

Original Research Article

Knowledge Management Maturity Level of Steel Fabricator Companies in Indonesia

ABSTRACT

Improving the maturity of knowledge management implementation is considered a promising approach that can help companies to gain a competitive advantage and improve company competitiveness. This study was conducted to evaluate the achievement of the maturity level of knowledge management implementation in steel fabricator companies in Indonesia using the methodology published by the Asian Productivity Organization in 2020. The evaluation was carried out on 7 steel fabricator companies in Indonesia with a non- random judgmental quota sampling method by distributing questionnaires. Based on the results of the analysis, it is found that the maturity level of the application of knowledge management for steel fabricators in Indonesia is at the expansion level, where knowledge management has been implemented but has not been carried out thoroughly in the organization. The analysis also found that the categories that need to be improved are "Learning and Innovation", "Knowledge Processes" and "People"

Keywords: Knowledge Management, Knowledge Management Maturity, Steel Fabricator.

1. INTRODUCTION

Infrastructure development in Indonesia has been a government priority since 2014, with the acceleration of national strategic projects (PSN) through various regulations, such as Presidential Regulation Number 3 of 2016 and adjustments in 2018 and 2021. However, alongside globalization and the ASEAN-China free trade, and internal challenges such as democracy, decentralization, poverty, and inequality, the construction sector faces increasing complexity.

According to the Indonesia Iron & Steel Industry Association The metal industry, specifically steel, experienced a growth of 7.9% in the first quarter of 2022, supported by a surplus in iron and steel trade and increased exports. However, steel imports remain significant, accounting for around 20% of total consumption. To support the growth of the national steel industry, the government has implemented policies favoring the use of domestic products. Challenges from competitors must be overcome with the increasingly complex and competitive construction industry caused by globalization, free trade and deregulation. [1]

The competitiveness indicators of a construction company include the ability to win contracts, retain customers, complete projects on time, meet technical specifications, and the capability to handle issues and risks. [2] Factors that can influence the success of a construction company in contract acquisition include quality, time, cost, and innovation. [3]

According to Michael E. Porter (1980), competitiveness is the ability of a company to create, produce and sell products or services at a better price and quality than its competitors in the same market. [9] According to Scott, Mark and Joseph (2008), competitiveness is the ability of a company to create added value for customers by producing products or services that are better, cheaper or more innovative than its competitors. [2]

Based on data from a fabricator company in Indonesia, the average contract acquisition ratio over a period of 5 years is 2.9% from the total quotation. According to [4], knowledge management can help companies gain competitive advantages and improve business performance for increasing competitiveness. Application of knowledge management can increase the competitiveness of construction companies by increasing efficiency, productivity and quality. [5]

Research [6] on knowledge management was carried out at a steel company in India, the result shown that the impact of increasing implementing knowledge management on the private steel company have significantly increasing production growth and performance growth.

Therefore this research aims to explore the implementation of knowledge management (KM) in steel fabricator companies in Indonesia as a strategy to enhance competitiveness. This study contributes by examining the level of KM implementation in steel fabricator companies and formulating development strategies to enhance competitiveness in the increasingly competitive global market.

2. LITERATURE REVIEW

2.1 Steel Fabrication Business Process

Steel material is a superior material, especially if the parameters of strength, stiffness and ductility are the benchmarks. [7] The advantage of steel material compared to concrete or wood material is that the material is made by a factory, which certainly has good production control, so that the quality provided can be maintained.

Fabrication Process. This process aims to change raw steel material into material that can be constructed according to the fabrication work drawings. Steel structure fabrication is generally carried out in workshops, especially for fairly large scale projects, the fabrication stages for steel structures are from marking raw material, cutting, drilling, welding and finishing. [8]

2.2 Knowledge Management

According to King, W.R. (2009), the basis of knowledge management is the inability of humans to fully describe the record of brain potential and organizations cannot fully utilize the knowledge they have. [10] The knowledge management cycle is how organizations can generate, maintain and organize the right set of knowledge strategically to create value. [11]

One way to achieve project goals and contribute to organizational learning requires a knowledge management process. The main benefit of this knowledge management is that previous organizational knowledge is utilized to produce or improve project outcomes and the knowledge created by the project is available to support organizational operations and future projects. [12] According to [13], knowledge management can reduce costs from project to project that have been carried out by implementing a systematic process to capture, structure, manage and disseminate knowledge throughout the organization.

2.3 Knowledge Management Maturity Model

Knowledge Management Maturity Model (KMMM) is a framework used to assess and measure the level of maturity or maturity of an organization in managing knowledge. This model helps organizations understand the extent to which their systems, processes, and culture support knowledge management initiatives. By evaluating the maturity level, organizations can identify their areas of strength and weakness when it comes to knowledge management, as well as plan improvement steps.

A maturity model is a method or framework for measuring the maturity level and providing a blueprint for the development of an entity within a company. The maturity level describes the fundamental attributes of criteria that must be met at each maturity level, thereby assisting the company in determining strategic steps in the process of development and optimization. [14]

According to the research by Septari in 2020 on a State-Owned Construction Company, after analyzing the maturity level using seven organizational or functional factors/categories, it was found that the KM maturity level is at level 3, meaning "used to some extent" (IAEA). [15] However, there is a difference in the KM maturity level between the current condition and the expected condition, with the cultural factor of KM having the largest gap value.

Materials and method

The APO method is in line with Indonesian culture, values, and business practices by taking into account and respecting cultural diversity and facilitating collaboration between individuals and organizations.

The APO framework method focuses on 4 main elements, namely, the vision and mission of the organization, accelerators, knowledge processes and the results of knowledge management on KM initiative.[16]

The APO KM Assessment Tool categories and indicator based on the 4 major elements of the framework, as follow :

- KM Leadership

To evaluates the organization's leadership capability to respond to the challenges of a knowledge-based of the growth of organization. This category consist of 6 indicators to evaluate.

- Process

To assess how knowledge is used in managing, implementing and improving the organization's performance. This category consist of 6 indicators to evaluate.

- People

To assess the organization's ability to create and sustain learning culture, knowledge sharing, collaboration and knowledge worker. This category consist of 6 indicators to evaluate.

- Technology

To reviews the organization ability to develop and deliver knowledge-based solution, collaborative tools, and content management systems. This category consist of 6 indicators to evaluate.

- Knowledge Processes

To assess the organization ability to identify, create, store, share and apply knowledge systemcatically. This category consist of 6 indicators to evaluate.

- Learning and Innovation

To assess the organization's ability to encourage, support and strengthen learning and innovation process. This category consist of 6 indicators to evaluate.

- KM Outcomes

To measure the organization's ability to enhance value to customers through new and improved products and service, increase of productivity, quality, profitability, and sustain growth through the effective use of resources. This category consist of 6 indicators to evaluate.

The instrumen used to assess the maturity level of KM is a questionnaire of consist of 42 variables covering the seven elements. Each of the question can be rate from 1 (doing poorly) to 5 (doing very well) as describe in table 1.

Table 1. Rating Level and Secription

Level Description	Scale Rating
Doing very poorly	1
Doing poorly	2

Doing adequately	3
Doing well	4
Doing very well	5

The result of APO KM Maturity assessment provide an understanding of the level of KM readiness in an organization.

3. RESULTS AND DISCUSSION

3.1 Data Collection

Qualitative data analysis conducted by the 56 questionnaires distributed to 7 steel fabricator companies in Indonesiawhich located on Java Island and have production greater than 1.000 tons in a month, 37 questionnaires were returned, resulting in a response rate of 66.07%. The feedback is resume and categorized by their education, experience on work and position as shown on table 2.

Table2. Resume Responden

Company	Responden	Education			Experience on years			Posistion		
		Diploma	Bachelor	Magister	< 10	10-20	>20	Staff	Supervisor	Management Level
A	10									
B	6									
C	6									
D	6	7	33	3	18	14	11	18	10	15
E	6									
F	4									
G	5									

3.2 Data Analysis

3.2.1 Homogeneity Test

Testing on 3 groups will use the Kruskal- Wallis H Test, with the hypothesis used inhomogeneity testing as follows:

- Ho: There is no difference in the understanding of respondents with different education, length of work, and position.
- Ha: There is a difference in the understanding of respondents with different education, length of work, and position.

Table3. Resume Homogeneity Test

Category	Variables	Test Method	Description
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Education	Level of Knowledge Management Implementation	Kruskal-Wallis	1 indicator issued
Experience	Level of Knowledge Management Implementation	Kruskal-Wallis	2 indicator issued
Position	Level of Knowledge Management Implementation	Kruskal-Wallis	5 indicator issued

Based on the summary of the homogeneity test results in Table 3, the indicators to be excluded in this study are 5 indicators

3.2.2 Validity Test

To get the value of r table, the calculation of df is carried out, namely (n-2), in this study there were n = 43, so that df = 41 was obtained. The table is searched at of 0.05. It was found that the value of r table was 0.3008. It can be concluded that out of a total of 42 variables, there is no calculated r value \leq r table of 0.3008.

3.2.3 Reliability Test

Table4. Reliability Test

Variables	Reliability Coefficient	Criteria	Description
Level of Knowledge Management Implementation	0.755	0.6	Reliable

Based on the calculation results displayed in table 4, it is known that the reliability coefficient is above the Cronbach's Alpha value for the level of application of knowledge management so that it can be asked that the variable is reliable or consistent in measuring.

3.2.4 Analysis of Knowledge Management Implementation Level

After passing the stages of validation, reliability, and homogeneity testing, the data will then be calculated in terms of quantity and grouped into each rating scale. The average values for each variable will be sought. The processed

data results are presented using a spider-web chart, allowing the values of each component to be visible.[10]



Figure 1. KM Assessment Radar Chart

According to figure 1, the highest category is “Processes” and the lowest category is “learning and innovation” with a value of 3.59. The highest value of indicators is in the processes category, where “the organization periodically evaluates and improves work processes to improve performance, improve products and services in line with business trends”. The lowest value of indicators is in the Learning and Innovation category, where “individuals are given incentives to cooperate and share information”.

3.3 Findings and Discussion

The maturity level of the application of knowledge management in steel fabricator companies based on analysis obtained a value of 128.90, which is the level at the “expansion” level. Expansion level where knowledge management has been implemented but has not been fully applied to the system, so it is necessary to expand policies and increase human resources in carrying out the knowledge management process. [17]

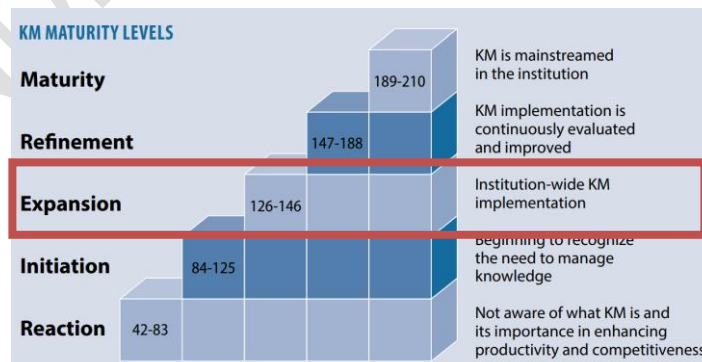


Figure 2. KM Maturity Level (APO, 2020)

According to research by Ade (2020) and Zain (2019) on private and state-owned construction service business entities (BUMN) in Indonesia using the 2016 IAEA indicators, the level of maturity of private knowledge management is at level 3 "to some extent" and BUMN at level 2, namely "a little much". [15] [18] According to IAEA (2016), the main focus at level 2 is that in the development stage, the strategy for knowledge management must be closely connected to the company's business strategy and goals and must identify business opportunities to implement knowledge sharing and knowledge transfer approaches. [19] While the main focus at level 3 is to manage knowledge management strategies, processes and approaches so that they can be standardized. Standardization will be achieved by integrating best practices from knowledge management approaches and processes that are already in use and improving the results with best practices to fill practice gaps.

The highest value in this study lies in the "process" categories with a value of 3.83, with a gap value of 1.17. According to APO (2020), process is how knowledge is managed, applied and developed as the key to the organization's work process by always evaluating and developing in the work process to get better results. [16] One of the indicators with the highest score, namely "The organization periodically evaluates and improves work processes to obtain improved performance, improved products and services in line with business trends".

The lowest value in the study lies in the learning and innovation categories with a value of 3.59, with a gap value of 1.41. According to APO (2020), learning and innovation is the organization's ability to encourage, support and strengthen learning and innovation with a systematic knowledge process. [17] Based on research (Dash & Rath, 2021) states that the increase in the amount of expenditure made by the *Steel Authority of India Limited* (SAIL) on development and research is in line with positive resources and increasing revenue. [6]

One of the low indicators is, namely "Individuals are incentivized to cooperate and share information", according to APO (2020) management needs to reward learning and innovation by providing incentives to shared knowledge. According to (Stajkovic & Luthans, 2001) there are several types of incentives including monetary incentives, recognition and feedback. [20] Research states that monetary incentives and recognition have an effect on improving performance, while input has no effect on improving performance.

4. CONCLUSION

After series of analyses of the level of KM implementation using tools from the Asian Productivity Organization in 2020, it was found that the maturity level of knowledge management implementation was at level 3, namely expansion or at level 3. The indicator that has the largest gap value is "Learning and Innovation", so it is the first priority to improve.

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