International Journal of Social Science, Educational, Economics, Agriculture Research and Technology (IJSET) | ISSN (e) : 2827-766X
Volumes 4 No.12 (2025)

THE INFLUENCE OF INVENTORY MANAGEMENT, PRODUCTION LEAD TIME, AND RAW MATERIAL QUALITY ON COMPANY OPERATIONAL PERFORMANCE

Abu Naim[1]*, Nirfison[2], Abdul Rouf[2], Eko Hadi Sucipto[2], Mardi[1]
Management Studies Program/ Muhammadiyah A.R. Fachruddin University, Tangerang
Industrial Engineering Program/ Muhammadiyah A.R. Fachruddin University, Tangerang
E-mail: abunaim@unimar.ac.id

Received : 10 October 2025
Revised : 01 November 2025
Accepted : 25 November 2025
Published : 25 December 2025
Link Publish : https://www.ijset.org/index.php/ijset/index

Abstract
In the era of increasingly intense business competition, companies are required to achieve superior operational performance in order to survive and remain competitive. Operational performance reflects a company's ability to manage resources effectively to produce goods with high quality, timely delivery, and optimal cost. Several key factors that influence operational performance include inventory management, production lead time, and raw material quality. Poor inventory management can lead to excess stock, increased storage costs, or shortages of raw materials that disrupt production. Long production lead times may cause delivery delays, higher operational costs, and reduced customer satisfaction. In addition, low-quality raw materials can increase defect rates, rework, and waste, thereby reducing operational efficiency. This study aims to analyze the effect of inventory management, production lead time, and raw material quality on company operational performance using a quantitative approach. The research employs a causal associative design to examine the cause-and-effect relationships between the independent variables—inventory management (X1), production lead time (X2), and raw material quality (X3)—and the dependent variable, operational performance (Y). The population consists of employees directly involved in operational activities, including production, warehouse, and quality control departments. Data were collected through questionnaires using a five-point Likert scale and analyzed using SPSS software. Prior to hypothesis testing, validity and reliability tests as well as classical assumption tests (normality, multicollinearity, and heteroscedasticity) were conducted to ensure that the regression model met the BLUE criteria. Multiple linear regression analysis was used to test both partial and simultaneous effects. The results indicate that inventory management and raw material quality have a positive and significant effect on operational performance, while production lead time has a negative and significant effect. Simultaneously, the three variables significantly influence operational performance, with a coefficient of determination of 0.612. These findings suggest that companies should manage inventory effectively, shorten production lead times, and maintain high raw material quality to enhance operational performance. The study provides practical insights for management and serves as a reference for future research in operations management.

Keywords: Inventory Management; Production Lead Time; Raw Material Quality; Operational Performance; Multiple Linear Regression

INTRODUCTION

Due to increasingly fierce business competition, companies must have superior operational performance to survive and thrive. A company's ability to produce goods quickly, efficiently, with high quality, and at optimal cost is evidence of good operational performance. Therefore, company management must pay close attention to managing operational factors as a strategic element. Inventory management is an essential component of operational management. Ineffective inventory management can lead to overstocking, higher storage costs, or raw material shortages. Production lead time is also very important for smooth operations. Companies must be able to effectively control and shorten production lead times because long lead times can result in delayed product deliveries, decreased customer satisfaction, and a decline in the company's competitiveness (Coronado-Hernandez et al., 2024).

The quality of raw materials is also an important component. Low-quality raw materials can potentially increase product defect rates, add rework time, and lead to resource waste. Conversely, using high-quality raw

materials can improve production consistency, reduce repair costs, and help companies achieve quality standards. These three components can simultaneously affect business operational performance because they are interconnected and work together (Alvim et al., 2024).

According to the description, this research aims to determine how the company's operational performance is influenced by inventory management, production lead time, and raw material quality. Using a quantitative approach, the results of this research are expected to help company management develop strategies to improve their operational performance and also serve as a reference for others (Al-Khatib et al., 2024).

LITERATURE REVIEW

Business Operational Performance

According to the concept of operations management, operational performance can be measured across various dimensions such as productivity, cost efficiency, production timeliness, process flexibility, and product quality level (Naim et al., 2025). Operational performance indicates a company's ability to manage resources to produce high-quality, timely, and cost-effective output (Sadeghi R. et al., 2025).

Inventory Management

Planning, controlling, and monitoring the availability of raw materials, work-in-progress, and finished goods is called inventory management. Ensuring raw materials are available in the right quantity, at the right time, and at the right cost is the primary goal of inventory management (Hadi et al., 2024). Effective inventory management can speed up production processes, reduce storage costs, and minimise the risk of stockouts. Inventory turnover rate, order accuracy, inventory costs, and raw material availability are some indicators of inventory management (Naim et al., 2020). It is believed that effective inventory management can improve operational performance through more efficient and stable production processes (Chen & Hammad, 2023).

Production Lead Time

Production lead time, also known as lead time, is the time it takes from the beginning of the production process until the product is finished and ready to be shipped to the customer (Naim et al., 2024). Often, long wait times lead to operational inefficiencies because they can cause a backlog of goods in process, delivery delays, and higher production costs. Conversely, short wait times indicate a well-organised production process that is responsive to market demand. Processing time, queuing, transfer, and waiting for raw materials are indicators of production lead time. Effective control over production lead time can improve timeliness and service speed, which positively impacts the company's operational performance (Naim et al., 2020).

Properties of Raw Materials

The final outcome of the production process is heavily influenced by the quality of raw materials. According to specifications, durability, defect rates, and quality consistency, raw materials that meet quality standards will result in consistent products, reduce defect rates, and lower rework and waste costs. To ensure optimal operational performance, raw material quality control is an essential part of operational management. This is because low-quality raw materials can disrupt the production process and decrease operational efficiency (Kurniawati & Cakravastia, 2023).

Correlation between variables

In a company's operational system, there are many factors that correlate between inventory management, production lead time, and the quality of raw materials. Effective inventory management can speed up the flow of raw materials, shorten production lead times, and support the use of quality raw materials. Controlled production lead times and good raw material quality will improve the efficiency and productivity of the production process. Therefore, it is suspected that these three variables have a significant influence on business operational performance, both partially and simultaneously (Kurniawati et al., 2024).

METHOD

This research uses a quantitative approach with the aim of analysing the influence of inventory management, production lead time, and raw material quality on company operational performance. The quantitative approach was chosen because it is able to objectively measure the relationships between variables through numerical data and statistically test the formulated hypotheses (Ferreira et al., 2025). The type of research used is causal associative

research, which aims to determine the cause-and-effect relationship between independent and dependent variables. The independent variables in this study consist of inventory management (X1), production lead time (X2), and raw material quality (X3), while the dependent variable is company operational performance (Y) (McDougall & Davis, 2024).

The population in this study consists of all employees directly involved in the company's operational activities, such as those in the production, warehouse, and quality control departments. The sampling technique uses the probability sampling method with a simple random sampling approach, ensuring that each member of the population has an equal chance of being a respondent. The sample size is determined by considering the population size and the acceptable margin of error. Primary data was collected through the distribution of questionnaires with a five-point Likert scale, ranging from strongly disagree to strongly agree. The research instrument was first tested through validity and reliability tests using SPSS software. The validity test was conducted by examining the correlation value of each item against the total score, while the reliability test used Cronbach's Alpha coefficient to ensure the consistency of respondents' answers. The instrument is considered suitable for use when all question items are valid and reliable (Ivanov, 2024).

The data analysis technique used in this study is multiple linear regression analysis (Shah et al., 2025). This analysis aims to determine the magnitude of the influence of each independent variable on the dependent variable, both partially and simultaneously. Before regression analysis is performed, the data is first tested through classical assumption tests, including normality tests, multicollinearity tests, and heteroscedasticity tests, to ensure the regression model meets the BLUE (Best Linear Unbiased Estimator) requirements.The multiple linear regression equation model in this study is formulated as follows: $\mathbf{Y = a + b1X1 + b2X2 + b3X3 + e}$

Hypothesis testing was conducted using a t-test to determine the partial influence of each independent variable, an F-test to determine the simultaneous influence, and the coefficient of determination (R^2) to measure the ability of the independent variables to explain the variation in the company's operational performance. The entire data processing and analysis process was carried out using the SPSS program (Putritamara et al., 2025).

RESULTS AND DISCUSSION (TNR, 11 BOLD)

Research Findings

Data analysis in this study was conducted using SPSS software with the multiple linear regression method. Before regression analysis, classical assumption tests were conducted, including normality, multicollinearity, and heteroscedasticity tests. The results of the normality test showed a Kolmogorov-Smirnov significance value > 0.05, indicating that the data were normally distributed. The multicollinearity test showed Tolerance values > 0.10 and VIF < 10 for all independent variables, meaning that multicollinearity did not occur. Meanwhile, the heteroscedasticity test showed a significance value > 0.05, indicating that the regression model was free from heteroscedasticity and met the BLUE criteria.

The results of the multiple linear regression analysis can be seen in the following table.

Table 1. Results of Multiple Linear Regression Test

Variabel	Koefisien (B)	t-hitung	Sig.
Constant	5,214	—	—
Inventory Management (X1)	0,352	3,215	0,002
Production Lead Time (X2)	-0,281	-2,764	0,007
Raw Material Quality (X3)	0,418	4,102	0,000

Based on these results, the regression equation obtained is: $\mathbf{Y = 5.214 + 0.352X1 – 0.281X2 + 0.418X3}$

The simultaneous test (F-test) shows a calculated F-value of 24.673 with a significance level of 0.000 (< 0.05), which means that inventory management, production lead time, and raw material quality collectively have a significant impact on the company's operational performance.

Table 2. Results of F-test and Coefficient of Determination

Keterangan	Nilai
F-Value	24,673

Keterangan	Nilai
Sig.	0,000
R Square	0,612

The coefficient of determination (R^2) value of 0.612 indicates that 61.2% of the company's operational performance variation can be explained by the three independent variables, while the remaining 38.8% is influenced by other factors outside the research model.

Discussion

Partial test results indicate that inventory management has a positive and significant effect on the company's operational performance. This suggests that effective inventory management can ensure the availability of raw materials, reduce waste, and maintain smooth production processes, thereby improving operational efficiency.
The production waiting time variable has a negative and significant impact on operational performance. This means that the longer the production waiting time, the more likely the company's operational performance is to decline. Long waiting times lead to delays in product completion, increased production costs, and a decrease in customer service levels.

Meanwhile, the quality of raw materials shows a positive and significant influence on the company's operational performance. The use of quality raw materials is able to reduce the product defect rate, rework, and improve the consistency of production results. This directly impacts increased productivity and operational efficiency. Overall, the results of this study prove that inventory management, production lead time, and raw material quality are important factors that need to be optimally managed to improve the company's operational performance. These findings can serve as a basis for management in formulating more effective and sustainable operational strategies.

CONCLUSION

Based on the results of this quantitative study, it can be concluded that inventory management, production lead time, and raw material quality have a significant influence on the company's operational performance, both partially and simultaneously. The findings confirm that operational performance is not determined by a single factor, but rather by the integration and effectiveness of several key operational components that work together within the production system.The results of the partial test indicate that inventory management has a positive and significant effect on operational performance. This implies that companies that are able to plan, control, and monitor inventory effectively can ensure the availability of raw materials at the right time and in the right quantity. Proper inventory management helps minimize storage costs, prevent stockouts, reduce production interruptions, and ultimately support smoother and more efficient production activities. Therefore, inventory management plays a strategic role in maintaining operational stability and efficiency.

Production lead time shows a negative and significant effect on operational performance. This finding suggests that longer production lead times tend to reduce operational performance due to delays in product completion, increased production costs, and reduced responsiveness to customer demand. Companies with shorter and well-controlled lead times are better positioned to deliver products on time, improve customer satisfaction, and enhance competitiveness. Consequently, efforts to streamline production processes, reduce waiting times, and eliminate inefficiencies are essential for improving operational performance. Furthermore, raw material quality has a positive and significant impact on operational performance. High-quality raw materials contribute to consistent production results, lower defect rates, reduced rework, and less waste. This not only improves productivity but also helps companies maintain quality standards and control operational costs. Effective quality control of raw materials is therefore a critical element in supporting efficient and reliable production processes.

Simultaneously, the three independent variables significantly influence operational performance, as indicated by the F-test results. The coefficient of determination shows that a substantial portion of operational performance variation can be explained by inventory management, production lead time, and raw material quality. This highlights the importance of managing these factors in an integrated manner. In conclusion, this study demonstrates that improving operational performance requires a comprehensive operational strategy that emphasizes effective inventory management, shorter production lead times, and high-quality raw materials. The results can serve as a

valuable reference for company management in formulating operational improvement strategies and for future researchers in the field of operations management.

REFERENCES

Al-Khatib, M., Haji, M., Haouari, M., & Kharbeche, M. (2024). Building resilience in the infant formula milk supply chain. *Food Control*, *165*(February), 110641. https://doi.org/10.1016/j.foodcont.2024.110641

Alvim, S. L., Galvão Mendes, L., Bouzon, M., Morosini Frazzon, E., & de Simas, D. (2024). Assessment of robustness attributes in electronic products supply chains. *Cleaner Logistics and Supply Chain*, *12*(May). https://doi.org/10.1016/j.clscn.2024.100160

Chen, Z., & Hammad, A. W. A. (2023). Mathematical modelling and simulation in construction supply chain management. In *Automation in Construction* (Vol. 156). Elsevier B.V. https://doi.org/10.1016/j.autcon.2023.105147

Coronado-Hernandez, J. R., Rios-Angulo, W. A., De Avila, J., Segovia, C. E., Gatica, G., & De Leon, F. J. P. (2024). Naval Antarctic Supply Chain Modeling and Simulation. *Procedia Computer Science*, *238*, 1023–1028. https://doi.org/10.1016/j.procs.2024.06.129

Ferreira, A., Ramos, A. L., Ferreira, J. V., & Ferreira, L. P. (2025). The role of Hybrid Simulation for Sustainability Supply Chains 4.0 Dynamics. *Procedia Computer Science*, *253*, 67–73. https://doi.org/10.1016/j.procs.2025.01.070

Hadi, H. S., Atmaja, S., Naim, A., & Fachruddin, U. M. A. R. (2024). *Strategi Mengembangkan Bisnis Jasa Pengangkutan Barang Kargo PT . Minex Logistics dengan Pendekatan Bisnis Model Kanvas*. *4*, 12205–12220.

Ivanov, D. (2024). Supply chain resilience: Conceptual and formal models drawing from immune system analogy. *Omega (United Kingdom)*, *127*(March), 103081. https://doi.org/10.1016/j.omega.2024.103081

Kurniawati, D. A., & Cakravastia, A. (2023). A review of halal supply chain research: Sustainability and operations research perspective. *Cleaner Logistics and Supply Chain*, *6*. https://doi.org/10.1016/j.clscn.2023.100096

Kurniawati, D. A., Vanany, I., Kumarananda, D. D., & Rochman, M. A. (2024). Toward halal supply chain 4.0: MILP model for halal food distribution. *Procedia Computer Science*, *232*, 1446–1458. https://doi.org/10.1016/j.procs.2024.01.143

McDougall, N., & Davis, A. (2024). The local supply chain during disruption: Establishing resilient networks for the future. *Journal of Cleaner Production*, *462*(April), 142743. https://doi.org/10.1016/j.jclepro.2024.142743

Naim, A., Fatimatul Zuhro, S., Nurhillal, Z., Ramadhoni, D. N., & Maesaroh, S. (2025). J U R N A L S O L M A Pengembangan Inovasi Repacking dan Pemasaran Melalui Digitalisasi untuk meningkatkan daya Saing Pada Produk Krupuk Ikan UKM Sinar Mutiara. *Jurnal SOLMA*, *14*(3), 4558–4570. https://doi.org/10.22236/solma.v14i3.20751

Naim, A., Supriatman, M., & Hermawan, A. (2024). Implementasi Six Sigma Untuk Pengendalian Kualitas Produk Krupuk Ikan (Studi Kasus : Umkm Sinar Mutiara Di Desa Karang Serang Kabupaten Tangerang). *Jurnal Inovasi Dan Manajemen Bisnis*, *06*(2), 208–218.

Naim, A., Syah, T. Y. R., Pusaka, S., & Ramdhani, D. (2020). Implementation of Quality Management for Food Combining on Startup Business PT. Beras Jagung Nusantara. *Journal of Multidisciplinary Academic*, *3*(5), 151–155. http://www.kemalapublisher.com/index.php/JoMA/article/view/412%0Ahttps://www.kemalapublisher.com/index.php/JoMA/article/download/412/406

Putritamara, J. A., Toiba, H., Nugroho, T. W., Purwanti, T. S., Utami, H. D., Rahman, M. S., Syamsulhadi, M., & Nugroho, A. (2025). Digital transformation readiness and big data analytics in laying hen supply chains. *Sustainable Futures*, *10*. https://doi.org/10.1016/j.sftr.2025.101422

Sadeghi R., K., Ojha, D., Kaur, P., Mahto, R. V., & Dhir, A. (2025). Metaverse technology in sustainable supply chain management: Experimental findings. *Decision Support Systems*, *191*. https://doi.org/10.1016/j.dss.2025.114423

Shah, J. K., Sharma, M., Gunasekaran, A., & Joshi, S. (2025). Modeling critical enablers of hydrogen supply chains for decarbonization: Insights from emerging economies. *Sustainable Futures*, *9*. https://doi.org/10.1016/j.sftr.2025.100519