimacy by minimize tenant complain, such as: solution development, management, and relationship management; empowerment close to customer contact and high skills at boundary of the organization; customer equity measures like life time value and share of client managing outcomes; and Emphasize complete solutions.
4. The fourth factor is information transfer, knowledge sharing process must be integrated which is without people, process, and technology aspects, knowledge sharing process can’t be effectively.
5. The last factor is adequate IT infrastructure, technology is really important to support knowledge sharing process at company in order to can create new knowledge and innovation and also knowledge development can develop continuously.

From the previous explanation, KMS Evaluation Model in the organization can be conclude with:

\[ Y = 8.289 - 0.004X_1 + 0.110X_2 + 0.015X_3 + 0.019X_4 + 0.180X_5 \]

With the minimum and maximum values:

\[-2.867 \leq X_1 \leq 1.935\]
\[-2.552 \leq X_2 \leq 1.965\]
\[-2.385 \leq X_3 \leq 2.511\]
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