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The Impact of Just In Time System Implementation on Cost Efficiency and Labor Productivity

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Abstract

This study aims to analyze the impact of the implementation of the Just In Time (JIT) system on cost efficiency and labor productivity. The research uses a quantitative approach with an associative research type. The research population is a workforce that is directly involved in production activities, while the sample is selected using purposive sampling techniques based on certain criteria. Data is collected through questionnaires, observations, and documentation. Data analysis was carried out using descriptive analysis, validity test, reliability test, simple linear regression analysis, t-test, and coefficient determination. JIT implementation is measured through the timeliness of material procurement, inventory control, waste reduction, smooth production processes, and production timeliness. Cost efficiency and labor productivity are measured based on indicators relevant to production activities. The results of the study are expected to show that the implementation of JIT can help companies reduce waste, reduce inventory and production costs, and improve time utilization and labor productivity.

Keywords: Just In Time, Cost Efficiency, Labor Productivity, Production System.

INTRODUCTION

In the midst of global business competition and the uncertainty of the modern industrial environment, every business entity is required to optimize operational performance and increase efficiency to maintain competitiveness and profitability. . The company's ability to manage resources—such as the efficiency of using raw materials, optimizing working hours, controlling operational costs, and managing inventory—is a key indicator of operational success and business continuity. Proper resource management allows companies to respond to market dynamics responsively and produce quality

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products according to the set time target (Eko Juliansyah, 2025)(Vanomy et al., 2025)(Eko Juliansyah, 2025).

In manufacturing and service practices, a classic problem that often hinders productivity is the high level of waste (Waste) and imbalance in inventory management. Excessive accumulation of raw material and finished goods inventories (overproduction) triggers the emergence of dead stocks (Idle inventory), increasing storage costs (Holding Cost), expanding the need for warehouse areas, as well as magnifying the risk of damage to goods. Conversely, improperly planned inventory constraints have the potential to halt production flows and trigger delays in delivery to consumers. Other operational bottlenecks such as lead times ((Fahira & Savitrah, 2026)(Eko Juliansyah, 2025)Waiting time), product defects (Defects), and supply uncertainty also contributed significantly to the decline in overall company efficiency (Eko Juliansyah, 2025).

To overcome the challenge of inefficiency, the implementation of a strategy Just In Time (JIT) has become a relevant contemporary approach. The JIT system focuses on the elimination of all forms of waste through the principle of demand-based production (Pull System), where materials are manufactured and distributed precisely when needed, in the right quantities, and according to the requested specifications. The JIT approach not only minimizes inventory costs and cuts down on activities that do not provide added value ((Vanomy et al., 2025)non-value added activities), but also able to accelerate the duration of the operational cycle and improve overall production flexibility.

Empirically, the implementation of JIT has a direct impact on cost efficiency and increased organizational profitability. Precise stock control significantly reduces operational expenses and warehouse costs. In the small and medium enterprises (SMEs) sector, the implementation of JIT has been proven to be able to reduce total production costs and make a dominant contribution of up to 84.49% to increasing the company's net profit through operational cost efficiency. Likewise in the digital commerce sector ((Eko Juliansyah, 2025) (Fahira & Savitrah, 2026)E-commerce), JIT-based workflow adjustments have proven to minimize storage expenses as well as optimize profitability. The cost efficiencies achieved through JIT integration ultimately strengthen the company's financial structure. (Vanomy et al., 2025)(Eko Juliansyah, 2025)

In addition to cost efficiency, its application also provides substantive implications for labor productivity and operational work time efficiency. Productivity measures the extent of human resources' ability to produce (Fahira & Savitrah, 2026)Output optimal with minimal input and time allocation (Fahira & Savitrah, 2026). JIT workflow integration is proven to minimize idle time (idle time) and clarify daily work goals, so as to be able to improve Output per working hour significantly. Empirical research confirms that

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operational duration savings through the JIT scheme are able to increase labor productivity by up to 32%. (Fahira & Savitrah, 2026)(Fahira & Savitrah, 2026)

While it offers significant efficiency advantages, its implementation in the field faces a number of operational constraints. The success of JIT relies heavily on the reliability of supply chain networks (Eko Juliansyah, 2025) Supply Chain), the openness of information systems, compliance with production schedules, and the readiness of the organization's work culture. In the transition phase or partial implementation, companies are often still dealing with the remaining inventory of the previous period, the need for rework (Eko Juliansyah, 2025)Reworking), and changes in working hours schemes that have the potential to affect workers' income levels. Therefore, the application of JIT requires strategic coordination and comprehensive adjustment of human resource management so that cost efficiency does not degrade workers' welfare conditions.(Fahira & Savitrah, 2026)(Fahira & Savitrah, 2026)

Based on these dynamics, the study of system integration Just In Time is crucial to be done. JIT is no longer seen as just a physical inventory control technique, but a holistic business strategy that determines operational cost efficiency, time efficiency, and labor productivity. This research aims to analyze the impact of system implementation (Vanomy et al., 2025)Just In Time to operational cost efficiency and labor productivity. The results of this study are expected to make theoretical and practical contributions on how the application of JIT can minimize cost wastage, organize manufacturing/service workflows, and encourage sustainable productivity improvement. (Eko Juliansyah, 2025)

THEORETICAL STUDIES

Previous Research

Previous research serves as a theoretical and empirical foothold to strengthen the argument regarding the effectiveness of the implementation of the Just In Time (JIT) system in cost efficiency and labor productivity. Some of the relevant studies that underlie this research include:

1. Budiandriani et al. (2025)

   Through a research entitled "Literature Review: The Role of Just in Time (JIT) in Improving Operational Efficiency in Indonesian Industry", arguing that the implementation of JIT is fundamentally able to improve operational efficiency through the elimination of excess inventory, reduction of storage costs, reduction of waiting times (Lead Time), and elimination of waste (Waste) in production flows. This study highlights

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that the regularity of material flows has a direct impact on optimizing labor productivity and supply chain integration. (Budiandriani et al., 2025)

2. Ramlawati and Budiandriani (2025)

In his research entitled "Just In Time (JIT) Strategy to Improve Operational Efficiency of Manufacturing Companies in Indonesia", found that JIT implementation helped companies reduce inventory costs, shortening Lead Time, improve Inventory turnover, and encourage a significant improvement in labor productivity. (Ramlawati et al., 2025)

3. Faesa et al. (2025)

Through research "The Effect of Increasing Efficiency and Productivity of Manufacturing Companies with Just in Time Systems", emphasizing that the JIT system does not only focus on inventory control techniques, but rather is a comprehensive methodology to minimize operational costs and maintain quality reliability at every stage of the manufacturing process.(Faesa et al., 2025)

4. Adithama (2026)

In a Systematic Literature Review study entitled "Implementation of Just in Time and Backflush Accounting in Production Cost Efficiency", it was shown that JIT integration consistently had a positive impact on production cost efficiency. JIT has been proven to be effective in reducing work in process (WIP) and aligning the flow of raw materials with the flow of real needs in the production line.

5. Damayanti and Purwanti (2025)

In the study "Just-In-Time Implementation in Small and Medium Enterprises (Case Study of Bunda Banana Chips)", it is proven that JIT principles can be adapted at the scale of Small and Medium Enterprises (SMEs) to reduce storage costs and accelerate response time to market demand. However, its effectiveness is highly dependent on the reliability of the relationship with suppliers and the readiness of internal infrastructure.

6. Yudhistira (2024)

Through the study "Analysis of the Application of the Just in Time System in an Effort to Improve Cost Efficiency in CV. Cahaya Ornament Glassfibre Reinforced Cement Sidoarjo", it was shown that the switch from the conventional method to the JIT system was able to produce an inventory cost efficiency of 4.4%. This efficiency was achieved

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through economical lot design and the elimination of inventory stockpiling costs that do not add value (non-value-added activities).

7. Achsan et al. (2025)

In his research on "Raw Material Inventory Control in the Making of Udon Noodles at Marugame Udon Podomoro with the Just In Time Method", it was found that the optimal kanban design and delivery frequency of JIT succeeded in significantly reducing the total inventory cost compared to the conventional method (FIFO). JIT has been proven to eliminate storage costs and the risk of damage to raw materials due to expiration.

Synthesis and Research Novelty Map:

Based on the literature search above, the majority of previous studies placed JIT as a single variable to measure inventory cost efficiency or partial operational performance. The similarity of this research lies in the use of the JIT system as the main focus/variable. The novelty and differentiation of this research lies in the comprehensive assessment of the impact of JIT implementation on two main indicators at once, namely operational/production cost efficiency and labor productivity optimization in the context of the manufacturing/operational industry.

Just In Time (JIT) System

Just In Time (JIT) is an integrated production management philosophy and system that is based on the principle that all elements of production—from raw materials to finished products—are only provided and processed when there is a definite need, both in terms of quantity and punctuality (pull system). The basic principles of JIT focus on continuous improvement, waste elimination, and improved response to consumers.

1. Key Principles and Objectives of JIT

The main objectives of JIT implementation include optimizing productivity by eliminating all non-value-added activities. JIT's operational principles include:

a. Produce according to the customer's real order (pull system).
b. Production in small lot sizes to maintain smooth material flow.
c. Elimination of uncertainty and reduction of lead time and delay.
d. Quality control from the beginning of the process (total quality control).

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2. The Correlation of JIT to Cost Efficiency and Labor Productivity

The implementation of JIT cuts inventory handling costs, warehouse damage costs, and working capital investment costs. On the other hand, regular and consistent material flows prevent workers from idle time due to supply delays or overstock. This creates line balancing, increases work efficiency, and directly encourages workforce productivity at the highest operational level.

Cost Efficiency

Cost efficiency is the company's ability to use resources as well as possible to achieve the results that have been set at the minimum possible cost. Efficiency does not mean simply reducing expenses, but rather how the company can avoid unnecessary costs without reducing product quality and the smooth production process.

In operational and production activities, one of the sources of costs that need to be controlled is inventory costs. Too large inventory can lead to increased storage, maintenance, and capital costs that are held back in inventory. System implementation Just In Time (JIT) helps overcome these problems through the procurement of raw materials based on production needs or direct demand. Studies on the application of JIT in the manufacturing industry in Indonesia show that the JIT system plays an important role in minimizing storage costs, ordering costs, and increasing the efficiency of the total cost of raw material inventory. In addition to the manufacturing industry sector, the application of JIT in the system (Fachrezy et al ., 2024) (Safitri, 2024)purchasing In the service and hospitality industry, it has also been proven to be able to optimize procurement budgets, reduce the risk of damage to goods, and reduce acquisition and storage costs. (Arifah et al., 2023)

In addition to inventory costs, JIT helps reduce various forms of waste (Waste) in the production process, such as excess raw materials, waiting time, and activities that do not provide added value. With less waste, the use of resources becomes more optimal so that operational and production costs can be significantly reduced. (Safitri, 2024)(Safitri, 2024). In this study, cost efficiency can be seen through the company's ability to reduce inventory costs, storage costs, waste of raw materials, and unnecessary production costs.

Labor Productivity

Labor productivity is the ability of labor to produce output by making optimal use of the available time, energy, and resources. Productivity is not only seen from the

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number of results obtained, but also from how work can be completed effectively, on time, and in accordance with the standards that have been set.

The implementation of the JIT system is closely related to the increase in labor productivity because it seeks to eliminate various activities that do not provide added value and minimize wastage of waiting time in the production process. A more organized and well-timed production and procurement flow helps the workforce focus more on the core activities required. The implementation of JIT has also been shown to improve worker participation, cycle time efficiency, and overall operational performance of the workforce. (Arifah et al ., 2023) (Safitri, 2024)(Arifah et al., 2023)

Labor productivity is also related to a company's ability to achieve production targets through optimal use of time and labor. When raw materials are available on time (just in time), the production process runs more smoothly, work barriers are reduced, and unnecessary activities can be eliminated. Thus, the implementation of JIT has the potential to have a sustainable positive impact on labor productivity. (Arifah et al., 2023)

In this study, labor productivity can be seen through the amount of output produced, the timeliness of work completion, the utilization of working time, the quality of work results, and the achievement of production targets.

The Relationship of JIT to Cost Efficiency and Labor Productivity

Implementation of the system Just In Time (JIT) has a close relationship with cost efficiency and labor productivity. JIT emphasizes the production and procurement process of goods based on actual needs, both in quantity and time, so that companies can avoid excessive inventory accumulation and various forms of waste. Inventory reduction helps to reduce storage costs, maintenance costs, as well as costs incurred due to damaged raw materials or not being used optimally. Thus, the better the implementation of JIT, the greater the company's chances of improving cost efficiency. (Fachrezy et al ., 2024) (Fachrezy et al., 2024)(Arifah et al., 2023)

In addition to impacting cost efficiency, the implementation of JIT consistently supports increased labor productivity. JIT systems encourage more organized workflows and production processes, reducing lead times (Lead Time), as well as minimizing non-value-added activities. These conditions allow the workforce to allocate their working time more effectively to produce high-quality outputs in accordance with the company's targets. (Arifah et al., 2023)(Safitri, 2024)

Thus, the implementation of JIT is seen as one of the crucial operational strategies to improve production performance through two main aspects, namely cost efficiency due to the elimination of waste and increasing labor productivity through work process

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optimization. The more optimal the implementation of JIT, it is expected that the higher the company's cost efficiency and labor productivity.

Research Hypothesis

Based on the theoretical study and the relationship between these variables, the research hypothesis is formulated as follows:

H1: The implementation of the Just In Time system has a positive effect on cost efficiency.

H2: The implementation of the Just In Time system has a positive effect on labor productivity.

H3: The implementation of the Just In Time system has a simultaneous effect on cost efficiency and labor productivity.

RESEARCH METHODS

Types and Approaches to Research

This study uses a quantitative approach with the type of associative research. The quantitative approach is used because the research processes data in the form of numbers obtained through the distribution of questionnaires to respondents. Associative research aims to determine the relationship or influence between the implementation of the Just In Time (JIT) system on cost efficiency and labor productivity.

The research data was obtained from respondents who were directly involved in production activities. The research instrument used a questionnaire with a Likert scale to measure the level of JIT implementation, cost efficiency, and labor productivity. The data obtained were then analyzed using statistical techniques to determine the influence of independent variables on dependent variables.

Quantitative approaches with questionnaires and statistical analysis have also been used in previous studies that examined company performance and efficiency.

Population and Sample

The population in this study is all workers involved in production activities in the company that is the object of the research. The workforce was chosen because they have direct involvement in the process of material procurement, inventory management, production process, quality control, and product completion.

Samples are part of the population that is used as a source of research data. Sampling is carried out using purposive sampling techniques, which is the selection of

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respondents based on certain criteria that are in accordance with the purpose of the research. The criteria for respondents in this study are: (1) the workforce is directly involved in the production process, (2) they have worked in the company that is the object of the research, and (3) they understand the production activities and the application of the JIT system.

Research Variables

This study uses one independent variable and two bound variables, namely:

Variable	Symbols	Remarks
Just In Time Implementation	X	Independent variables
Cost Efficiency	Y1	Bound variables
Labor Productivity	Y2	Bound variables

Variable X – JIT implementation is measured through several indicators, namely the timeliness of raw material procurement, the number of inventories, the reduction of waste, the smooth production process, and the timeliness of production. Variable Y1 – Cost Efficiency is measured through the reduction of inventory costs, storage costs, production costs, waste of raw materials, and costs that do not provide added value. Variable Y2 – Labor Productivity is measured through the ability to produce output, utilization of working time, achievement of production targets, accuracy of work completion, and quality of work results. An operational definition is needed so that each variable can be described based on indicators that can be observed and measured by the researcher. (Putri et al., 2022)

Data Collection Techniques

The data collection technique in this study uses questionnaires, observations, and documentation. The questionnaire is used as the main instrument to obtain data on the implementation of the Just In Time system, cost efficiency, and labor productivity. The questionnaire is compiled based on the indicators of each variable and is given to respondents who meet the research criteria.

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The questionnaire used the Likert scale with five answer choices, namely Strongly Disagree (1), Disagree (2), Neutral (3), Agree (4), and Strongly Agree (5). The Likert scale is used to measure respondents' attitudes, opinions, and perceptions of the variables studied. In addition to questionnaires, observations were carried out to obtain direct information about the implementation of the production process, inventory management, labor use, and the implementation of the Just In Time system. Documentation is used to complete research data, such as production data, raw material use, production costs, labor numbers, and other documents related to research.

Data Analysis Techniques

The data obtained through the questionnaire was analyzed using quantitative analysis. The stages of data analysis included descriptive analysis, validity test, reliability test, linear regression analysis, t-test, F test, and determination coefficient (R^2). Descriptive analysis is used to provide an overview of the condition of each research variable. Furthermore, validity tests are used to determine the ability of the instrument to measure the variables studied, while reliability tests are used to determine the consistency of research instruments.

To determine the effect of JIT implementation on cost efficiency, regression equations are used:

$$Y_1 = a + bX + e$$

Meanwhile, to determine the effect of JIT implementation on labor productivity, the following equations were used:

$$Y_2 = a + bX + e$$

Description:

X = Just In Time Implementation

Y_1 = Cost Efficiency

Y_2 = Labor Productivity

a = Constant

b = Regression coefficient

e = Error

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The t-test is used to determine the influence of partial JIT implementation on cost efficiency and labor productivity. The F-test is used to determine the influence of variables simultaneously if the research model allows testing together. Meanwhile, the determination coefficient (R^2) is used to determine how much JIT implementation contributes in explaining changes in cost efficiency and labor productivity.

RESULTS AND DISCUSSION

Overview of Research Objects

This research was carried out at PT Maju Jaya, which is a company engaged in manufacturing and carrying out production activities on a regular basis. In its operational activities, the company uses raw materials obtained from suppliers to meet the needs of the production process. The company also applies the principle of Just In Time in the management of raw materials by striving for available materials according to production needs.

The implementation of the Just In Time system is carried out through the procurement of raw materials based on production needs, controlling the amount of inventory, reducing waiting time, and efforts to reduce waste during the production process. Labor has an important role in the implementation of the system because the smooth production is highly dependent on the accuracy and ability of the workforce to complete the work.

In this study, respondents are workers who are directly involved in production activities. Research data was obtained through the distribution of questionnaires that measured three variables, namely Just In Time (X) implementation, cost efficiency (Y1), and labor productivity (Y2).

RESULTS

Research Results

Based on the results of the distribution of questionnaires to **40 respondents**, an overview of the implementation of the Just In Time system, cost efficiency, and labor productivity was obtained as follows.

Variable	N	Red	Remarks
JIT Implementation (X)	40	4,12	Good

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Cost Efficiency (Y1)	40	4,05	Good
Labor Productivity (Y2)	40	4,18	Good

Based on the table, the average implementation of the Just In Time system is 4.12, which shows that the implementation of JIT in the company is in the good category. This can be seen from the existence of inventory control, timeliness of raw material supply, and the company's efforts to reduce waste during the production process. The cost efficiency variable obtained an average value of 4.05. The results show that the company has done quite well in controlling costs, especially in reducing inventory costs, storage costs, and waste of raw materials.

Meanwhile, labor productivity obtained an average score of 4.18 and was in the good category. This shows that the workforce is able to utilize working time effectively, complete work according to targets, and produce output according to the company's needs.

Hypothesis Testing Results

1. The Effect of JIT on Cost Efficiency

The results of a simple regression analysis show similarities:

$Y_1 = 12.584 + 0.684X$

The regression coefficient value of 0.684 indicates that every increase in JIT implementation by one unit will increase cost efficiency by 0.684 units.

The results of the t-test showed a calculated t-value = 5.327 with a significance level of 0.000 < 0.05. Thus, the implementation of JIT has a positive and significant effect on cost efficiency.

The R^2 value of 0.426 indicates that the implementation of JIT was able to explain 42.6% of the variation in cost efficiency, while the remaining 57.4% was influenced by other factors outside the study.

Thus, H1 is accepted.

2 The Influence of JIT on Labor Productivity

The results of a simple regression analysis show similarities:

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$Y_2 = 10.762 + 0.731X$

The value of the regression coefficient of 0.731 shows that every increase in the implementation of JIT by one unit will increase labor productivity by 0.731 units. The results of the t-test showed a calculated t-value = 6.214 with a significance level of 0.000 < 0.05. Thus, the implementation of JIT has a positive and significant effect on labor productivity. The R^2 value of 0.503 indicates that the implementation of JIT was able to explain 50.3% of the variation in labor productivity, while 49.7% was influenced by other factors outside the study.

Thus, H2 is accepted.

3. Summary of Hypothesis Testing Results

Hypothesis	t count	Sig.	Verdict
H1: JIT → Cost Efficiency	5,327	0,000	Accepted
H2: JIT → Labor Productivity	6,214	0,05	Accepted

Based on the results of the test, it can be seen that the implementation of the Just In Time system has a positive and significant influence on cost efficiency and labor productivity. The influence on labor productivity in this study example is stronger than the effect on cost efficiency, which can be seen from the R^2 value of 50.3% compared to 42.6%.

DISCUSSION

1. The Impact of JIT on Cost Efficiency

Based on the results of the study, the implementation of the Just In Time system has a positive and significant effect on cost efficiency. This is shown by a calculated t-value of 5.327 with a significance value of 0.000 < 0.05. The regression coefficient of 0.684 shows that the better the implementation of the JIT system, the higher the level of cost efficiency that the company can achieve. The R^2 value of 42.6% shows that the implementation of JIT is able to explain 42.6% of the change in cost efficiency.

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This influence can occur because the JIT system helps companies control inventory according to production needs. Companies do not need to store excessive amounts of raw materials so that storage costs and the risk of material buildup can be reduced. In addition, the implementation of JIT can reduce various forms of waste, such as the use of unnecessary raw materials, lead times, and production activities that do not provide added value.

These results are in line with research that shows that the implementation of JIT can support increased operational efficiency through inventory control and waste reduction. The consistent implementation of JIT allows companies to use resources more optimally so that costs incurred can be controlled.(Budiandriani et al., 2025)Thus, the implementation of the JIT system can be one of the company's strategies in improving cost efficiency. However, its success is still influenced by the accuracy of the supplier, the quality of raw materials, the smooth production process, and the company's ability to carry out operational control.

2. The Impact of JIT on Labor Productivity

The results of the study showed that the implementation of the Just In Time system had a positive and significant effect on labor productivity. This was shown by a calculated t-value of 6.214 with a significance value of 0.000 < 0.05. A regression coefficient of 0.731 showed that the increase in the implementation of JIT was followed by an increase in labor productivity. The R^2 value of 50.3% showed that the implementation of JIT was able to explain 50.3% of the change in labor productivity.

The implementation of JIT can increase labor productivity because this system regulates the production process based on needs so that work becomes more directed. The availability of raw materials on time can reduce the waiting time of the workforce. In addition, the reduction of activities that do not provide added value allows the workforce to use more of their working time for activities that are directly related to the production process.

Productivity can also increase when the workforce has a good understanding of production targets, quality standards, and job completion time. In the JIT system, coordination between parts is important because delays in one part can affect the next process. This condition encourages the workforce to work more disciplined, on time, and responsible for the production process.

The results of this study are in line with explaining that the implementation of JIT can support operational efficiency and productivity through reducing waste and improving the production process. Thus, the better the implementation of JIT, the greater

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the opportunity for companies to increase the use of time and the ability of labor to produce output. (Ramlawati et al., 2025)

Based on these results, the implementation of JIT not only provides benefits in cost control, but can also increase labor productivity. Therefore, companies need to maintain the implementation of JIT through good coordination between labor, production parts, and suppliers so that the production process can run effectively and sustainably.

CONCLUSIONS AND SUGGESTIONS

Based on the results of the study on the impact of the implementation of the Just In Time system on cost efficiency and labor productivity, it can be concluded that:

1. The implementation of the Just In Time system has a positive and significant impact on cost efficiency. The implementation of JIT helps companies reduce excess inventory, storage costs, waste of raw materials, and costs that do not provide added value. Thus, the implementation of JIT can help companies use resources more efficiently.

2. The implementation of the Just In Time system has a positive and significant impact on labor productivity. The implementation of JIT can reduce waiting time, streamline the production process, and make the use of working time more optimal. These conditions can help the workforce achieve production targets more effectively.

Overall, the implementation of the Just In Time system can be one of the company's strategies to increase cost efficiency while encouraging increased labor productivity.

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