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State-Owned Enterprises (SOEs) in Construction Services in Indonesia

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Abstract
Background. The construction industry plays a strategic role in Indonesia's economic development, particularly through State-Owned Enterprises (SOEs) that are mandated to deliver national infrastructure projects. Despite their importance, Indonesian construction SOEs continue to face persistent challenges, including low productivity, cost overruns, schedule delays, bureaucratic complexity, and limited organizational agility. Lean Management has been widely recognized as a practical approach to improving efficiency and reducing waste; however, its application in the construction sector has predominantly focused on project-level operations rather than organizational-level readiness.
Aims. This study aims to identify the key factors influencing the successful implementation of Lean Management in Indonesian construction SOEs and to assess how these factors interact in determining organizational readiness.
Methods. A quantitative research design was employed, with a structured survey administered to 246–250 respondents from six major Indonesian construction SOEs. The study adopts the Lean Construction Maturity Model (LCMM), consisting of 11 main attributes: lean leadership, customer focus, organizational culture, competency, process and tools, change management, work environment, business results, and learning and competency development. Data were analyzed using linear regression to examine relationships among influencing factors and their contribution to Lean Management readiness.
Result. The findings are expected to yield a Lean Management Implementation Readiness Index that provides a comprehensive measure of organizational preparedness and highlights critical interdependencies among factors.
Conclusion. The study contributes theoretically by extending lean management research to the organizational level within construction SOEs and practically by offering a diagnostic tool to support strategic decision-making, policy formulation, and performance improvement in Indonesia's construction sector.

Keywords: Lean Management, Organizational Readiness, Construction SOEs, Lean Readiness Index, Indonesia

INTRODUCTION

The construction services industry is one of the largest business sectors in the world. Over time, it has continued to grow dynamically, exerting a significant influence on the country's economy. This is because the construction services industry comprises interconnected supply chains of construction resources, with many parties and workers involved in their implementation. Therefore, construction activities will involve many works, including infrastructure, buildings, public and private facilities, and other physical structures.

The number of activities in the construction industry makes construction services one of the most complex industries. The construction industry is characterized as an industry with low productivity, cost overruns and schedule delays, frequent errors, a shortage of skilled labor, and low safety, occupational health, and environmental awareness. The construction industry has a uniqueness that distinguishes it from other industries, including its fragmented nature, each project being different from others, the specific physical properties of the product, and the number of parties involved. The characteristics of this unit in the construction field pose a complex problem. One of the common challenges in the construction industry is creating an effective sequence of work activities to achieve maximum productivity, cost-effectiveness, timely completion, minimal maintenance and repair work, and low labor errors. Indonesia itself has construction companies. The vast potential of Indonesia's construction market has not been fully realized by construction SOEs (State-Owned Enterprises). According to the Ministry of Public Works (2013), state-owned construction companies can only control 10% of the existing market share, 20% controlled by national private construction companies, and 70% by foreign private construction companies operating in Indonesia, such as Mitsubishi, they do Corporation, and China Road and Bridge Corporation. So far, lean construction has been implemented primarily at the operational level of the project. The implementation of lean management at the company level will greatly facilitate fast, appropriate decision-making to support operational activities.

The large number of activities in the construction industry makes construction services one of the most complex industries. Low productivity, cost overruns, and schedule delays characterize the construction industry.

Frequent errors, shortage of skilled labor, and low levels of safety, occupational health, and environmental awareness. So far, lean management has been applied primarily at the project operational level. Implementing lean management at the company level will help make faster, more appropriate decisions to support operational activities.

The following research questions must be answered:

1. What factors/variables influence the application of lean management principles in state-owned construction company organizations in Indonesia?
2. How are the influencing factors/variables interconnected in ensuring the success of implementing lean management in state-owned construction companies in Indonesia?

The following are the internal objectives of this research:

Identify the Factors That Have a Significant Influence on the Successful Implementation of Lean Management in Indonesian construction companies.

It is hoped that this research will provide an overview of the factors influencing the implementation of Lean Management in Indonesia. For the government, this must be the basis for improving state-owned construction companies in Indonesia.

Lean Management Implementation Readiness Index And Influential Factors Which Interact With Each Other.

The results of this research are expected to produce an existing Readiness Index for implementing Lean Management and measuring it to determine the interaction between these factors in the successful implementation of Lean Management in SOE Construction

Companies. The following are the External objectives of this research:

Such as:

Government:

1. Have a tool to measure readiness to implement Lean Management as a tool to improve the performance and productivity of state-owned construction companies in Indonesia
2. Obtain efficiency and productivity indicators as a basis for improving economic development in the Construction sector in Indonesian SOEs

3. Motivate project management actors to improve their performance for the smooth running of development in Indonesia
4. Obtain input from researchers to improve public policies in Indonesian countries towards better Indonesian development policies

Construction management

1. Obtain more detailed and accurate information to photograph a company's carrying capacity in implementing Lean Management in state-owned construction companies in Indonesia
2. Obtain information that can be read as a prospective business opportunity
3. Gain knowledge to measure readiness to implement Lean Management in state-owned construction companies in Indonesia

Public

1. Choose more open business opportunities and employment opportunities
2. Have a higher enthusiasm for improving each other's performance
3. Work will be more effective, efficient, and productive

Business

1. Business opportunities will become more open
2. Can easily measure and improve our performance

Scope Of Work

This research will be conducted with a focus on SOE Construction management activities in Indonesia

For this reason, data will be collected on the implementation of Lean Management in the form of a survey of Management Team of state-owned construction companies in Indonesia. If possible, explore obstacles and possible solutions to increase the implementation of Lean management in state-owned construction companies in Indonesia.

Thus, it is necessary to explore the obstacles and causes of obstacles to implementing Lean Management in state-owned construction companies in Indonesia.

Limitation

The following are the limitations of the research we will conduct:

1. The research was only carried out in Indonesia and only state-owned construction companies in Indonesia
2. The in-depth mapping research on the implementation of Lean Management which was carried out only applies to state-owned construction companies in Indonesia
3. Research to deepen the obstacles and causes of obstacles to implementing Lean Management in state-owned construction companies in Indonesia

Research on Lean Management has developed extensively since its introduction by Womack and Jones (1996), with a primary focus on improving efficiency, eliminating waste, and continuous improvement. In the context of the construction industry, the Lean Construction approach is widely applied to improve project performance through methods such as *Value Stream Mapping*, *Last Planner System*, *Just-In-Time*, and *Kaizen*.

However, the state-of-the-art Lean research in the construction sector shows some key characteristics:

1. Dominance of the project-level approachMost Lean Construction studies focus on:
   a. Project operational efficiency
   b. Cost and time control
   c. Increase in labor productivity. This approach is still partial and has not addressed the organization's overall readiness.

2. The limited Lean study at the organizational level. Research assessing organizational readiness for Lean implementation remains relatively limited, especially in the construction industry, which has complex, fragmented, and project-based characteristics.

3. Not yet comprehensive readiness measurement studies have used the Lean index or maturity model, but:
   a. Many are generic
   b. Not yet fully adjusting to the context of the construction organization
   c. Rarely studies the interaction between readiness factors quantitatively
   d. Lack of Studies in the Context of Indonesian Construction SOEs. Lean Management Research on State-Owned Enterprises (SOEs) in Indonesia is still limited, even though construction SOEs have:

   a. High bureaucratic complexity

b. Strategic role in national projects
c. Organizational productivity and agility challenges

Thus, the state of the art shows that although Lean Management has been extensively researched, its application still does not address organizational readiness holistically, especially in construction SOEs in Indonesia.

LITERATURE REVIEW

On this occasion, the Literature discussion below concerns several things, such as Lean Management, Lean Management Index Readiness, Indonesia SOE Construction, and Implementation of Lean Management at Indonesian SOE Construction.

Lean Management

Lean management has emerged as an essential approach in modern organizational management, emphasizing efficiency, waste reduction, and continuous improvement. This literature review examines various aspects of lean management, including its principles, applications across industries, and impact on organizational performance.

Lean Management Principles

Lean management is rooted in several key principles aimed at maximizing value and minimizing waste. (Womack and Jones, 1996) outlined five principles of lean thinking: identifying value, mapping value streams, creating flow, establishing traction, and pursuing perfection. These principles form the basic framework for implementing lean practices in organizations, emphasizing a systematic approach to simplify operations and increase productivity.

Implementation of Lean Management

The application of lean management extends to various sectors, demonstrating its versatility and effectiveness. For example, in the manufacturing industry, lean techniques such as Just-In-Time (JIT) inventory management and Total Productive Maintenance (TPM) have been widely adopted to reduce waste and increase production efficiency (Liker, 2004). Likewise, in the service industry, lean principles have been applied to simplify processes, increase customer satisfaction, and reduce costs (Radnor & Bucci, 2007).

Benefits and Challenges

Organizations that adopt lean management often experience a variety of benefits, including improved quality, increased productivity, and increased employee engagement (Shah & Ward, 2007). However, the journey towards lean transformation is not without challenges. Resistance to change, cultural barriers, and the complexity of implementing lean across various organizational functions can pose significant obstacles (Sohal & Egglestone, 1994).

Lean Management and Organizational Performance

Research shows a positive correlation between lean management practices and organizational performance metrics. Research has shown that lean organizations tend to achieve higher operational efficiency, greater customer satisfaction, and better financial results than non-lean organizations (Nordin et al., 2012). In conclusion, lean management represents a powerful approach to increasing organizational effectiveness through waste reduction, continuous improvement, and employee empowerment. Despite implementation challenges, the benefits of lean practices have been well documented across a variety of industries. Future research should continue to explore the evolving application of lean management and its impact on organizational dynamics in increasingly competitive global markets. This literature review provides a comprehensive overview of lean management, integrating key principles, applications, benefits, challenges, and its impact on organizational performance, drawing on current research and scientific perspectives.

Organizational Readiness To Implement Lean Management

An organization's readiness to implement Lean Management (LM) is an important determinant of the success and sustainability of lean initiatives. This literature review explores the various dimensions of organizational readiness, the factors that influence them, assessment methodologies, and their impact on the implementation of Lean Management.

Dimensions of Organizational Readiness

Organizational readiness refers to an organization's readiness and willingness to adopt and implement lean principles and practices effectively. According to Weiner (Weiner, 2009), organizational readiness includes three main dimensions: motivational readiness (desire and commitment to change), cognitive readiness (understanding of lean concepts and principles), and resource readiness (availability of necessary resources, skills and abilities).

Factors Influencing Organizational Readiness

Several factors influence an organization's readiness to implement Lean Management. Leadership support and commitment play an important role in cultivating a culture that embraces lean principles (Davies & Kochhar, 2002). Employee involvement and engagement are also important factors because they directly affect the acceptance and implementation of lean practices at all levels of the organization (Poksinska et al., 2010). Additionally, organizational culture, prior experience with process improvement initiatives, and the presence of clear communication channels can facilitate or hinder readiness (Shah & Ward, 2007).

Assessment Methodology

Assessing organizational readiness involves using various methodologies to measure an organization's readiness to implement lean. Surveys, interviews, and structured assessments are commonly used tools to assess motivational, cognitive, and resource-readiness factors (Gijo & Antony, 2013). The Lean Management Index (LMI) is a specific tool designed to measure an organization's readiness across multiple dimensions, providing a quantitative assessment of its ability to support and sustain lean practices (Bhasin, 2012).

Impact on the Implementation of Lean Management

Organizational readiness significantly influences the success of Lean Management initiatives. Research shows that organizations with higher levels of readiness are more likely to achieve successful outcomes such as increased operational efficiency, reduced waste, and increased customer satisfaction (Radnor & Bucci, 2007). Conversely, inadequate preparedness can lead to implementation challenges, resistance to change, and limited sustainability of lean practices (Sohal & Egglestone, 1994). In conclusion, organizational readiness is an important starting point for the successful implementation of Lean Management. It includes motivational, cognitive, and resource dimensions that collectively determine an organization's ability to adopt and sustain lean practices effectively. Leadership commitment, employee involvement, organizational culture, and previous experience are key factors that influence readiness. Assessing readiness with a tool like the Lean Management Index can provide valuable insights for organizations planning a lean transformation. Future research should focus on refining assessment methodologies and exploring strategies to improve organizational readiness for lean implementation. This literature review synthesizes current research on organizational readiness for Lean Management implementation,

highlighting key dimensions, influencing factors, assessment methodologies, and their impact on implementation success.

State-Owned Enterprises (Soes) In Indonesia's Construction Sector

State-Owned Enterprises (SOEs) play an important role in Indonesia's construction industry, contributing to infrastructure development and economic growth. This literature review explores various aspects of SOEs in the Indonesian construction sector, including their role, challenges, governance issues, and impact on national development.

The Role of SOEs in the Indonesian Construction Sector

SOEs in the Indonesian construction sector are the leading players involved in infrastructure development projects such as roads, bridges, dams and public buildings. They play an important role in implementing the government's development agenda, contributing to job creation, regional development, and improving public services (Darma, 2018). SOEs often receive government contracts and funding, underscoring their strategic role in national infrastructure projects (Sobirin & Mutia, 2019).

Challenges Faced by SOEs in the Construction Industry

Despite their important role, state-owned companies in the Indonesian construction sector face several challenges. This includes bureaucratic inefficiency, lack of transparency, corruption risk, budget constraints, and delays in project implementation (Utama & Tjahjono, 2020). Problems related to project management, technology adoption, and workforce capacity also pose significant obstacles (Mahendra & Prabowo, 2017).

Governance and Regulatory Framework

The SOEs governance framework in Indonesia's construction sector is regulated by laws that aim to ensure accountability, transparency, and efficiency. However, there are still challenges in implementing these regulations effectively, giving rise to governance problems such as conflicts of interest, political interference, and inadequate supervision (Lumban Gaol & Prasetyo, 2016). Strengthening corporate governance practices and regulatory enforcement is critical to improving SOE performance and mitigating risks.

Impact on National Development

SOEs' activities in the construction sector have a significant impact on Indonesia's national development goals. They contribute to economic growth by stimulating investment, creating jobs, and improving infrastructure quality (Suhartono & Resosudarmo, 2018). Infrastructure development facilitated by SOEs increases connectivity, facilitates trade, and supports socio-economic development across regions (Suwandi & Situmorang, 2021). In conclusion, SOEs play an important role in Indonesia's construction sector, driving infrastructure development and supporting national development goals. Despite their contributions, challenges in governance, operational efficiency, and project implementation persist. Addressing these challenges through regulatory reform, capacity building, and increased transparency is critical to maximizing the impact of SOEs on Indonesia's economic and social development. This literature review provides insight into the role, challenges, governance framework and impact of State-Owned Enterprises (SOE) in the construction sector in Indonesia, as well as highlighting their contribution to infrastructure development and national development goals.

Implementation Of Lean Management At Indonesian State-Owned Enterprises (SOEs) In Construction

Lean Management (LM) has gained recognition as a systematic approach to improving efficiency and productivity across industries, including construction. This literature review examines the application of Lean Management, particularly in Indonesian State-Owned Enterprises (SOEs) operating in the construction sector, focusing on strategies, challenges, outcomes, and implications.

The Importance of Lean Management in Construction

Lean Management principles, which initially originated in the manufacturing context, emphasize waste reduction, continuous improvement, and value creation. In construction, where efficiency and project schedules are critical, LM offers a methodology to simplify processes, optimize resource utilization, and improve project execution (Abdul-Rahman & Berawi, 2011).

Strategy for Implementing Lean Management in Indonesian SOEs

Implementing Lean Management in Indonesian SOEs involves several strategies adapted to the unique challenges and context of the construction sector. These strategies include:

1. Training and Capacity Development: Providing training programs to increase employee understanding of Lean principles and methodology (Arditi & Nawakorawit, 2018).
2. Value Stream Mapping (VSM): Identifying and analyzing value streams to eliminate non-value-added activities and optimize workflows (Dwiyanto & Gaspersz, 2016).
3. Kaizen Events: Organizing Kaizen events to facilitate continuous improvement and problem solving within the project team (Utama & Indrajit, 2019).
4. Integration with Information Technology: Utilizing IT solutions for data-based decision making and real-time monitoring of project progress (Triyono & A Prize, 2020).

Challenges of Implementing Lean Management in Indonesian Construction SOEs

Despite its potential benefits, implementing Lean Management in Indonesian SOEs faces significant challenges. This includes resistance to change, cultural barriers, lack of top management support, bureaucratic complexity, and inadequate resources (Kusumawardani et al., 2021). Overcoming these challenges requires a holistic approach involving organizational culture change, leadership commitment, and stakeholder engagement.

Results and Implications of Implementing Lean Management

Research shows that the successful implementation of Lean Management in Indonesian SOEs can provide real results, such as increasing project efficiency, cost savings, improving quality, and increasing customer satisfaction (Pratama & Wahyudi, 2017). These results contribute to the competitiveness and sustainability of SOE in the construction sector as a whole, thereby supporting national infrastructure development goals (Sugiyanto & Muhardi, 2020).

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Results and Implications of Implementing Lean Management

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METHODS

This research methodology is about measuring the factors that influence the implementation of Lean Management and assessing the readiness to implement Lean Management in State-Owned Enterprises (SOE) in the Construction Sector

1. Research Design

This research uses a quantitative approach to comprehensively assess the readiness of State-Owned Enterprises (SOEs) in the construction sector to implement Lean Management (LM). This research also developed a quantitative method to capture a holistic view of the interactions among influencing factors and organizational readiness in implementing Lean Management in state-owned construction companies in Indonesia.

2. Sampling Strategy

It was reported that there were 6 state-owned companies in the construction sector, including PT. Wijaya Karya, PT. Hutama Karya, PT. Waskita Karya, PT. Adhi Karya, PT. Nindya Karya, and PT. Pembangunan Perumahan.

Sample Frame: This research targets the Management Team of construction companies in state-owned enterprises in Indonesia, i.e :

a. Division Head (each company has Divisions around 5-6) × 6 companies) = 6 X 6 = 36 people
b. Section Managers (each Division has around 3 Section Managers x 6 company) = 3 x 6 x 6 = 108 People
c. Division Staff (each section in Division represented by at least two staff) = 2 x 6 x 6 = 72 People; And
d. Project Management at Project Site (minimum 5 Project Managers of ongoing projects for each company) = 5 x 6 = 30 people.

So the total number of people to be surveyed is at least 246/250 respondents.

3. Data Collection Methods

Quantitative Data Collection:

Survey Questionnaire: Develop a questionnaire model based on a validated scale and framework to assess the level of SOE readiness to implement LM. The survey will also assess factors such as commitment, employee engagement, resource availability and technology readiness.

Data Analysis

Type of Data Analysis:

The research will be analyzed using a Quantitative Analysis approach—the Analysis of survey responses using Linear Regression between influencing factors based on the Structural Model. The Structural Model is a model in which the main factors mutually influence one another. For example, Leadership is taken at the Lean Management Readiness measurement point. In Leadership, Sub Questions are created that serve as the criteria for effective Leadership. Between the questions and/or Main Factors, their relationship and influence will be measured.

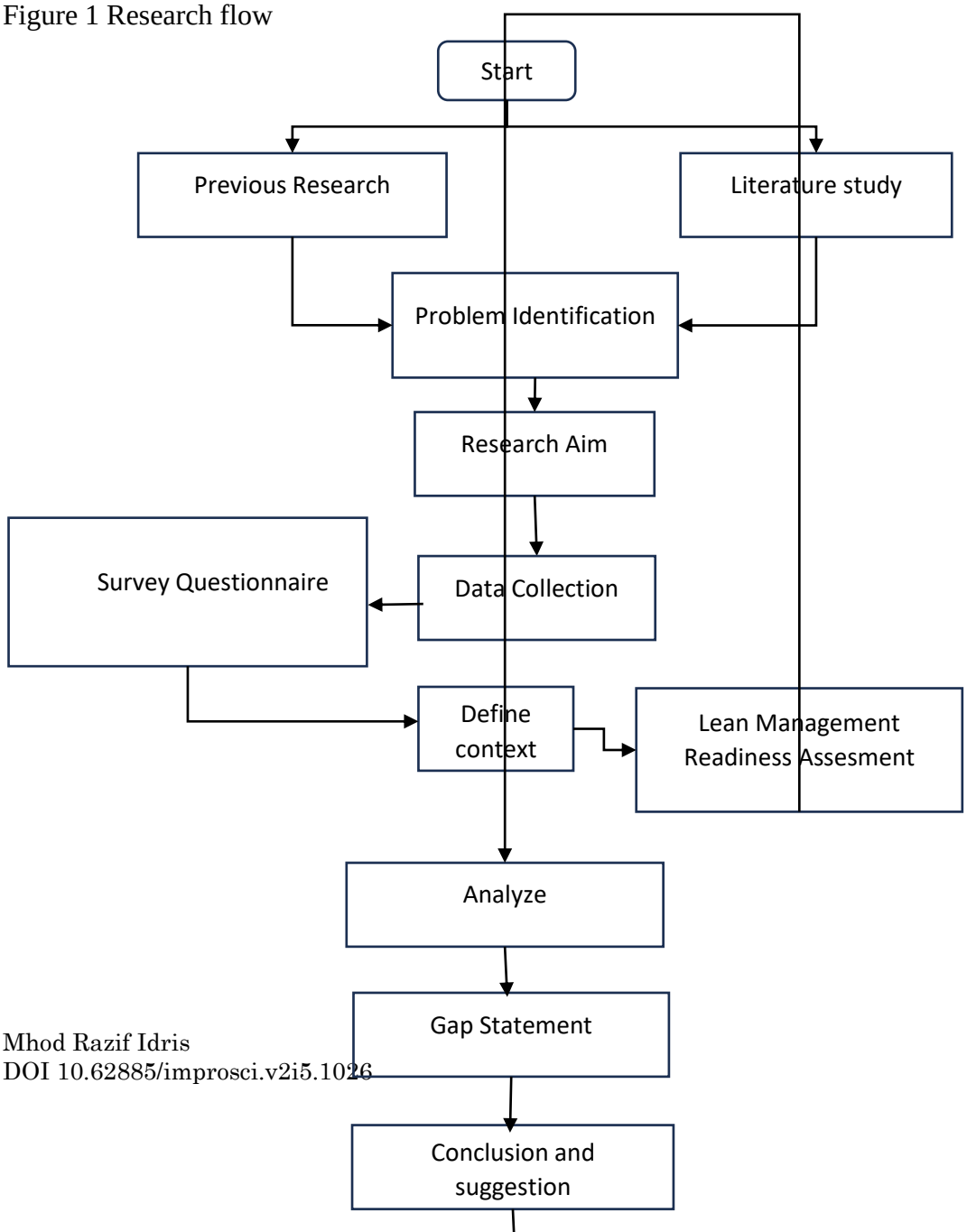
Stages of the Data Analysis

The following are the stages of preparing questions and collecting data and analyzing data:

1. Determining a Lean Management Readiness Measurement Model
2. Determine the Main Factors of the Measurement Model based on the selected Reference
3. Create questions that support the Main Factor criteria
4. After the survey has been carried out, a linear regression analysis is carried out between the questions and/or between the main factors.
5. Analysis of the Relationship of all questions and Main Factors.

RESEARCH FLOWCHART

Figure 1 Research flow



RESULTS

Preparing for Data Collection

In collecting this data, first prepare a list of questions that will be made in the form of questions with assessed values. Or what we call structured model questions. But first, follow these steps:

1. Determine the Lean Management Readiness Measurement Model. After being discussed in the Literature Review Chapter, it was discussed that the author chose the theoretical basis for implementing the Lean Management and Readiness Measurement Model (LCMM) which consists of 11 main attributes. (Nesensohn et al., 2014). These things are as follows: (1) Lean leadership, (2) Focus on customers, (3) Way of thinking, (4) Culture & behavior, (5) Competency, (6) Supporting improvement, (7) Process & tools, (8) Change, (9) Work environment, (10) Business results, (11) Learning and competency development.
2. Determine the Main Factors of the Measurement Model based on the selected Reference. Based on this model, there are 11 criteria that become the main factors of the measurement model. If the model is depicted, it will be depicted as in the following image.

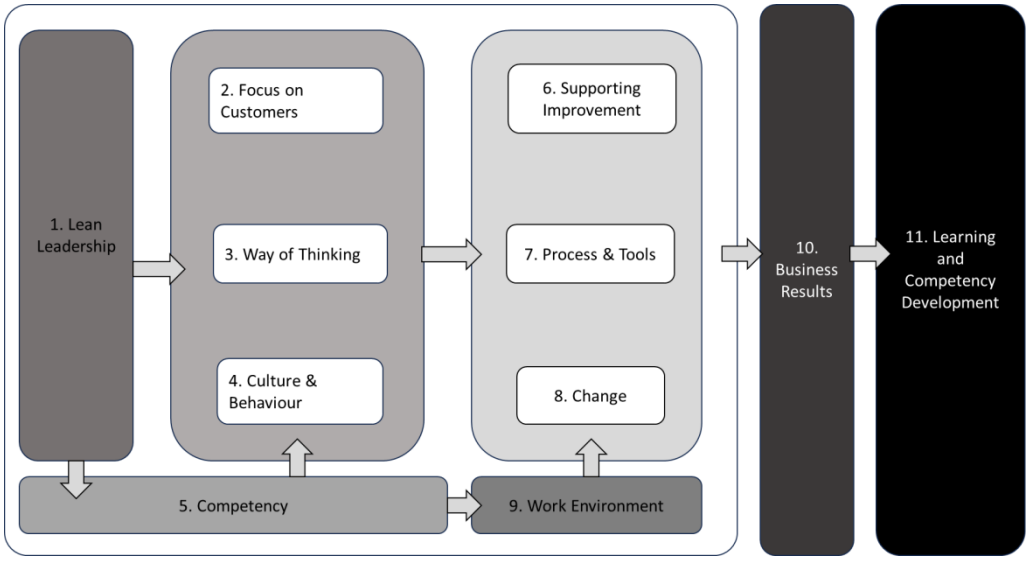


Figure 4. The Lean Management and Readiness Measurement Model (LCMM)

These things are as follows: (1) Lean leadership, (2) Focus on customers, (3) Way of thinking, (4) Culture & Behavior, (5) Competency, (6) Supporting improvement, (7) Process & tools, (8)

Change, (9) Work environment, (10) Business Results, (11) Learning and Competency Development.

Create questions that support the Main Factor criteria

Next, from the 11 criteria mentioned above, we will describe the sub-criteria for each of the main criteria. These criteria are illustrated in the List below:

Lean Leadership.

1. Contex Organization
2. Vision and Mission
3. Stakeholder Needs Analysis
4. External and Internal Communication
5. Risk-Based Thinking
6. Performance Management
7. Standard Qualification
8. Continual Improvement

Focus on Customer.

1. Customer Satisfaction Measurement
2. Customer Needs Analysis
3. Contract Review
4. Customer Complaint
5. Customer Relationship Management

The Way of thinking

1. Planning to develop of The way of Thinking Your Organization
2. Implementation of Ways of Thinking into Daily Activities
3. Measuring the depth of understanding of the organization's way of thinking
4. Carry out corrective actions from instilling the organization's way of thinking

Culture & Behavior

1. Develop Good Culture and Behavior in The Organization
2. Implementation of Good Culture and Behavior in The Organization
3. Evaluate Culture and Good Behavior in the Organization
4. Increase and improve the implementation of Culture and Good Behavior in the Organization

Competency

1. Identify the competencies of each main and supporting organizational position
2. Measuring Gap analysis between Expectations and Reality of Competency for each Organizational position
3. Steps to try to reduce the Expectation and Reality Competency Gap in each Organizational position

Supporting Improvement

1. Identify things that support continuous improvement in the organization
2. Realizing things that can encourage continuous improvement in the organization
3. Evaluate the things that have been attempted to encourage continuous improvement in the organization
4. Corrective actions that have been attempted to encourage continuous improvement in the organization

Process & tools

1. Identification of processes and tools that will be used in each organizational activity
2. How the organization has defined the processes and tools to be implemented
3. How the organization has implemented processes and tools well
4. How the organization has made corrections to improve processes and tools in the future

Change

1. How the organization carries out organizational change plans over time
2. How organizations monitor organizational change over time
3. How the organization corrects organizational changes over time

Work Environment

1. How the organization plans the Work Environment
2. How the organization conditions the work environment, including work health and safety
3. How the organization monitors the Work Environment
4. How the organization corrects the Work Environment

Business Results

1. The organization determines the results that are measured as organizational Performance Results

2. Organizations analyze organizational performance results that influence each other

Learning and Competency Development

1. The extent to which analyzing business results is influenced by learning and developing organizational competencies
2. Reset learning targets and develop organizational competencies in the future

After the above criteria have been explained in more detail, the next step is to describe them in the form of questions that have graded value answers such as grades 1=A, 2=B, 3=C, 4=D, 5=E. Attached are the following questions:

Lean Leadership.

Contex Organization

How much does the leader understand the organization he leads?

1. Leaders have understood the organization through existing literature internally and externally to the company
2. Leaders have understood the organization through literature and information gathered through interactions with subordinates regarding internal and external issues.
3. Leaders have understood the organization through literature, information about internal and external problems, as well as internal and external organizational challenges.
4. Leaders have understood the organization through literature, information about internal and external problems, internal and external organizational challenges, as well as customer expectations and stakeholder needs analysis.
5. Leaders have understood the organization through literature, information about internal and external problems, internal and external organizational challenges, customer expectations, stakeholder needs analysis, as well as threats of changes in government policies, organizational changes, and technological changes.

Vision and Mission

How do leaders set the organization's vision and mission?

1. Leaders set Vision and Mission based on Personal Vision and Mission only
2. Leaders determine the Vision and Mission based on input from Company Owners

3. Leaders determine the Vision and Mission based on input from organizational stakeholders, internal and external issues, challenges, and hopes for the organization in the future.
4. Leaders determine the Vision and Mission based on input from organizational stakeholders, internal and external issues, TOWS analysis, and empirical data on organizational performance.
5. Leaders determine the Vision and Mission based on input from organizational stakeholders, internal and external issues, TOWS analysis, and empirical data on organizational performance, the world of technology, and information in the future.

Stakeholder Needs Analysis

How do Leaders do Stakeholder Needs Analysis?

1. Leaders have not carried out a Stakeholder Needs Analysis in the organizations they lead
2. Leaders plan to carry out a Stakeholder Needs Analysis in the organizations they lead
3. Leaders have carried out a Stakeholder Needs Analysis in the organizations they lead
4. Leaders have carried out Stakeholder Needs Analysis in the organizations they lead, but sporadically
5. Leaders have carried out Stakeholder Needs Analysis in the organizations they lead continuously and sustainably

Risk-Based Thinking

How does the organization implement risk analysis at the beginning of each activity?

1. Leaders have not implemented risk analysis in every activity
2. Leaders will apply risk analysis in every activity
3. Leaders have implemented risk analysis in each activity only partially
4. Leaders have implemented risk analysis in every comprehensive activity
5. Leaders have implemented a comprehensive risk analysis in every activity and are evaluated regularly

External and Internal Communication

How do leaders conduct internal and external communications?

1. Leaders have not managed internal and external communications
2. Leaders have managed internal and external communications only partially
3. Leaders have managed internal and external communications completely but the implementation is sporadic
4. The leaders have managed all internal and external communications, but the implementation is routine and recorded
5. The leaders have managed all internal and external communications, but the implementation is routine and recorded, and always discussed and evaluated on an ongoing basis.

Performance Management

How do Leaders Implement Performance Management in Organizations ?

1. Leaders have not implemented Performance Management in the Organization
2. Leaders have implemented Performance Management in the Organization only in certain parts
3. Leaders have implemented Performance Management in the Organization as a whole
4. Leaders have implemented Performance Management in the Organization as a whole and linked it to part of performance incentives
5. Leaders have implemented Performance Management in the Organization as a whole and linked it to part of performance incentives, and are always evaluated every time on a regular basis.

Standard Qualification

How do Leaders carry out setting Input, Process and Output Qualification Standards?

1. Leaders have not yet established Input, Process and Output Qualification Standards
2. Leaders have set Input, Process and Output Qualification Standards only in part
3. Leaders have set overall but sporadic Input, process and Output Qualification Standards
4. Leaders have established overall and comprehensive Input, process and Output Qualification Standards
5. Leaders have established overall and consistent Input, Process and Output Qualification Standards as standards that are adhered to

Continual Improvement

How do leaders carry out continuous improvement of the organization?

1. Leaders have not implemented continuous organizational improvement
2. The Leaders have planned a form of implementation of the Organization's continuous improvement
3. Leaders have implemented the Organization's continuous improvement only partially
4. Leaders have implemented Continuous Improvement of the Organization as a whole
5. Leaders have implemented continuous organizational improvement as a whole and are evaluated regularly

Focus on Customer.

Customer Satisfaction Measurement

How do Leaders implement Customer Satisfaction Measurement?

1. Leaders have not implemented Customer Satisfaction Measurement
2. Leaders plan the implementation of Customer Satisfaction Measurement through certain activities
3. Leaders have implemented Customer Satisfaction Measures sporadically
4. Leaders have implemented Customer Satisfaction Measurements regularly and continuously
5. Leaders have implemented Customer Satisfaction Measurements regularly and continuously, and their implementation is always evaluated

Customer Needs Analysis

How do Leaders carry out Customer Needs Analysis in the organizations they lead?

1. The Leaders have not carried out Customer Needs Analysis in the organizations they lead
2. The Leaders have planned the technicalities of conducting Customer Needs Analysis in the organizations they lead
3. The Leaders have carried out Customer Needs Analysis in the organizations they partly lead
4. The Leaders have carried out Customer Needs Analysis in the entire organization they lead on an ongoing basis

5. The Leaders have carried out Customer Needs Analysis on an ongoing basis in the entire organization they lead and its implementation is always evaluated regularly

Contract Review

How can leaders ensure that they always review the contract for every job?

1. Leaders should not always ensure that every job they get must undergo a contract review
2. Leaders must always ensure that every job they get is subject to contract review through prepared SOPs to be adhered to
3. Leaders must always ensure that every job they get goes through contract review through SOPs and checked through Internal Audit
4. Leaders must always ensure that every work goes through contract review through SOPs and checked through Internal Audit, and corrective and preventive actions are planned.
5. Leaders must ensure that every work from customers goes through a contract review, is supported by SOPs, checked through Internal Audit, followed up on corrections and prevention, and ends with the establishment of corrected standards.

Customer Complaint

How can leaders ensure they manage Customer Complaints well?

1. Leaders have not yet established a Complaint Management mechanism
2. Leaders have established sporadic management of the Complaint Management System
3. Leaders have established that the management of the Complaint Management System is consistently implemented according to SOP
4. Leaders have established that the management of the Complaint Management System is consistently implemented according to SOP, and its effectiveness is evaluated
5. Leaders have established that the management of the Complaint Management System is consistently implemented according to SOP, and its effectiveness is evaluated, and all Complaint data is analyzed and discussed at management meetings

Customer Relationship Management

How do leaders ensure Customer Relations Management is implemented?

1. Leaders have not implemented Customer Relationship Management mechanisms
2. Leaders have established Customer Relations Management SOPs
3. Leaders have established Customer Relations Management SOPs, but they are implemented sporadically
4. Leaders have established Customer Relations Management SOPs, but implemented them consistently
5. Leaders have established Customer Relations Management SOPs, but implemented them consistently and evaluated their effectiveness

Way of thinking

Speak by Data

How can leaders ensure that the organization's way of thinking always speaks to data?

1. The Leaders do not know how to ensure the organization's way of thinking always speaks to data
2. The leader asks the subordinate organizations under him to make reports based on data
3. The leader asks the subordinate organizations under him to analyze the data that has been collected for decision-making making
4. Leaders and subordinates of organizations under them receive training in collecting data for decision making
5. Leaders and subordinate organizations below them use technological innovation to retrieve data and make decisions

Plan Do Check Action

How do leaders ensure that all activities follow the PDCA pattern?

1. The Leaders have not yet established PDCA as a pattern of activities in the Organization
2. The Leaders have established PDCA as a pattern of activities in the Organization through partial outreach only
3. The Leaders have established PDCA as a pattern of activities in the Organization through extensive outreach through training

4. The Leaders have implemented PDCA as a pattern of activities in the organization through Weekly Meeting activities in only a few organizations
5. Leaders have implemented PDCA as a pattern of activities in the Organization through QCC (Quality Control Circle) activities throughout the organization

Continual Improvement

How do leaders ensure continuous improvement in the organization?

1. Leaders do not yet understand Continuous Improvement in Organizations
2. Leaders understand Continuous Improvement in the Organization through comprehensive Socialization in the Organization
3. Leaders have implemented Continuous Improvement in the Organization as proven through performance improvement data
4. Leaders have implemented Continuous Improvement in the Organization as proven through performance improvement data and innovation in work processes and products.
5. Leaders have implemented Continuous Improvement in the Organization as proven through performance improvement data, work process and product innovations, as well as Organizational Audit Results.

Risk-Based Thinking

How do leaders ensure that all activities are based on Risk-Based Thinking?

1. Leaders do not understand Risk-Based Thinking yet
2. Leaders understand Risk-Based Thinking through comprehensive socialization in the Organization?
3. Leaders have been trained in the practice of implementing Risk-Based Thinking in every activity throughout the organization
4. The leaders have implemented Risk-Based Thinking in their activities sporadically
5. The leaders have implemented Risk-Based Thinking in every activity thoroughly, and it has become a habit for every activity to start with a Risk Analysis.

Change of Agent

How do leaders produce Change Agents throughout the Organization?

1. Leaders do not yet understand the role of Change Agent in the Organization
2. Leaders have understood the role of Change Agent through Training on Change Agent
3. The leaders have practiced Change Agent in some of the organizations under them
4. Leaders have practiced Change Agent throughout the Organization under them
5. The leaders have practiced Change Agent throughout the organization under them and regularly evaluate their activities

Culture & Behavior

Develop Good Culture and Behavior in The Organization

How do leaders ensure that Good Culture and Behavior Development is implemented in the Organization?

1. Leaders do not understand the development of good culture and behavior in organizations
2. Leaders have identified what Good Culture and Behavior will be implemented in the Organization
3. Leaders have identified Good Culture and Behavior, and planned the practice of implementing them in the Organization
4. Leaders have identified Good Culture and Behavior, planned their implementation practices in the Organization, and evaluated their implementation.
5. Leaders have identified Good Culture and Behavior, planned the practice of implementing it in the Organization, and evaluated its implementation, taking corrective action or adding to the good culture or behavior.

Implementation of Good Culture and Behavior in The Organization

How do leaders ensure the implementation of Good Culture and Behavior in the organizations they lead?

1. Leaders have not socialized the points of Good Culture and Behavior that have been established in the organizations they lead
2. Leaders have socialized the Good Culture and Behavior points that have been established through banners, photo frames, or other media in the work environment

3. Leaders have socialized the Good Culture and Behavior points that have been determined through banners, photo frames, or other media, as well as socialization at every employee meeting.
4. Leaders have socialized the Good Culture and Behavior points that have been determined through banners, photo frames, or other media, socialization at every employee meeting, and in special training.
5. The leaders have socialized the established Good Culture and Behavior points through banners, photo frames, or other media, socialized at every employee meeting, in special training, and evaluated their implementation regularly.

CONCLUSION

This research highlights the importance of organizational readiness as a critical prerequisite for the successful implementation of Lean Management in Indonesian State-Owned Enterprises within the construction sector. While Lean Management has traditionally been applied at the project operational level, this study emphasizes that sustainable improvement in productivity, efficiency, and performance can only be achieved when lean principles are embedded at the organizational level. The adoption of the Lean Construction Maturity Model (LCMM) provides a comprehensive framework for evaluating readiness through eleven interrelated dimensions, encompassing leadership, culture, competencies, processes, and learning mechanisms.

The proposed Lean Management Readiness Index offers a systematic and measurable approach to assessing the preparedness of construction SOEs to implement lean practices. By analyzing the interactions among key factors using quantitative methods, this study underscores the central role of lean leadership, organizational culture, competency development, and continuous improvement in driving successful lean transformation. The findings also indicate that weaknesses in any single dimension can hinder overall readiness, underscoring the need for a holistic, integrated implementation strategy.

From a practical perspective, the results of this study provide valuable insights for government stakeholders, SOE executives, and construction managers in designing targeted interventions to improve organizational capability and competitiveness. The readiness index can

serve as a strategic diagnostic tool to guide policy decisions, prioritize resource allocation, and monitor progress toward lean transformation. Ultimately, strengthening lean management readiness within Indonesian construction SOEs is expected to enhance project performance, support national infrastructure development, and contribute to sustainable economic growth.

Future research is recommended to validate the proposed readiness index through longitudinal studies and to explore its application across different sectors and organizational contexts.

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