Evaluation of the maturity level and critical success factors in the implementation of knowledge management in the national private construction service company in Indonesia

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Abstract. At present, knowledge management (KM) is considered an appropriate competitive tool for success in a knowledge-based economy, many organizations have deployed and implemented KM to improve performance. The purpose of this paper is to provide guidelines and picture for organizations to evaluate the level of KM maturity of national private construction service companies in Indonesia and ways to improve them so that organizational performance improves. The first step in achieving the KM goal is the recognition of the current status of the KM capability itself in the company gained through the KM maturity model. Next, how to improve it so that the company's performance is better by reviewing alignment with identifying critical success factors (CSF). Seven organizational or functional criteria are used as key elements towards an effective KM approach, namely policies / strategies, HR planning and processes, training and improvement of human performance, procedure methods and documentation processes, technical solutions (IT), approaches to capture / use tacit knowledge, and KM culture. Based on the results of the study, it was concluded that the level of KM maturity was in the second level, namely the development stage. Policies / strategies are the main categories to be improved.

1. Introduction
The construction industry is one of the largest industries in the world, which must face various aspects of challenges and problems to maintain its significant growth. With increasing demand in the construction sector, there are challenges in the areas of performance, profits, productivity, sustainability, labor and total industry growth.

Ghani in his research on knowledge management (KM) explains that in the midst of the high competition in construction service companies in planning and striving for the advancement of their business, each company uses a variety of ways to achieve its business goals [1]. To increase knowledge from construction service companies, one way companies can do is to use a KM.

At present, according to Bagheri, Eslami, Mirfakhraee, and Yarjanli, KM is considered an appropriate competitive tool for success in a knowledge-based economy such that many organizations have deployed and implemented KM to improve performance such as construction service companies [2]. KM is basically about getting the right knowledge to the right person at the right time.

In line with the 6th edition of Project Management Book of Knowledge (PMBOK) which includes the Manage Project Knowledge sub-chapter that is not in the 5th edition, which is the process of using...
existing knowledge and creating new knowledge to achieve project goals and contribute to organizational learning and the new technique is Knowledge Management (KM).

KM maturity level is quite low in construction companies in Indonesia [3]. Maturity models explain the development of entities over time, and these entities can consist of the desired topic, whether human beings, or organizational, technology, processes, etc. [4]. The purpose of this paper is to provide guidelines for organizations to evaluate the level of KM maturity which further identify the CSF of KM that must be developed to improve organizational performance in national private construction service companies in Indonesia.

2. Literature review

2.1. Organizational performance
Organizational performance according to Cho and Dansereau, refers to the company's performance compared to its goals and objectives [5]. In addition, Tomal and Jones define organizational performance as the actual results or outputs of an organization that are measured against the intended output of the organization [6].

2.2. Knowledge management
Knowledge Management (KM) is about making the right available knowledge to the right people. This is about ensuring that an organization can learn, be able to take and use its knowledge assets in the current application as needed.

The experts divide KM into 3 stages of the process such as the research of Garcias, namely the creation of knowledge, the sharing of knowledge and the application of knowledge [7].

IAEA (International Atomic Energy Agency), defines knowledge management or KM as an integrated and systematic approach to identifying, acquiring, transforming, developing, disseminating, using, sharing, and preserving knowledge, which is relevant to achieving the specified goals. The IAEA helps organizations identify, by their own judgment, the level of maturity of their own KM against a set of predetermined criteria through: policies / strategies, HR planning and processes, training and improvement of human performance, procedure methods & documentation processes, technical solutions (IT), approaches to capturing / using tacit knowledge, and KM culture. The author uses this reference for this research as key elements towards an effective approach to KM. This self-assessment method has also been applied and proven to be applicable to a variety of organizations.

The Maturity Level of KM based on APQC provides a road map for switching from immature and inconsistent knowledge management activities to a mature and disciplined approach that is aligned with strategic business imperatives. Maturity level based on this APQC is used by the author as a reference for KM maturity level in this study. Figure 1 illustrates five levels of maturity.

![Figure 1. KM maturity level.](image-url)
2.3. CSF
So many definitions of the key success factors or critical success factors (CSF). One of the most frequently cited definitions, Rockart (1979) uses ideas from Daniel (1961) and Anthony et al. (1972) in defining CSF as "a limited number of areas where results, if satisfactory, will ensure the success of competitive performance for organizations".

Organizational leaders are always looking for the reasons and main factors of success in devising a knowledge management system and to execute it in their organizations [8].

2.4. Relationship of KM and CSF
Many organizations are looking for ways to determine the appropriate KM system and manage their knowledge successfully. For a successful Knowledge Management implementation, it is important to identify obstacles or critical factors that influence the success of the KM process [9].

3. Methodology
Seven organizational or functional criteria are used as key elements towards an effective KM approach with five maturity levels of KM. In this study, questionnaires were personally distributed to 7 national construction service companies in Indonesia. This study adopted questionnaires from IAEA for KM and Valmohammadi for CSF [10,11]. However, out of 105 questionnaires which were distributed to the targeted respondents, only 68 were returned and usable for analysis. The questionnaire was designed on a 0 (not utilized at all), 1 (to a little extent) through 5 (to a very great extent) likert scale for KM and a 1 (not important at all) through 5 (very important) likert scale for CSF.

Statistical analysis is used to process the data that has been obtained. The stages include homogeneity test, validity test, reliability test. Furthermore, using Excel to get the level of KM maturity and for CSF is processed using the EFA method. The results of the analysis of the level of KM maturity are processed by GAP analysis using excel which is then linked to the results of analysis from CSF which are then reviewed to be developed into a strategy to increase the KM maturity level.

![Figure 2. Research methodology.](image-url)
4. Results and discussion

4.1. KM maturity level
The level of KM maturity that the company has achieved in the current conditions on all indicators lies at the level between 2 (development) and 3 (standardization). This is still far lower than the level of KM maturity under the expected conditions (preferably), which is above 4 (optimization). The level of KM maturity achieved by the company in the highest current condition is in the IT technical solution indicator, which is 2.593, it is also still far lower than the level of KM maturity in the expected condition is 4.407. While the lowest is in the HR planning and process, which is 2.237 and the expected condition is 4.313.

![Figure 3. KM maturity level.](image)

4.2. Critical Success Factor (CSF)
The most dominant indicator is training and improvement of human performance with a factor loading value of 0.917, then followed by an IT technical solution indicator with a factor loading value of 0.909, then the third is an indicator approach to capture / use tacit knowledge with a factor loading value of 0.901, then the fourth namely KM culture / workforce culture that supports KM with a factor loading value of 0.896, and so on until the seventh dominant indicator, namely planning and human resource (HR) processes. Whereas CSF in the biggest gap category is having a shared vision which is supported by all workers.

| Indicator                                      | Loading Factor | Ranking |
|------------------------------------------------|----------------|---------|
| policies / strategies                          | 0.892          | 5       |
| HR planning and processes                      | 0.849          | 7       |
| training and improvement of human performance  | 0.917          | 1       |
| procedure methods & documentation processes    | 0.882          | 6       |
| technical solutions (IT)                       | 0.909          | 2       |
| approaches to capturing / using tacit knowledge| 0.901          | 3       |
| KM culture                                     | 0.896          | 4       |
4.3. Improvisation level of maturity KM

Gap analysis is performed with the aim of providing the largest gap value between current conditions and conditions should be at the level of KM maturity. The biggest gap is in policy / strategy indicators. While the largest component gap is the KM information policy component. Therefore it can be concluded that this component is the most prioritized for improvisation based on gap analysis to raise the level of KM maturity in improving organizational performance.

Once it is obtained from the gap analysis that the indicator / category of policy / strategy has the highest gap value, an assessment of the component will be conducted in terms of CSF or key success factors. It was found that the highest value in the policy / strategy component was "having a shared vision that is supported by all workers" with a value of 4.368. After conducting a literature study on the improvised actions of policies or strategies in this study, expert validation and recommendations for improvement are the most important of the biggest gaps in this research:

- Develop KM strategies / policies by reviewing the organization's vision and mission and related business and strategy plans.
- Conduct induction events for all employees or staff to explain the importance of KM and the systems available in the company.
- Provide information about the vision and mission of the organization's KM to all employees to make them aware of it, understand its importance, and be part of it.

5. Conclusion

After a series of KM maturity levels was analyzed using seven categories, it was found that the maturity level was at level 2 (development) while what was expected was level 4 (optimization) so it needed to be improved.

After analyzing CSF, the most dominant key category was training on the use of KM systems and tools. Whereas CSF in the biggest gap category is having a shared vision which is supported by all workers. The recommendations for improvement in this research in order to increase the level of KM maturity to improve organizational performance in this research that are more effective is to develop KM strategies / policies by reviewing the organization's vision and mission and related business and strategy plans, conduct induction events for all staff to explain the importance of KM and the systems available in the company, as well as provide information about the vision and mission of the organization's KM to all staff to make them aware of it, understand its importance, and be part of it.

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