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The Relationship Between Knowledge Management, Dynamic Capability and Project Success in Indonesian Construction Industry

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Abstract
This research examines the impact of knowledge management (KM) and dynamic capabilities on project success in the Indonesian construction industry, with a focus on the role of innovation processes and digital capabilities. Using a quantitative survey of employees in construction companies, the study finds that knowledge management, dynamic capabilities, and innovation processes positively influence project success. The innovation process mediates the relationship between both dynamic capabilities and project success, and knowledge management and project success, while digital capabilities do not have a mediating role. The study concludes that construction companies should invest in knowledge management, develop dynamic capabilities, and foster innovation to enhance project success, and implement digital capabilities strategically within the innovation process.

Keywords: Dynamic Capability, Knowledge Management, Digital Capabilities, Project Success, Construction Industry

Introduction

Knowledge is a strategic asset crucial for competitive advantage [1]. Knowledge management (KM) involves managing information, collecting knowledge from various sources, transforming it into strategies, and preserving it [2]. An integrated approach to handling organizational data is essential [3]. Competitive advantage stems from an organization's ability to manage and utilize stored information [4]. KM is vital for overcoming challenges in complex projects [5], and project failures often result from poor KM [6]. The Project Management Body of Knowledge emphasizes the link between project management and KM. Dynamic capabilities require organizations to adapt and expand knowledge continuously [7]. Effective KM is crucial for organizational success. In construction, performance is evaluated through cost, quality, and time [8]. Future competitiveness requires leveraging intangible assets. KM positively impacts performance [9]. Maximizing human capital and fostering a learning culture are crucial [10]. Leadership support and technological collaboration further optimize KM [11, 12, 13].

Business managers strive to use knowledge as an asset to create value [12]. Effective KM capabilities are essential for generating and reusing knowledge [13]. It's important to develop KM capabilities to drive

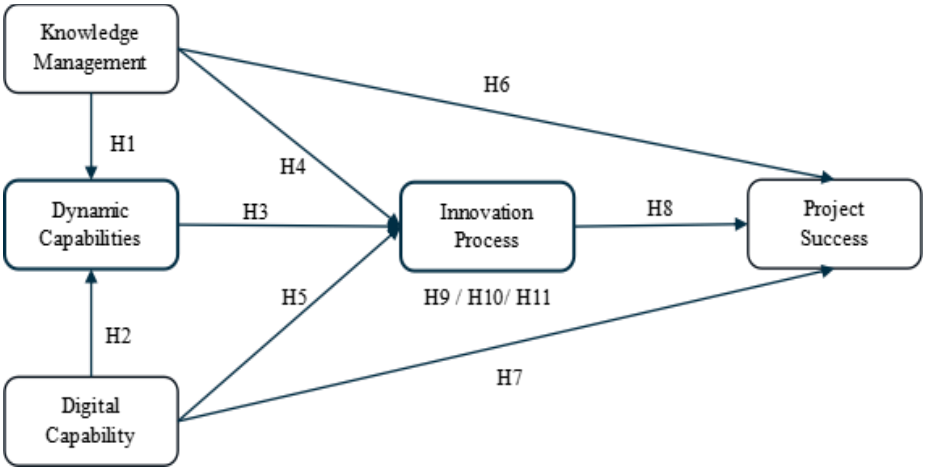
innovation and win market competition. Rapid technological changes pressure companies to adapt by enhancing digital capabilities. Traditional resource-based perspectives lack mechanisms to transform resources into competitive advantage. Improving dynamic capabilities is key to project success [14]. Previous studies confirm KM and dynamic capabilities affect project success [15]. However, few studies investigate the relationship between KM, dynamic capabilities, digital capabilities, innovation processes, and project success. This study aims to explore these relationships and how companies can improve project success through KM and dynamic capabilities. In Indonesia, KM is implemented to improve employee and company performance, but its impact on construction companies is not well understood. This research seeks to clarify the relationship between KM, dynamic capabilities, and project success.

Method

This research adopts the Post-positivism paradigm which aims to verify existing theories or refine existing theories related to existing variables. Previously, the literature has shown the relationship between knowledge management, dynamic capabilities, and project success, but research in the context of companies in Indonesia is still limited. Therefore, this study seeks to complement the existing theory by considering the conditions that occur in construction companies in Indonesia. This research aims to explain the phenomena that occur by using explanatory and causal approaches, and using quantitative deductive methods by testing a number of previously formulated hypotheses. The research was conducted with minimal interference, focusing on correlational or natural studies, without much interference from the researcher. The unit of analysis is individuals or employees in construction companies in Indonesia, with the use of a representative sample.

The sampling method used is Quota Sampling, which ensures each sample has an equal chance of being selected. The population of this study consists of leading construction companies in Indonesia and the sample obtained was 206 respondents. Data collection was carried out by survey method using a questionnaire with a Likert scale unit linkert scale (1-6). Where value 1 represents strongly disagree and value 6 represents strongly agree. The data were then analyzed through reliability analysis, confirmatory factor analysis, reliability test, validity, variability, and collinearity test before hypothesis analysis was conducted by analyzing the path coed and p-value generated from the original data. The data analysis stage also included psychometric evaluation through reliability, convergent, and discriminant validity, as well as the use of SEM (structural equation modeling) methods to test the relationship between variables in a model.

Figure 1: Theoretical Framework



Result and Discussion

The respondent data shows a male dominance of 84.47%, indicating a gender imbalance in participation. The majority of respondents were in the age range of 31-35 years, reaching 40.29%, while only 1.94% were aged 21-25 years. The education level of respondents is dominated by those who have completed their undergraduate education, reaching 69.42%, indicating a high level of education in the sample. Interestingly, the majority of respondents have more than 10 years of work experience, reaching 40.29%, indicating a tendency for respondents who have been in the industry for a long period of time.

Reliability Test and Validity Test

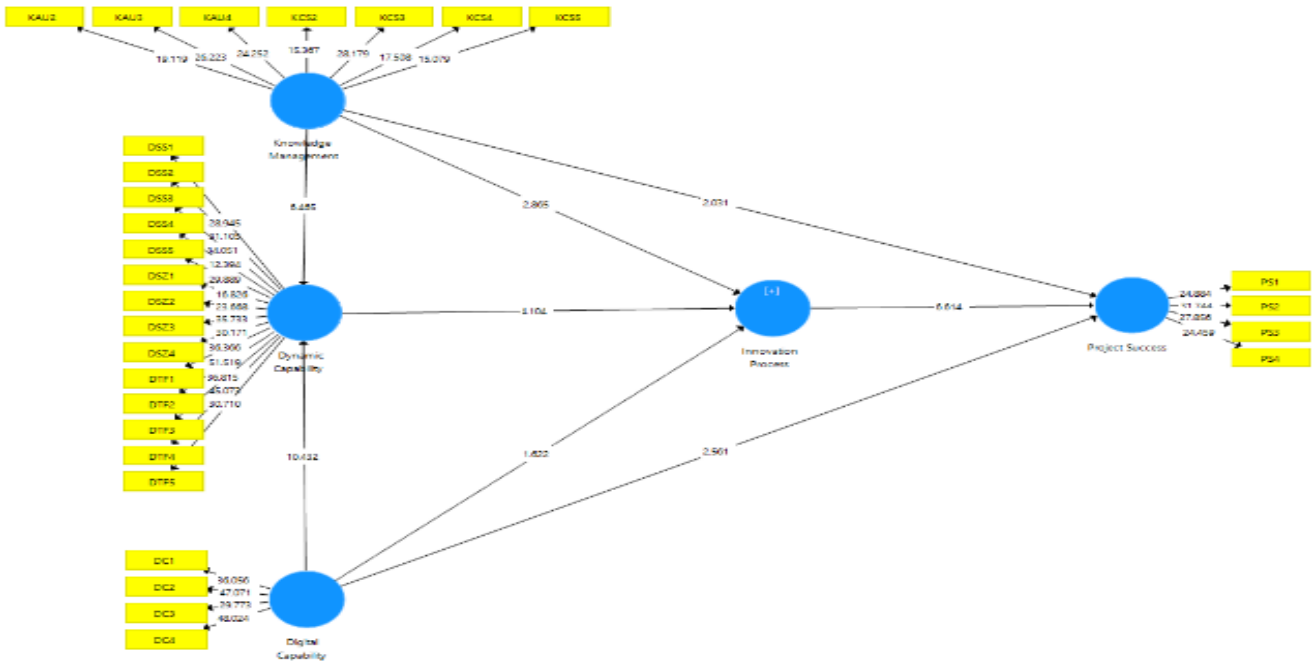
The value of Cronbach's alpha (CA), rho_A, Composite Reliability, and Average Variance Extracted (AVE). The value that is said to be reliable is that it has a threshold of rho_A ≥ 0.7, Composite Reliability ≥ 0.8, AVE ≥ 0.50, and Chonbach's Alpha ≥ 0.80. Discriminant validity is measured using the Fornell-Larcker criterion. The table below shows the results using the Fornell-Larcker criteria. The top value is the value of the AVE Root, the results below show that all variables have a value greater than the correlation, so it can be concluded that discriminant validity has been fulfilled.

Variability Test and Collinearity Test

The structural model is measured through bootstrapping tests, and significance levels. Structural model explains R2, which is 77.86% in dynamic capability, 43.75% in innovation process, and 57.67% in project success. The R2 criteria consists of three classifications, namely: the value of 0.67 as substantial, 0.33 moderate and 0.19 and weak. From the table below, it shows that the structural model is still in the moderate standard or the variability test is still very strong in describing the variables. Data collinearity is measured through the VIF value of the inner model where a value below 5 will show that the data is not multicollinear or the data can describe a clear relationship between variables. All constructs is <5 which states that the data has met the collinearity test.

Hypothesis Test

Figure 2: Structural Model



This study proposes 11 hypotheses to be tested with 8 direct effects hypotheses. After analyzing using the PLS-SEM application. It is found that H1, namely knowledge management, has a positive effect on dynamic capability. It can be seen that knowledge management has a positive impact on dynamic capability because β = 0.3570, t = 6.4651 and p Values 0.000 <0.05.

The proposed hypothesis H2 is that digital capability has a positive influence on dynamic capability. This can be seen from the value of β = 0. 5892, t = 10.4318 and p Values 0.0000 <0.05. Proposed H3, namely dynamic capability has a positive influence on the Innovation Process, which can be seen from the results of β = 0.4817, t = 4.1039 and p Values 0.0000 <0.05. Furthermore, H4, namely knowledge management, has a positive influence on the innovation process (β = 0.3686, t = 2.8651 and p Values 0.0043 <0.05). However, H5, namely digital capability, has a negative influence on the innovation process because the P Values are more than 0.05 (β = -0.1822, t = 1.6217 and p Values 0.1055> 0.05). H6, namely knowledge management has a positive influence with project success (β = 0.1801, t = 2.0312 and p Values 0.0428 <0.05). H7, namely digital capability, has a positive influence on project success (β = 0.1908, t = 2.5606 and p Values 0.0107 <0.05). And the last direct effect is H8, namely the innovation process has a positive influence on project success (β = 0.5016, t = 6.6141 and p Values 0.0000 <0.05).

From the results of this study, it can be concluded that knowledge management, digital capability, dynamic capability, and innovation process have a significant influence on project success. However, Digital Capability has an insignificant negative effect on the Innovation Process.

Table 1: Direct Effects PLS SEM Results

Variable	Original Sample (O)	Sample Mean (M)	Standard Deviation (STDEV)	T Statistics (|O/STDEV|)	P Values
Digital Capability → Dynamic Capability	0.5892	0.5882	0.0565	10.4318	0.0000
Digital Capability → Innovation Process	-0.1822	-0.1838	0.1124	1.6217	0.1055
Digital Capability → Project Success	0.1908	0.1921	0.0745	2.5606	0.0107
Dynamic Capability → Innovation Process	0.4817	0.4862	0.1174	4.1039	0.0000
Innovation Process → Project Success	0.5016	0.4895	0.0758	6.6141	0.0000
Knowledge Management → Dynamic Capability	0.3570	0.3593	0.0552	6.4651	0.0000
Knowledge Management → Innovation Process	0.3686	0.3628	0.1286	2.8651	0.0043
Knowledge Management → Project Success	0.1801	0.1862	0.0887	2.0312	0.0428

Mediation Analysis

Three other hypotheses are testing the mediating effect of innovation process in the relationship between knowledge management and project success, dynamic capabilities and project success, and digital capabilities and project success. It was found that Hypothesis H9 that Innovation process mediates Knowledge management with project success and this study found that innovation projects have a positive indirect or mediating effect between knowledge management and project success (β = 0.1849, t = 2.8507, and p Values 0.0045 <0.05). While H10, namely innovation process mediates dynamic capability with project success and we also find that innovation process has an indirect positive effect or mediates between dynamic capability and project success (β = 0.2416, t = 3.1805, and p Values 0.016 <0.05). However, H11, namely innovation process mediates Digital Capability with project success and we found that innovation projects do not have an indirect positive effect or mediate between digital capability and project success (β = -0.0914, t = 1.5879, and p Values 0.01129> 0.05). From the results of this study, it can be concluded that the innovation process can mediate knowledge management with project success and dynamic capabilities with project success. However, the innovation process does not have a positive effect in mediating between digital capabilities and project success.

Table 2: Mediation Effects PLS SEM Results

Variable	Original Sample (O)	Sample Mean (M)	Standard Deviation (STDEV)	T Statistics (|O/STDEV|)	P Values
Knowledge Management → Innovation Process → Project Success	0.1849	0.1758	0.0648	2.8507	0.0045
Dynamic Capability → Innovation Process → Project Success	0.2416	0.2401	0.0760	3.1805	0.0016
Digital Capability → Innovation Process → Project Success	-0.0914	-0.0905	0.0576	2.9752	0.1129

Discussion

The results of this study support the hypothesis that H1 Knowledge management has a positive effect on dynamic capability. These results are in accordance with research conducted by Tsekhovoy et al. [16] that Knowledge Management in this case operational capabilities and mechanisms must be in place to ensure that they can be reconfigured appropriately when business circumstances change and are also in line with Mikalef & Pateli [17] that dynamic capabilities take a relatively stable, predictable, and analytical form, and rely heavily on existing knowledge in enabling reconfiguration of resources and routines. For hypothesis H2, namely Digital Capability has a positive influence on Dynamic Capability. This result is in accordance with the research of Songkajorn, Aujirapongpan, Jiraphanumes, & Pattanasing [18] that Dynamic Capabilities has a positive impact on Digital Transformation. For the next hypothesis H3, namely the relationship between Digital Capability which has a positive influence on the Innovation Process. These results are in accordance with research conducted by Gupta & Gupta [19] that dynamic capabilities

and innovation processes provide a positive relationship. Furthermore, hypothesis H4 Knowledge Management has a positive influence on the Innovation Process.

This result is in accordance with research from Afqarina & Dihan [20] that knowledge management has a major impact in transforming knowledge into innovation capabilities or innovation processes and Wang et al. [20] which states that effective management leads to organizational innovation. However, H5, namely the relationship between Digital Capability and Innovation Process has a negative relationship. The results are not in accordance with the research of Boeker, Hermanussen, & Scheffler [21] which underlines the key role of technology adoption in accelerating innovation and is not in accordance with the findings of Mikalef & Pateli [17] which state that the establishment of Digital Platform Capability (DPC) not only improves organizational capabilities but also allows flexible deployment of resources in a dynamic business environment which ultimately improves the innovation process. In H6 our research findings are Knowledge Management and Project Succes have a positive relationship. These results are in accordance with research Yang & Lin [22] that Knowledge Management has a role in project and work success. Knowledge Management improves project performance through team interaction, collaboration and decision making. In addition, research by Favoretto & de Carvalho also concluded that good Knowledge Management can improve project efficiency, quality and products produced [23].

Furthermore, H7 Digital Capability has a positive influence on Project Success. This result is in accordance with the research of Liu, Li, & Liu [24] which concluded that digital capabilities can support project performance and research from Marhraoui [25] that Digitalization can increase project efficiency and enable data-based decision making and automate repetitive processes. H8, namely the Innovation Process has a positive influence on Project Success. This result is in accordance with research from Galjanić, Marović, & Hanak [26] which suggests that the project performance dimension introduces a model that brings together a framework for assessing the success of construction projects, combining various project performance metrics with the innovation process. Furthermore, H9, namely the Innovation process mediates Knowledge management with project success and we find that Innovation projects have an indirect or mediating positive effect between knowledge management and project success. These results are in accordance with research from [27] which underlines the role of knowledge management in generating innovative ideas that can form the basis of project success. Sahibzada et al. [28] who suggest that innovation integrated with effective knowledge management creates an environment where organizations can leverage collective intelligence to overcome project challenges and achieve success.

Other results of this study from H10, namely Innovation process mediates Dynamic Capability with project success and we found that Innovation projects have an indirect or mediating positive effect between Dynamic Capability and project success. This result is in accordance with research from Songkajorn et al. [29] that the innovation process plays a key role in linking innovative steps with dynamic capability building. As well as Corboș et al. who highlight that the mediating role of the innovation process not only builds a bridge between innovation and dynamic capability, but also opens up opportunities for project success [30]. Project success, as measured by Too & Weaver can be achieved through the effective integration of the innovation process, dynamic capabilities, and the achievement of project goals and the last is hypothesis H11 about Innovation process mediates Digital Capability with project success and we found that Innovation projects do not have an indirect or mediating positive effect between Digital Capability and project success [31]. This result is inconsistent with research from Badewi [32] who found that project success depends not only on effective knowledge management, but also on the extent to which digital capabilities are applied in the innovative process. The integrated implementation of technology

with knowledge management creates an ecosystem where organizations can leverage collective knowledge to overcome project barriers and achieve success.

Conclusion

This research makes a significant contribution to the literature related to knowledge management, digital capabilities, dynamic capabilities, innovation processes, and project success. The research findings confirm the importance of knowledge management, dynamic capabilities, and innovation processes in improving project success in Construction Companies. The results show that the innovation process can be a mediator between dynamic capabilities and project success, as well as between knowledge management and project success. However, digital capabilities cannot act as a mediator of project success. The managerial implications of this study include contributions to the scientific literature, recommendations for improving the innovation process to support dynamic capabilities and knowledge management, and the importance of improving the quality of knowledge management, innovation, and digital capabilities to improve company performance in facing construction project challenges

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