

THE INFLUENCE OF LEAN MANAGEMENT ON WORK EFFECTIVENESS AND EFFICIENCY AND THEIR IMPACT ON ORGANIZATIONAL PERFORMANCE WITH WORK ENVIRONMENT AS MODERATING VARIABLES IN MANUFACTURING COMPANIES



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Abstract

The study aims to determine the effect of lean implementation on work effectiveness and efficiency and its impact on organizational performance moderated by the work environment and is conducted using a quantitative approach with employees from four manufacturing companies in Cikarang as research respondents. From the results of the research conducted, it can be seen that communication has a significant positive effect on work effectiveness and efficiency (0.179), and communication has a significant positive effect on organizational performance with sig. value of 0.268, coordination has a significant positive effect on work effectiveness and efficiency with sig. value of 0.194, coordination does not have an influence on organizational performance with sig. value of -0.154, work effectiveness and efficiency have a significant positive effect on organizational performance with sig. value of 0.654, planning has a significant positive effect on work effectiveness and efficiency (0.192), and planning has no effect on organizational performance with sig. value of -0.016, resource allocation has a significant positive effect on work effectiveness and efficiency (0.209), and resource allocation has no effect on organizational performance with sig. value of -0.014, Structure and Integration has a significant positive effect on work effectiveness and efficiency with sig. value of 0.325, Structure and Integration has a significant negative effect on organizational performance with sig. value of -0.137, the work environment has a significant positive effect on organizational performance with sig. value of 0.358, the work environment cannot moderate the effectiveness and efficiency of work on organizational performance with sig. value of 0.567.

Keywords: Lean, Work Effectiveness, Efficiency, Performance, Work Environment

INTRODUCTION

Humans as social beings always need the help of others to do something and achieve their goals. To achieve the same goal, humans will generally form an organization. The organization is a structured unit of various components that interact and work together to achieve common goals (American Psychological Association, 2015). Each achievement of the organization's efforts will shape the organization's performance.

Organizational performance is a concept that describes the results, achievements, or achievements of the organization in terms of income, profits, development, and organizational growth (Hasan *et al.*, 2018; Khan *et al.*, 2016). Organizational performance may be encouraged by means of numerous elements, together with organizational tradition, work environment, management, and HR training and improvement (Cera & Kusaku, 2020). The work environment is a dimension that includes physical and non-physical aspects. This dimension can influence the ideas and activities of employees in an organization (Cera & Kusaku, 2020).

Apart from being social beings, humans are also known as economic creatures who strive to obtain maximum results by giving an effort or sacrifice. This also applies in organizational life. One method that can be applied to help minimize expenses and reduce waste in implementing organizational activities is to apply lean management. The method is proven to increase the productivity of an organization (Watanabe, 2018). Lean management is designed to produce the best products at low costs through a short process and without any waste; in short, lean is a method used to minimize waste and add product value (Kadarova & Demecko, 2016).

Based on the report of Pricewaterhouse Coopers LLP(2013), it can be seen that the application of this method can increase productivity between 40% to 60%. In addition, through their research, Moyano-Fuentes *et al.*, (2021) prove that the application of lean can improve organizational efficiency. Research by Salhieh & Abdallah, (2019) found that lean implementation has a positive impact and can improve organizational performance. Various studies have proven that lean implementation tends to impact the organization positively. However, no research examines the impact of lean on the organization by considering the

influence of other factors such as the work environment. The study aimed to determine the effect of lean on work effectiveness and efficiency and its impact on organizational performance with the work environment as a moderating variable.

REVIEW OF LITERATURE

Organizational Performance

The concept of performance can be described as the degree to which a set of objectives is met. The outcome of a sequence of process operations carried out to achieve certain organizational goals is performance. Performance appraisal is important because it may be used to assess an organization’s success in accomplishing its objectives (Khajeh, 2019). Good organizational performance can provide positive results for improvement with changes obtained from the process undertaken. Individuals, groups, and organizations can be measured on their performance, which is a reflection of the quantity and quality of work they accomplish (Obeso *et al.*, 2020).

Table 1
Indicators of Organizational Performance

Variable	Dimension	Indicators
Organizational Performance	Financial Performance	1. The company is able to achieve the targeted return on sales.
		2. The company is able to achieve the targeted profit.
		3. The company is able to achieve the targeted sales growth rate.
		4. The company is able to achieve the targeted productivity level.
	Operational Performance	5. The company is able to achieve the targeted market share
		6. The company always introduces new products at the right time
		7. The company is able to offer products/services that are in accordance with customer perceptions
		8. The company is able to use minimum production resources.

Source: (Obeso *et al.*, 2020)

Lean Management

Lean management is a method companies use to improve product quality, increase its value, and reduce waste. Lean is a concept to do more and more with less human effort, less equipment, less time, and less space to fulfill what consumers want (Kusumastuti, 2021). Lean management is an operational approach in organizational management (Parkhi, 2019). Another opinion states that lean is a management system and methodology that aims to improve service quality, safety, and efficiency (Khorasani *et al.*, 2020). Lean management is driven by the philosophy of respect for people and continuous improvement (Rosin *et al.*, 2020). This effort is carried out systematically with existing resources, focusing on customer value and eliminating existing waste (Lenarduzzi *et al.*, 2021). The ultimate goal is process speed, quality improvement, and efficiency (Mousavi Isfahani *et al.*, 2019).

Table 2
Indicators of Lean Management

Variabel	Dimension	Indicators
Lean Management	Structure and Integration Coordination	1. Trust and Knowledge
		2. Position
		3. Evaluation of product quality
		4. Good coordination with employees well
	Planning	5. Product quality
	6. New product strategy	
	Resource Allocation	7. Use of resources effectively and efficiently
		8. Make good use of resources
	Communication	9. Good communication between leaders and employees
		10. Good communication between employees

Source: (Mousavi Isfahani *et al.*, 2019)

Work Effectiveness and Efficiency

Effectiveness is the main element to achieve a predetermined goal or target in every organization. Organizations or companies can encourage and strengthen the behavior of being effective in achieving goals in the workplace by providing positive reinforcement to employees who exhibit this behavior. It can include recognizing and rewarding employees for their effectiveness, and providing opportunities for growth and development that can further enhance their effectiveness in the workplace (Belwalkar et al., 2018).

Effectiveness can be said to be effective if achieving predetermined goals or objectives. Work effectiveness is how a person or group carries out their primary tasks to achieve the desired goals (Ibrahim & Daniel, 2019). As a result, work effectiveness can be defined as the degree to which management actions succeed in accomplishing goals, such as the quantity of work, the quality of work, and the timeliness with which work is completed.

Efficiency is one way for companies to effectively manage financial resources, materials, processes, equipment, labor, and costs (Popovič et al., 2018). Efficiency is an effort to achieve maximum performance by using the available possibilities (materials, machines, and humans) in the shortest possible time in natural conditions (as long as the situation can change) without disturbing the balance between the objective factors, tools, energy and time. Efficiency is the best ratio between an outcome and its effort. This comparison can be seen from the following two aspects.

Table 3
Indicators of Work Effectiveness and Efficiency

Variable	Dimension	Indicators
Work Effectiveness and Efficiency	Ability to adapt	1. Adjustment to the task 2. Adjustment to people
	Work Productivity	3. Ability and interest of a worker 4. Clarity and acceptance of explanations
	Job Satisfaction	5. Job satisfaction 6. Satisfaction of

		rewards
	Resource Achievement	7. Material resources 8. Non material resources

Source: (Trougakos et al., 2020)

Work Environment

The overall number of tools and materials encountered, the surrounding area in which a person works, his work practices, and his work arrangements as individuals and groups are all considered part of the work environment. Everything in and around the workplace that can directly or indirectly affect employees is referred to as the physical work environment (Yovina Vanesa et al., 2019). A good working environment gives you a sense of security and allows you to do your best work. If an employee is satisfied with the work environment in which he or she works, the employee will feel at ease at work and will be more productive.

Table 4
Indicators of Work Environment

Variable	Dimension	Indicators
Work Environment	Physical Work Environment	1. Temperature 2. Noise 3. Lighting 4. Air quality 5. Workspace size 6. Privacy workspace settings
	Non-physical work environment	1. Working relationship 2. Group work environment

Source: (Yovina Vanesa et al., 2019)

Research Framework

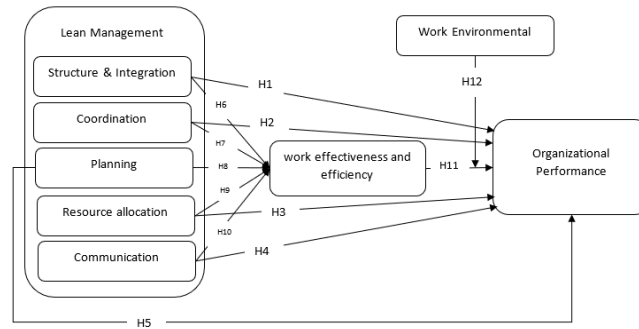


Figure1
Conceptual Framework
Source: Researchers' Data

RESEARCH METHOD

This research uses quantitative method. Quantitative research methods are designed to test existing hypotheses (Creswell. J., 2018). Quantitative methods are expressed as numbers obtained from measurements using a variable scale in research. Respondents in this study were employees of a manufacturing company in Cikarang, Indonesia. The sampling technique was random sampling, so the researchers took 100 employees from the four companies that were respondents in this study.

With the support of SmartPLS 3.0 software, the data was analyzed using a Structural Equation Model (SEM) technique. The following are the stages of data analysis in this study: a) Each indicator's validity and reliability are tested using the measurement methodology. The validity test in this study used convergent validity, in which the item score (component score) is correlated with the construct score, yielding the loading factor value. If the loading factor value is greater than zero, the instrument is declared valid. A reliability test was conducted after the validity test to verify the instrument's reliability (Petruzzo *et al.*, 2017). In this study, the alpha coefficient or Cronbach alpha and composite reliability were used to determine the level of reliability. If the coefficient value is greater than 0.6, the item is considered reliable; b) The Structural Model Test is a hypothesis-testing stage that tries to identify whether there is a correlation between constructs measured with SmartPLS or whether there is an influence between variables. The r-square,

which reveals how much impact between variables in the model, is used to assess the structural or inner model. Then, using the bootstrapping process, estimate the route coefficient with a value that is considered significant if the t-statistics is greater than 1.96 and the p-values are less than 0.05, while the coefficient of Beta value is used to see the direction of the effect.

RESULTS AND DISCUSSION

Outer Model Analysis

R-Square Test

The image below shows the PLS SEM model calculation results after the indicator that does not meet the requirements for the factor loading value is deleted; as can be seen, the factor loading value of the indicators in each variable is not less than 0.6, so the analysis moves on to the Discriminant Validity test.

Table 5
R-Square Test

	R Square	R Square Adjusted
Work Effectiveness and Efficiency	0.826	0.817
Organizational Performance	0.906	0.897

Source: Researchers' Data Analysis Results

Based on the test results, the R-Square score for work effectiveness and efficiency (Z) is 0.826, which means that work effectiveness and efficiency is influenced by structure and integration, coordination, planning, resource allocation and communication by 82.6% and 17.4% respectively. others are influenced by variables that have not been explained in this study. The R-Square score for Organizational Performance is 0.906, which means that structure and integration, coordination, planning, resource allocation and communication and Work Environmental (M) affect MSMEs Performance (Y) by 90.6% and 9.4% others are influenced by other variables that have not been described in this study.

Inner Model Analysis

The value of t-statistics and probability values can be used to test the hypothesis. To test the hypothesis using statistical values, compare the t count with the t table with an alpha of 5%. So, the criteria for accepting or rejecting the hypothesis are:

H0 is rejected if t-statistic > t-count. When utilizing probability to reject or accept a hypothesis, Ha is accepted if the p value is less than 0.05.

Table 6
Inner Model Analysis

	Original Sample (O)	Sample Mean (M)	Standard Deviation (STDEV)	T Statistics (O/STDEV)	P Values
Communication → Work Effectiveness and Efficiency	0,179	0,190	0,073	2,436	0,015
Communication → Organizational Performance	0,268	0,270	0,062	4,290	0,000
Coordination → Work Effectiveness and Efficiency	0,194	0,191	0,057	3,431	0,001
Coordination → Organizational Performance	-0,154	-0,153	0,085	1,818	0,070
Work Effectiveness and Efficiency → Organizational Performance	0,654	0,652	0,083	7,874	0,000
Moderating Effect 1 → Organizational Performance	0,017	0,018	0,030	0,576	0,565
Planning → Work Effectiveness and Efficiency	0,192	0,187	0,076	2,525	0,012
Planning → Organizational Performance	-0,016	-0,024	0,063	0,259	0,796
Resource Allocation → Work Effectiveness and Efficiency	0,209	0,206	0,058	3,607	0,000
Resource Allocation → Organizational Performance	-0,014	-0,019	0,066	0,208	0,836
Structure and Integration → Work Effectiveness and Efficiency	0,325	0,323	0,063	5,152	0,000
Structure and Integration → Organizational Performance	-0,137	-0,148	0,069	1,980	0,048

Source: Researchers' Data Analysis Results

Communication on Work Effectiveness and Efficiency

The results of testing the hypothesis of the effect of communication on work effectiveness and efficiency show that the p-value is 0.015, which is smaller than 0.05. Moreover, the t-statistic value is 2.436, more significant than 1.960, and the beta score is 0.179. So, the explanation above will show that communication has a significant positive

effect on work effectiveness and efficiency. These results are in line with the findings of Simamora (2018), who found that communication and HR capabilities affect the level of work effectiveness and efficiency. In line with this, research conducted by Rachmayuniawati, (2018) research found that communication and coordination significantly affect work effectiveness. The communication variable significantly impacts work effectiveness both directly and through communication media (Anjani *et al.*, 2018), the communication variable significantly impacts work effectiveness. Cooperation can be carried out properly if dialogical communication between managers and subordinates and among all workers who carry out organizational activities (Athoillah, 2010). With the response, assumption, or feedback given by the communicant, it means that the message sent has arrived so that two-way communication occurs. So that the better the communication between employees, the more effective and efficient the work will be. It is in line with research (Chen *et al.*, 2020; Hamilton *et al.*, 2019; Lakoy, 2015). The results of these studies state that communication affects work effectiveness and efficiency.

Communication on Organizational Performance

The p-value for evaluating the hypothesis of communication's effect on organizational performance is 0.000, which is significantly less than 0.05. Moreover, the t-statistic value is 4.290, more significant than 1.960, and the beta score is 0.268. So, the explanation above will show that communication has a significant positive effect on organizational performance. Communication is the process of delivering information from ideas from one party to another, both from individuals and groups, to interpret what is meant and carry out tasks as well as possible. Therefore, better communication between employees can make organizational performance better. This is in line with research (Choi *et al.*, 2018; Fachrezi & Khair, 2020; Singh, 2021). The results of this study state that communication affects organizational performance.

Coordination of Work Effectiveness and Efficiency

The findings of evaluating the hypothesis of coordination's effect on work effectiveness and efficiency demonstrate that the p-value is 0.001, which is less than 0.05. The t-statistic value is 3,431, which is significantly higher than 1.960, and the beta score is

0.194. As a result of the preceding explanation, coordination has a major positive impact on work effectiveness and efficiency. The results of research support this finding by Rachmayuniawati, (2018) which finds that communication and coordination have a significant effect on work effectiveness. The same finding was also obtained by research (Mulait *et al.*, 2019; Pratama, 2019) where coordination significantly affected work effectiveness and efficiency.

Coordination of Organizational Performance

The p-value for testing the hypothesis of coordination's effect on organizational performance is 0.070, which is greater than 0.05. Moreover, the t-statistic value is 1.818, smaller than 1.960 and the beta score is -0.154. So, the explanation above will show that coordination does not affect organizational performance. The results of this study are in line with the findings (Darmanto, 2019; Nainggolan *et al.*, 2021; *Studi Manajemen et al.*, 2020), which also found that the coordination variable, either accompanied or not accompanied by other variables, either directly or indirectly had a positive influence and significant to the level of organizational performance.

Work Effectiveness and Efficiency on Organizational Performance

The p-value for evaluating the hypothesis of the effect of work effectiveness and efficiency on organizational performance is 0.000, which is significantly less than 0.05. Moreover, the t-statistic value is 7.874, greater than 1.960 and the beta score is 0.654. So, the explanation above will show that work effectiveness and efficiency have a significant positive effect on organizational performance. Syam, (2020), through his research at the East Banggae District Office on the effect of work effectiveness and efficiency on employee performance, found that effectiveness and work efficiency simultaneously affect the optimization of employee performance achievements. These findings support the results of this study which found that work effectiveness and efficiency had a significant positive effect on organizational performance.

Planning for Work Effectiveness and Efficiency

The p-value for testing the hypothesis of planning's influence on work effectiveness and efficiency is 0.012, which is less than 0.05. In addition, the t-statistic is 2.525, which is higher than 1.960, and the beta score is 0.192. As a result of the preceding explanation, planning has a significant positive impact on work effectiveness and efficiency. These findings are explained by (George *et al.*, 2019), who found that planning strategies can affect effectiveness and work efficiency.

Work Effectiveness and Efficiency Moderated Work Environment on Organizational Performance

The results of testing the hypothesis of the effect of work effectiveness and efficiency moderated by work environment on the organizational performance show that the p-value is 0.567, greater than 0.05. Moreover, the t-statistic value is 0.576, smaller than 1.960 and the beta score is 0.017. Thus, the explanation above will show that the work environment cannot moderate the effectiveness and efficiency of work on organizational performance.

Planning on Organizational Performance

The results of testing the hypothesis of the influence between planning on organizational performance show that the p-value is 0.796, more significant than 0.05. Moreover, the t-statistic value is 0.259, smaller than 1.960 and the beta score is -0.016. So, from the explanation above, it will show that planning does not affect organizational performance. Hapsari, (2019) through his research, found that planning affects performance.

Resource Allocation on Work Effectiveness and Efficiency

The p-value for evaluating the hypothesis that resource allocation has an influence on work effectiveness and efficiency is 0.000, which is less than 0.05. In addition, the t-statistic is 3.607, which is higher than 1.960, and the beta score is 0.209. As a result of the preceding explanation, resource allocation has a major positive impact on work effectiveness and efficiency. Human resource allocation based on competency has a

favorable and significant impact on effectiveness and efficiency. (Restiti Nintyari *et al.*, 2019).

Resource Allocation on Organizational Performance

The p-value for testing the hypothesis that resource allocation has an influence on organizational performance is 0.836, which is greater than 0.05. Furthermore, the beta score is -0.014, and the t-statistic value is 0.208, which is lower than 1.960. As a result, the foregoing argument demonstrates that resource allocation has no impact on organizational performance. Research conducted (Mulyono, 2012) found that HR allocation based on competence affects employee and organizational performance, not in line with the opinion of Winarno which states that human capital affects organizational performance. Human resources are an important part of higher education non-public organizations because they carry out the mandate to educate the community and create an insightful generation. If the human resources have good quality, they will automatically carry out their duties well, and the organization's performance can be achieved well.

Structure and Integration on Work Effectiveness and Efficiency

The results of testing the hypothesis of the influence between structure and integration on work effectiveness and efficiency show that the p-value is 0.000, which is smaller than 0.05. Moreover, the t-statistic value is 5.152, greater than 1.960 and the beta score is 0.325. The explanation above will show that structure and integration have a significant positive effect on work effectiveness and efficiency. Effectiveness can be said to be effective if achieving predetermined goals or objectives. Effectiveness needs to be considered because it has a large effect on the interests of many people. Effectiveness means that the previously planned goals can be achieved or, in other words, achieved because of the activation process (Rahman, 2015). Effective and efficient actions must be carried out consistently with behavior and conformity with the adopted values.

Structure and Integration on Organizational Performance

The p-value for evaluating the hypothesis of the influence of structure and integration on organizational performance is 0.000, which is significantly less than 0.05. In addition, the t-statistic is 4.290, which is higher than 1.960, and the beta score is -0.137. As

a result of the above explanation, it is clear that structure and integration have a negative impact on organizational performance. Organizational performance is a description of an organization's efforts to achieve its objectives, which are influenced by the organization's resources (Ahdiyana, 2015).

CONCLUSION

Based on the results of the research conducted, it can be seen that communication has a significant positive effect on work effectiveness and efficiency (0.179). Communication has a significant positive effect on organizational performance (0.268), coordination has a significant positive effect on work effectiveness and efficiency (0.194), coordination does not have influence on organizational performance (-0.154), work effectiveness and efficiency have a significant positive effect on organizational performance (0.654), planning has a significant positive effect on work effectiveness and efficiency (0.192), planning has no effect on organizational performance (-0.016), resource allocation has significant positive effect on work effectiveness and efficiency (0.209), resource allocation has no effect on organizational performance (-0.014), structure and integration has a significant positive effect on work effectiveness and efficiency (0.325), structure and integration has a negative effect significant positive effect on organizational performance (-0.137), work environment has a significant positive effect on organizational performance (0.358), work environment cannot moderate work effectiveness and efficiency on organizational performance (0.567).

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