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DRIVING ORGANIZATIONAL TRANSFORMATION BY LEVERAGING LEAN TO OPTIMIZE EFFICIENCY: A PEOPLE, CULTURE, AND SYSTEM APPROACH AT A PRINTING COMPANY IN INDONESIA

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ABSTRACT

The manufacturing industry is undergoing a significant transformation due to the rising demand for high-quality products delivered promptly. In response, lean manufacturing has emerged as a robust strategy for achieving operational excellence. The fundamental goal of lean is to achieve and further improve performance while using less input, such as less time, less space, less human effort, less machinery, less material and less cost. Despite its wide adoption, many manufacturing organizations, including PT XXX faces difficulties in maximizing the benefits of lean implementation.

This research investigates lean practices within PT XXX, a printing and packaging company. Its focus is on uncovering the factors influencing the optimization of lean processes, driving operational efficiency. One of the approaches is Human Resource Management principles. The research delves into the impacts of people participation, organizational culture, and an effective system. By examining these aspects, the study provides valuable insights for businesses aiming to refine their lean methodologies to increase the efficiency of the organization.

Utilizing a quantitative approach, this study involved a total of 250 respondents as the samples, selected based on the Slovin formula. The data were analyzed using Microsoft Excel, SPSS v.26, and SmartPLS 4.0 tools with the PLS-SEM analysis method. The study found the positive influence of people, culture, and systems in optimizing lean implementation. This finding highlights the fundamental role of human capital in driving organizational improvement through lean principles. Optimized lean implementation helps achieve higher levels of customer satisfaction and operational effectiveness.

Keywords: *People, Culture, System, Lean Implementation and Organization Efficiency.*

1. Introduction

The manufacturing industry has undergone a remarkable transformation in recent years, driven by the increasing demand for high-quality products that can be delivered quickly and efficiently. This change results from the growing demand for high-quality goods that can be delivered promptly and effectively. Manufacturers are under tremendous pressure to increase operational effectiveness, cut production costs, react quickly to consumer demands, and preserve a competitive edge as the world's marketplaces become more competitive Lean manufacturing has become a potent methodology for achieving operational excellence and fostering continuous improvement within firms as a response to these difficulties (Bhamu & Singh Sangwan, 2014; Baliga et al., 2020).Lean manufacturing has been widely adopted and is beneficial in reducing non-value-added activities and waste in both the industrial and service sectors (Nandakumara et al., 2020). Over processing, overproduction, high inventory, waiting times for personnel or materials, motion, defects, and wasteful transportation are the seven waste categories recognized by lean manufacturing (Bakke & Johansen, 2019). Due to their emphasis on achieving zero waste and adding value for customers, lean management approaches have become well-known on a global scale.

Implementing lean practices has been a challenging journey for many organizations, with the desired results often needing more attainable (Marodin et al., 2018). Despite having the best intentions, only about 10% of businesses have effectively adopted lean manufacturing techniques. Lean implementation is a challenging and complex process that depends on several key success criteria. Also support by Marodin et al. (2018), despite the benefits of implementing lean manufacturing, incorporating lean practices has been a challenging journey for many organizations, as observed at PT XXX.

PT XXX, a printing and packaging company, plays a vital role in the industry, manufacturing approximately 30,000 tons of paper each year. With intensifying competition and rising customer expectations for high-quality products delivered quickly and efficiently, it has become imperative for PT XXX to focus on eliminating waste and costly elements that do not add value to the final products. In line with this, PT XXX has strategically implemented lean principles across its operations and strategies. With a strong concept and structure of a Lean House, PT XXX has implemented lean practices to improve operational efficiency and achieve its desired goals. However, it is evident that the organization still encounters challenges in fully optimizing these lean practices. This is demonstrated through the persistence of non-value-added activities within the organization, which consume valuable resources, including time, effort, and materials, without contributing value to the final product. PT XXX also faces suboptimal productivity levels, impacting the increasing number of customer complaints and adding another layer of complexity to the challenges of lean implementation.

The observed increase in customer complaints each year further emphasizes this issue. In 2020, there were 48 customer complaints; in 2021, the number rose to 59, and in 2022, there was a significant increase of about 95% compared to the previous year. This indicates that PT XXX is still facing challenges in optimizing the implementation of lean practices. The first challenge is the people factor, where employees must actively contribute to the lean while it is found lack of engagement due to resistance to change, lack of participant, lack of communication, or inadequate training and support. This lack of communication and collaboration among employees can lead to miscommunication, siloed thinking, and a lack of cross-functional collaboration, all of which hinder the effectiveness of lean practices. Implementing lean manufacturing often requires significant changes to processes, systems, and organizational culture, which some employees may resist due to fear of job losses, uncertainty about new roles, or resistance to change itself.

Another challenge is related to the factor of culture. Lean promotes a culture of continuous improvement, seeking opportunities for enhancement and committing to implementing improvements regardless of hierarchy or position; however, at PT XXX, there appears to be a culture somewhat contrary to these principles, with workers finding comfort in the status quo. Implementing lean has yet to become a priority, as there is a misalignment between the organization's performance metrics and lean goals.

Furthermore, system visibility and accountability pose another challenge at PT XXX. The implementation of lean needs to be adequately documented and it has yet to become a key performance indicator (KPI) for every employee. Measures, skills, competency standards, development plans, and the delivery of results are examples of pertinent KPIs. This process focuses on their improvement, learning, and growth for the employees to properly contribute to the overall corporate strategy (Alefari et al., 2020).

The following research questions have been developed based on the background and problem statement described above. First, does people's participation positively influence the optimization of lean implementation in PT XXX? Second, does organizational culture positively influence the optimization of lean implementation in PT XXX? Third, does an effective system, including process visibility and accountability, positively influence the optimization of lean implementation in PT XXX? Finally, does optimal lean implementation positively influence the efficiency of operations in PT XXX?. This upcoming study intends to carefully assess and gauge

the effects of lean techniques on organizational effectiveness, determining whether these effects are more likely to be positive or negative. Utilizing the identified issues present at PT XXX and supported by several previous studies, this study aims to analyze the factors of people, culture, and systems to optimize lean implementation and enhance efficiency at PT XXX, building upon the identified problems and previous research conducted in this area.

2. Literature Review

2.1 Lean Manufacturing

The Toyota Production System (TPS), called Lean Manufacturing, was advancement in production methodology achieved by the Japanese corporation Toyota in the middle of the 20th century (Womack & Jones, 1996). Lean manufacturing is used in business to maximize resource utilization and reduce waste.

The core of the Lean philosophy revolves around achieving efficiency through a perpetual process of optimizing and perfecting operational procedures. This meticulous endeavor involves identifying and eradicating any activities that fail to contribute value while being attentive to the unique requirements and preferences of the customer base.

The ultimate objective is to create a finely-tuned, streamlined system that optimizes value generation while minimizing waste. Lean manufacturing classifies waste into seven categories: over processing, overproduction, excessive inventory, prolonged wait times for personnel or materials, redundant motion, defects, and wasteful transportation (Bakke & Johansen, 2019). As opposed to mass production's quest for cost reduction through economies of scale (Maware et al., 2022), lean manufacturing profoundly emphasizes flexibility, quality, profitability, and efficiency.

In summary, as distilled by Raval et al. (2020), the tenets of Lean manufacturing enshrine the systematic elimination of non-value-added activities, meticulous optimization of process flow, the cultivation of swiftness, and the persistent combat against MUDA (waste).The success of lean implementation, according to Salonitis et al. (2016), depends on several variables, including organizational culture and ownership, developing organizational readiness, management commitment and capability, providing adequate resources, external consultant support, effective communication, and engagement. Research by Trentin and Tontoni (2022) emphasizes the importance of integrating Lean principles into the Human Resource Management (HRM) approach.

2.2 People Influence Lean Challenges

Dutra (2016) states that people management is a set of policies and practices that enable the alignment of expectations between the organization and individuals, allowing both to achieve their goals over the long term. Businesses that embrace and implement this strategy consider people as the most precious resource, recognizing their distinctive and irreplaceable contributions to value development (Karekatti, 2021).

Effective people management is crucial during the early phases of a Lean transformation since implementing Lean concepts necessitates substantial organizational change. Due to the extensive level of worker interaction required for effectively arranging activity, this process is particularly complicated.

Employee commitment, according to several experts, is the best way to optimize true Lean implementation because workers are the ones that drive change, establish it, and make sure it lasts (Alkhoraif & McLaughlin, 2016; Ahmad, 2017; Hamzeh et al., 2021).

According to Saputra, Armendra, and Permana (2022), the dimensions of employee engagement encompass conciliation, cultivation, confidence, and communication. Employee engagement serves as a direct antecedent to employee performance. Aligning with the challenges in lean implementation, fostering robust employee engagement becomes crucial, as it directly influences the effectiveness of lean practices.

Benkarim and Imbeau (2022), who claim that Lean implementation centers on people and acknowledges their contribution to the company's growth, agree with this. They also emphasize the critical role that human resources management (HRM) practices play in the success and sustainability of Lean transformations.

2.3 Culture Influence Lean Challenges

In order to successfully implement a Lean transformation, more than only tools and processes must be used. A shift in corporate culture is necessary across the board and at all process phases. A supportive corporate culture is crucial for successfully implementing Lean and guaranteeing its long-term viability (Effah-Kesse, 2017).According to Bon, Zaid, and Jaaron (2018), adopting lean manufacturing requires consideration of organizational culture.

According to Permana (2015), organizational culture is significantly influenced by individual actions within the organization, forming the basis of employee excellence. Understanding the driving factors helps organizations

formulate strategies to engage, enable, and empower employees. For example, in optimizing employee engagement, the researcher identifies drivers such as job satisfaction, passion, organizational fit, trust in leadership, and recognition. Navigating the complexities of lean implementation, organizations can leverage these insights to formulate strategies aligned with their cultural values, contributing to the success of lean practices.

In these situations, cultural values serve as the compass for implementing lean. Lean methodology boundaries dissolve when people follow the beat of an empowered culture. It is the physical manifestation of values that encourage taking calculated risks, support ongoing improvement, and demolish complacency.

2.4 System Influence Lean Challenges

The success of implementing the lean principles is predominantly determined by the choice of appropriate Key Performance Indicators (KPIs). According to Cortes et al. (2016), KPIs are essential facilitators enabling leadership to assess success and identify areas needing improvement. KPIs should align with the organization's strategy, consider stakeholders' viewpoints, and include both short-term and long-term advantages. The development of KPIs helps to create more targeted planning and strategy for implementing Lean, which aligns with the intended goals and targets.

In this dynamic interaction of efficacy, bottlenecks are exposed, accomplishments are acknowledged, and continuous improvement becomes automatic. Thus, the claim gets support: In this setting, a successful system interwoven with KPIs and process visibility is the foundation upon which lean optimization flourishes. A well-functioning system interlaced with KPIs and clear process visibility in this complex interplay lays the foundation for effective lean optimization.

2.5 Kotter’s model of Change

Due to its ability to improve efficiency, reduce waste, boost overall operational effectiveness, and boost efficiency, the adoption of lean principles in enterprises has accelerated significantly. However, a deliberate approach to change management is necessary for successfully implementing Lean methods. Change is the behavioral shift of "the organization as a whole, from one state to another." On the other hand, change management is described as "the ongoing process of revitalizing an organization's direction, structure, and capabilities to meet the evolving needs of both external and internal customers" (AlManeia et al., 2018).

John Kotter's Model of Change provides a thorough framework that may be used to optimize the integration of Lean concepts within an organization. The change management model consists of eight steps, emphasizing areas where significant benefits for change management can be seen. Steps three and four emphasize the importance of developing and communicating a vision because doing so increases employee motivation, aligns improvement projects, and allows resources to help the transformation process.

2.6 Research Model

Based on the phenomena and problems described, the researcher predicts and uses three independent variables: People, Culture, and System. The interconnected link between these independent factors, which will be assessed along with the moderating factor of optimizing Lean techniques, is at the heart of this investigation. Understanding how these interrelated variables collectively form the dependent variable, organizational efficiency, is the primary goal of this inquiry.

The research model presented below is based on a foundation established by various previous studies, including those conducted by Armendra and Permana (2022), Maware et al. (2022), Trentin and Tontoni (2022), Hamzeh et al. (2021), Karekatti (2021), Raval et al. (2020), Bakke and Johansen (2019), Bon, Zaid, and Jaaron (2018), Ahmad (2017), Effah-Kesse (2017), Alkhoraif and McLaughlin (2016), Cortes et al. (2016), Dutra (2016), Salonitis et al. (2016), Permana (2015), and Womack et al. (1990). By integrating findings from diverse sources, the study offers valuable insights that can inform managerial practices, enhance operational strategies, and contribute to the broader discourse on Lean management and organizational effectiveness in academic and practical management and organization.

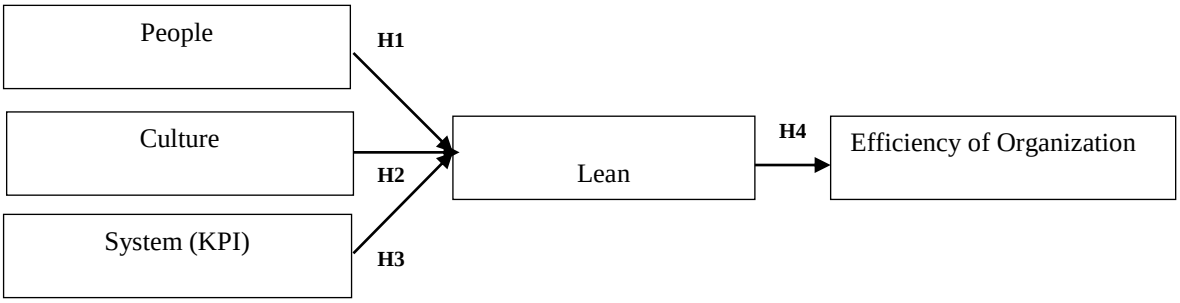

Figure 2. 1 Research Model

Source: Armendra and Permana (2022), Maware et al. (2022), Trentin and Tontoni (2022), Hamzeh et al. (2021), Karekatti (2021), Raval et al. (2020), Bakke & Johansen (2019), Bon, Zaid, and Jaaron (2018), Ahmad (2017), Effah-Kesse (2017), Alkhoraif & McLaughlin (2016), Cortes et al. (2016), Dutra (2016), Salonitis et al. (2016), Permana (2015), Womack et al (1990)

Based on several previous studies, the hypothesis is formulated as follows:

1. People Hypothesis
   (Reference by Benkarim & Imbeau, 2022; Karekatti, 2021; Alkhoraif & McLaughlin, 2016; Dutra, 2016)
   H1: *People participation positively influence the optimization of lean implementation in PT XXX*
2. Culture Hypothesis
   (Reference by Bon, Zaid & Jaaron, 2018; Effah-Kesse , 2017; Permana, 2015)
   H2: *Culture positively influence the optimization of lean implementation in PT XXX.*
3. System Hypothesis
   (References by Cortes et al. 2016)
   H3: *Effective system, including process visibility and accountability, positively influence the optimization of lean implementation in PT XXX*
4. Lean Hypothesis
   (References by Bakke & Johansen, 2019; Maware et al., 2022)
   H4: *Optimal lean implementation positively influence the efficiency of operations in PT XXX*

3. Research Method

This research conducted at the printing and packaging firm PT XXX employs a quantitative methodology to define phenomena and investigate underlying problems. The study commences with preliminary observations to identify issues related to implementing lean manufacturing and its impact on operational performance. The researcher determines independent, moderating, and dependent variables by collecting and examining existing literature. Subsequently, conceptual frameworks and hypotheses are constructed using these data as a basis. Through quantitative research, a substantial and representative sample of the population in the selected area will be obtained. Primary data will be used as the source for this investigation, with data collection conducted via questionnaires. These surveys, distributed via Google Forms, target over 650 employees, with the sample size determined using the Slovin formula, resulting in 250 respondents to ensure representative analysis.To ensure unbiased responses, the questions in the questionnaire were organized in such a way that no measures involving a driver were placed adjacent to each other. As part of this study, a pre-test will be administered to a subset of 50 responders from the staff at PT XXX. Statistical tools, such as SPSS and Microsoft Excel, will be utilized to analyze the acquired data comprehensively. The pre-test sessions were conducted to evaluate respondents' comprehension of the questionnaire items and confirm the appropriateness of these items for the study setting. The credibility and dependability of study findings are crucially influenced by validity and reliability (Mohajan, 2017).

Structural Equation Modeling (SEM) analyzes complex interactions between variables and assesses theoretical models. Specifically, Partial Least Squares Structural Equation Modeling (PLS-SEM) is utilized for data analysis due to its suitability for theory development and prediction, handling complex models with numerous constructs and relationships. The SEM approach assesses the reliability and validity of constructs and the hypothesized relationships among them. This study employs the PLS-SEM technique, supported by SmartPLS 4.0 data processing tools, to assist in structural modeling and illustrate the proposed components' interrelationships.

4. Result and Discussion

4.1 Pre Test for Validity and Reliability Test

The validity test for each question item is utilized to ascertain the validity of each question on the instrument. With a sample of 50 respondents, the validity tests were descriptively evaluated using the Statistical Package for Social Sciences (SPSS) version 26; the reference R table value was 0.2787 (rounded to 0.279) (Mohajan, 2017). The validity test used the correlation method, specifically the Pearson correlation test. Instruments was considered valid or feasible if the R-count exceeded the R-table value.

The researcher conducted a pre-test for validation, consisting of 30 statements administered to 50 respondents. Results from SPSS show that all statements were deemed valid, as evidenced by all R-count (correlation coefficients) surpassing the R-table threshold value of 0.279. This outcome signifies that the instrument or questionnaire utilized in the research possesses adequate validity and is proficient in measuring the intended.

Reliability is associated with the accuracy and precision of measurements. Reliability testing examines whether the data obtained from the research instrument demonstrates sufficient internal consistency. In this study, reliability testing is performed by assessing Cronbach's Alpha value. According to Sarstedt, Ringle, and Hair (2021), Cronbach's alpha values between 0.70 and 0.90 are deemed satisfactory, whereas those beyond 0.95 are considered undesirable. According to the SPSS test result, all the variables have Cronbach's alpha values >0.70, indicating strong internal consistency reliability. This implies that the research instrument, or questionnaire, is suitable for examining the relevant variables since it demonstrates their validity and the internal consistency of the measurements.

4.2 Descriptive Statistics

Table 1 Descriptive Statistics

Descriptive Statistics			
Variables	**N**	**Mean**	**Std, Deviation**
People	250	4.015	0.476
Culture	250	4.180	0.587
System	250	4.018	0.671
Lean	250	4.006	0.628
Organization Efficiency	250	4.047	0.638
Valid N (listwise)	250		

Source: Primary Data, Processed with SPSS v. 26.0 (2023)

As seen in Table 1, the data provided the descriptive statistics result for a set of variables, with each variable's mean value exceeding 4. The mean values provided for each variable indicate the average responses for each variable. The people variable has a mean value of 4.015, indicating that the average respondent agrees with this variable. The mean score for the variable "Culture" is 4.180, indicating a strong positive perception of the organizational culture in relation to lean implementation. The system variable has a mean value of 4.018, also above 4, indicating a higher average agreement for this variable. The lean variable has a mean value of 4.006, slightly lower than the other variables but still above 4. Finally, the organization efficiency variable has a mean value of 4.47.

4.3 Outer Model Testing

In Smart PLS, the analytical framework consists of two primary models: the Inner Model and the Outer Model. The Outer Model focuses on assessing validity and reliability, while the Inner Model evaluates coefficients of determination and conducts hypothesis testing. Factor item loadings and the Average Variance Extracted (AVE) determine convergent validity (Afthanorhan et al., 2020; Permana et al., 2021). The AVE should be at least 0.5, indicating that the latent variable can explain over half of the variance of its indicators on average.

Table 2 Construct Reliability and Validity Overview

Variables	Cronbach's alpha	Composite reliability (rho_a)	Composite reliability (rho_c)	Average variance extracted (AVE)
People	0,816	0,828	0,867	0,523
Culture	0,814	0,842	0,860	0,509
System	0,836	0,842	0,880	0,550
Lean	0,811	0,818	0,864	0,515
Organization Efficiency	0,808	0,819	0,860	0,507

Source: Primary Data, Processed with SmartPLS 4.0 (2023)

The analysis indicates that all constructs have high levels of internal consistency, reliability, and validity. All five constructs such as People, Culture, System, Lean, and Organization Efficiency—demonstrate strong internal consistency and reliability, as evidenced by Cronbach's Alpha and composite reliability values exceeding the standard threshold of 0.7 (Hair et al., 2017).

Furthermore, the AVE values for all constructs are above the minimum recommended value of 0.5, confirming adequate convergent validity. The high reliability and validity of the results indicate that the variables of people, culture, and system are consistent and accurate in improving Lean implementation to enhance organizational efficiency at PT XXX. By utilizing Lean principles and concentrating on improving these factors, PT XXX may guarantee long-term competitive advantage and operational excellence.

4.4 Inner Model Testing

The inner model can be evaluated using the t-statistic value of the path coefficient test and the dependent construct's R-square (reliability indicator). The relationship between variables is significant if the T-statistic p-value is less than the 5% significance level (Hair et al., 2017).

Table 3 Path Coefficients

Path Diagram	Original sample (O)	Sample mean (M)	Standard deviation (STDEV)	T statistics (|O/STDEV)	P values	Result
People -> Lean	0.118	0.120	0.043	2.751	0.006	Significant Influence
Culture -> Lean	0.130	0.116	0.051	1.987	0.009	Significant Influence
System -> Lean	0.742	0.736	0.049	15.089	0.000	Significant Influence
Lean -> Organization Efficiency	0.714	0.718	0.041	17.512	0.000	Significant Influence

Source: Primary Data, Processed with SmartPLS 4.0 (2023)

Based on above, all independent variables on the dependent variable have significant influence values. This is indicated by p-values that do not exceed 0.05. The results above reflect Path Coefficients, which are the results of direct effect testing:

- People: The path coefficient is 0.118, with a t-statistic of 2.751 and a p-value of 0.006, indicating a significant influence of the People variable on Lean at a 5% significance level.
- Culture: The path coefficient is 0.130, with a t-statistic of 1.987 and a p-value of 0.009, indicating a significant influence of the Culture variable on Lean at a 5% significance level.
- System: The path coefficient is 0.742, with a t-statistic of 15.089 and a p-value of 0.000, indicating a highly significant influence of the System variable on Lean at a 5% significance level.
- Lean: The path coefficient is 0.714, with a t-statistic of 17.512 and a p-value of 0.000, indicating a highly significant influence of the Lean variable on Organization Efficiency at a 5% significance level.

4.5 F Test for Hypothesis Testing

The F-test is designed to determine whether the independent variables, taken together, significantly impact the dependent variable. It is also used to examine the effect of all free variables on the bound variable. The level of significance used is 0.5 or 5%, and if the significant F value is less than 0.05, it can be concluded that the independent variables significantly impact the dependent variable.

Table 4. ANOVA Output

ANOVA[a]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	68.549	4	17.137	127.332	.000[b]
	Residual	32.974	245	.135		
	Total	101.523	249			

a. Dependent Variable: ORGANIZATION EFFICIENCY
b. Predictors: (Constant), LEAN , CULTURE , PEOPLE , SYSTEM

Source: Primary Data, Processed with SPSS v. 26.0 (2023)

The table below shows the ANOVA results generated using SPSS. The basis for making F Test decisions is as follows:

1)Based on the significance value (Sig.) of the ANOVA output : The Sig value is 0.000. Because of the Sig value. 0.000 < 0.05, then it can be concluded that the hypothesis is accepted or, in other words, People, Culture, System, and Lean simultaneously influence organizational efficiency.

2) Based on a comparison of the calculated F value with the F table : It can be seen that the estimated F value is 127.332. In this case, the F table value is 2.408. It is based on the degrees of freedom between groups (df1) which equals the number of variables minus one, resulting in 4, and the degrees of freedom within groups (df2) which equals the total number of data points minus the number of variables, resulting in 245.Because the calculated F value is 127.332 > F table 2.408, it can be concluded that the hypothesis is accepted, or in other words, People, Culture, System, and Lean simultaneously influence Organization Efficiency. Also, from the path coefficient already mention above analysis, it can be concluded as below:

- **H1**: *Influence of People has a positive influence Lean with t statistics 2.751 (p<0.006). Consequently, the first hypothesis is accepted*
- **H2**: *Influence of Culture has a positive influence on Lean with t statistics 0.577 (p<0.009). As a result, the second hypothesis is accepted*
- **H3**: *Influence of System has a significant and positive influence on Lean with t statistics 15.089 (p<0.000). The third hypothesis is accepted*
- **H4***: Lean has a significant and positive influence on Organization Efficiency with t statistics 17.512 (p<0.000). This proves that Lean is proven to have a significant influence on Organization Efficiency (H4 is accepted).*

4.6 The influence of people participation on the optimization of lean implementation in PT XXX

The examination outcomes reveal that approximately 58% of employees agree that lean implementation should commence with active participation. With an overall indicator average of 4.01, nearly all employees acknowledge the influence of people's participation in optimizing lean implementation in PT XXX. However, while employees recognize the importance of actively optimizing lean implementation, there remains a need to enhance their participation, dedication, commitment, and engagement. Permana (2021) states that employee engagement is about willingness, commitment, and effort. Employees and management must take ownership of Lean at the organizational level to enhance commitment and engagement. The employees must clearly understand the significance of Lean activities and be willing to engage actively in the process. To build commitment, it is crucial to equip individuals with the requisite information, knowledge, and abilities to engage in Lean activities actively. Promoting employee participation in decision-making processes about Lean initiatives ensures they feel valued and invested in the success of these initiatives. Cesario et al. (2017) suggest that dedication and engagement have the potential to result in significant individual performance and organizational effectiveness. In order to effectively include and retain people, firms must allocate resources to their human resources strategies and consistently evaluate their effects on individual performance and overall company outcomes. PT

XXX can utilize these insights to enhance the adoption of Lean practices and attain its objectives by enhancing people involvement and commitment through human resource initiatives, as previously discussed.

4.7 The influence of organizational culture on the optimization of lean implementation in PT XXX

The results indicate that employees generally agree with the statements related to leadership involvement in lean implementation, with 43.6% strongly agreeing that leaders' full participation will optimize the process. Survey results for cross-functional collaboration also show that employees largely agree on the involvement of different departments and effective two-way communication, with 40.8% strongly agreeing that good collaboration and communication facilitate lean maintenance. These findings highlight the importance of organizational culture, including leadership involvement and cross-functional collaboration, in optimizing lean implementation at PT XXX. The analysis underscores the role of organizational culture in lean success, with mean scores ranging from 4.02 to 4.27, indicating positive sentiment. However, the presence of dissenting opinions points to areas needing improvement in leadership involvement. The study emphasizes the need for PT XXX to leverage its cultural strengths, such as leadership support and effective communication, to enhance lean implementation.

Knapp (2015) notes that managers often overlook the role of culture in lean practices. Leaders can influence culture through strategic attention, control mechanisms, role modelling, and reward criteria. Effective leadership is crucial for lean transformation, requiring a clear vision, resources, and strategic guidance (Alefari et al., 2017). Promoting collaboration and engaging various departments harness diverse insights essential for lean success. Senior leadership must actively involve middle managers and staff, fostering a culture of continuous improvement and embedding lean thinking into the organizational DNA.

4.8 The influence of system, including process visibility and accountability on the optimization of lean implementation in PT XXX

The survey results indicate a strong system of employee agreement (mean score of 4.19) on the importance of KPIs in measuring lean effectiveness at PT XXX, suggesting high awareness and acceptance. The reward system, with a mean score of 3.91, is perceived as effective by 44% of respondents, though 26.4% are neutral or disagrees, indicating areas for improvement. Overall, the positive perception of system reflects alignment with lean principles, though communication and training consistency could be enhanced. Effective KPI measurement is essential for performance improvement, with the main challenge being the selection of relevant KPIs. Regular KPI review meetings can enhance understanding and alignment. As recommended by Stricker et al. (2017) and Zhu et al. (2018), continuous evaluation of KPIs ensures their relevance to strategic objectives.

PT XXX should conduct regular audits to maintain lean implementation progress. Dedicated cross-functional teams with specialized training can support lean implementation by ensuring comprehensive program consideration. Ongoing education and training for all employees are crucial for lean proficiency. Tying performance ratings and career prospects to lean project success can motivate employees. Implementing recognition and incentive systems fosters a culture of lean excellence, reinforcing dedication and embedding lean practices into the organizational culture.

4.9 The influence of on the optimization lean on the efficiency of operations in PT XXX

This analysis examines the influence of lean optimization on operational efficiency at PT XXX, identifying it as a mediating variable. The study uses survey data to assess employees' perceptions of lean principles, waste reduction, and their impact on efficiency and product quality. With a mean score of 4.03, employees demonstrate a strong understanding of waste types, which is essential for enhancing operational efficiency. Additionally, a mean score of 4.15 indicates that employees find cost efficiency indicators effective in managing cost, further supporting organizational efficiency. A significant reduction in customer complaints and improved product quality, as perceived by employees, underscores the positive impact of lean implementation. The results suggest that lean deployment has significantly improved product quality and is a crucial driver of organizational change at PT XXX. Despite generally positive feedback, targeted initiatives to address neutral and negative responses through better engagement, training, and communication can enhance the effectiveness of lean techniques. This conclusion aligns with Maware et al. (2022), who emphasize lean manufacturing's focus on flexibility, quality, profitability, and efficiency. Lean's adaptable methodology is recognized for reducing non-value-

added tasks and waste across various industries, including service and industrial sectors.
To optimize operational performance through lean implementation, PT XXX should focus on internal staff knowledge transfer, competency development, and cultural shifts related to lean practices. Emphasizing a cooperative application of concepts, procedures, and methods is crucial. Successful lean implementation requires a low-tech, human-centered organizational change strategy, a clear strategic vision aligned with HR policy, and highly engaged staff with resources for continuous improvement. This study highlights the transformative potential of lean practices in enhancing organizational efficiency through a people, culture, and system approach.
The findings of this research address the initial research questions, revealing that people's participation positively influences to enhance the optimization of lean implementation, emphasizing their pivotal role in driving lean effectiveness. Organizational culture positively influences the optimization of lean implementation in PT XXX, not only supporting effective lean practices but also shaping norms and values aligned with organizational goals, thereby enhancing employee engagement and facilitating lean optimization. Moreover, an effective system characterized by enhanced process visibility and accountability contributes significantly positively influences to lean implementation efforts by establishing clear frameworks and benchmarks for performance evaluation and improvement initiatives. Ultimately, the research found that optimal lean implementation positively influences operational efficiency at PT XXX, facilitating streamlined processes, waste reduction, and overall organizational enhancement. Integrating these findings into organizational strategy fosters sustained improvements in lean optimization to drive organizational efficiency, agility, and competitiveness, and positioning PT XXX for long-term success and growth in its industry.

5. Conclusion and Implications

5.1 Conclusion

Based on the discussion in the previous sections, the following conclusions are below:

- People participation has a significant influence on the optimization of lean implementation in PT XXX.
- Organizational culture has a significant influence on the optimization of lean implementation at PT XXX.
- The system, encompassing process visibility and accountability, significantly influence the optimization of Lean implementation at PT XXX.
- The optimization of Lean practices significantly enhances operational efficiency at PT XXX.

5.2 Implication

The research findings underscore several theoretical implications in the domains of people, culture, systems, lean implementation, and organizational efficiency. Firstly, engaging employees as active participants is pivotal for successful lean implementation, fostering a culture of continuous improvement, as Dutra (2016) highlighted. Secondly, a supportive organizational culture, advocated by Bon, Zaid, and Jaaron (2018), is crucial for sustaining lean transformation through collaborative environments and ongoing improvement efforts. Thirdly, effective systems and processes, including integrating KPIs aligned with strategic goals, promote visibility and accountability, facilitating continuous improvement (Cortes et al., 2016). Lastly, implementing Lean principles effectively reshapes organizational operations and culture, enhancing efficiency and quality (Sosa-Perez et al., 2020).Organizations can enhance lean implementation by focusing on key strategies. Firstly, fostering employee participation through comprehensive training, clear communication, and a participative environment encourages engagement and ownership of lean initiatives, integrating individual contributions into KPIs. Secondly, nurturing a supportive culture of transparency, teamwork, and continuous learning via reward systems and leadership exemplifying lean principles reduces resistance to change and ensures sustained success. Thirdly, implementing robust monitoring systems with defined KPIs and visual management tools aids in continuous improvement and waste reduction efforts, aligning organizational efforts with lean objectives. Recommendations include enhancing employee engagement, strengthening leadership involvement, optimizing system processes related to KPIs, conducting regular evaluations for lean optimization, and addressing neutral or unfavourable responses through improved communication and training. These steps will enable PT XXX to enhance operational efficiency, foster continuous improvement, and maintain competitiveness in the market through effective lean practices.

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