



THE INFLUENCE OF INVENTORY PLANNING AND CONTROL ON OPERATIONAL EFFICIENCY AT DEDEH SHOP

Dinda Dwi Pelisa^{1*}, Cindy Reisa Aprianti², Ilmi Nafila³, Sania Yuliana Mulyani⁴, Nissa Camilla Fajrin⁵

^{1,2,3,4,5}Faculty of Economics and Business, Universitas Siliwangi, Tasikmalaya, Indonesia

[*223402294@student.unsil.ac.id](mailto:223402294@student.unsil.ac.id)

Abstract. The purpose of this study is to analyze the effect of inventory planning and control on operational efficiency at Dedeh Shop in Ciamis Regency. The method used is a quantitative approach with data collection through questionnaires, interviews, and observations of 18 respondents, and sampling techniques using purposive sampling. To test the effect of inventory planning and control variables on operational efficiency, multidimensional linear regression analysis was used. The results show that inventory planning does not have a significant effect on operational efficiency ($p = 0.298 > 0.05$), while inventory control has a significant and positive effect on operational efficiency ($p = 0.000 < 0.05$). Overall, these two variables contribute 84.3% to operational efficiency. These results indicate that inventory control plays a more dominant role in improving operational efficiency in traditional retail companies. From an academic perspective, this study enriches the literature on inventory management by emphasizing the importance of inventory control, while inventory planning needs to be improved through the application of more adaptive forecasting methods.

Keywords: inventory planning; inventory control; operational efficiency.

1. Introduction

Indonesia's economy continues to grow in line with the increasing demand for goods and services. One of the sectors that plays an important role in supporting this economic activity is retail trade, especially in the field of staple food products. The existence of retail companies not only makes it easier for people to meet their daily needs, but also supports the fast and efficient distribution of products from producers to end consumers. Data from the Central Statistics Agency (BPS, 2023) shows that wholesale and retail trade accounts for 12.58% of the country's gross domestic product (GDP). This figure confirms that retail trade is an important support for the Indonesian economy, both in terms of private consumption and job creation.

Although the sector plays an important role, inventory management in traditional retail still faces many problems. One is the imbalance between supply and demand, which often leads to a shortage of supply or an oversupply. Most previous studies have focused on inventory management theories and models applied in large modern enterprises. In reality, traditional retailers like Toko Dedeh often work with more limited resources and face strong fluctuations in demand during certain periods, such as during the month of Ramadan or holidays. There has been little in-depth research on the influence of inventory planning and control on operational efficiency in traditional retail, especially in the context of local markets. Therefore, the aim of this study is to fill the gap by examining the application of inventory planning and control in Toko Dedeh, which is expected to contribute to the development of the literature on inventory management in traditional retail and offer practical solutions to improve operational efficiency.

2. Literature Review

2.1 Inventory Planning

According to Chopra & Meindl (2016), inventory planning refers to determining the quantity and timing of ordering goods to ensure the continued availability of goods at minimal cost. Effective planning helps avoid shortages of goods and minimizes storage costs. Heizer & Render (2017) emphasize the importance of a balance between supply and demand for operational efficiency. The Economic Order Quantity (EOQ) model developed by Heizer & Render is a basic approach to determining the optimal order quantity and minimizing overall inventory costs.

2.2 Inventory Control

Inventory control, as described by Zainul (2019), involves monitoring stock levels to ensure that the quantities remain within the desired limits, preventing inefficiencies such as spoilage or expiration. Effective control is essential to maintain operational efficiency. Sagaert & Kourentzes (2025) in their hierarchical forecasting model emphasize how inventory control not only affects the amount of stock, but also improves the accuracy of demand forecasting, leading to a more precise inventory management strategy.

Research by Schiffels & Jost (2025) reinforces the importance of efficient inventory control in reducing the effects of scarcity and stabilizing demand. This in turn improves operational efficiency by preventing stockouts during high demand such as during the month of Ramadan.

2.3 Operational Efficiency

Operational efficiency, as defined by APQC (2024), is the ability to maximize results with minimal inputs, which includes elements such as productivity, cost control, and process speed. Efficient operation reduces waste and increases competitiveness. Kumar et al. (2024) show how dynamic pricing strategies and stochastic demand forecasting improve inventory forecasting accuracy, ultimately improving inventory control and operational efficiency.

Although previous studies such as Sagaert & Kourentzes (2025) and Schiffels & Jost (2025) have focused more on the impact of inventory control, it is clear that integrating planning and control of the two is critical. The findings of this study, where inventory planning did not show a significant effect on operational efficiency, but inventory control had a significant effect, are in line with these findings. This difference highlights the importance of improving the forecasting process, especially in environments with fluctuating demand.

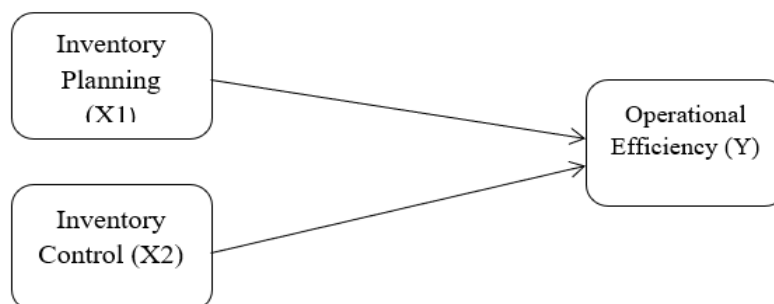


Figure 1. Research Models

3. Research Method

This study used a quantitative approach, and data were collected from 18 employees directly involved in purchasing, inventory management, and operations at Dedeh's Shop.

using purposive sampling. Data were collected through questionnaires and interviews, then analyzed using the following statistical methods:

1. Descriptive statistics

Used to describe the characteristics of respondents and the distribution of answers for each research variable.

2. Reliability and Validity Tests

Reliability testing was conducted using Cronbach's Alpha, which produced a value of 0.890, indicating that the questionnaire can be considered reliable. In addition, validity testing was also conducted to measure the validity of the questionnaire.

3. Multiple linear regression analysis

To test the effect between inventory planning (X1), inventory control (X2), and operational efficiency (Y), a multiple linear regression model was used. The regression equation obtained was:

$$Y = 4,347 + 0,144X1 + 0,699X2$$

Where Y is operational efficiency, X1 is inventory planning, and X2 is inventory control.

4. Classical assumption test

To ensure the robustness of the regression model, a classical assumption test was conducted, which included:

- Normality test (Kolmogorov-Smirnov), which showed that the residual data was normally distributed ($p = 0.352, > 0.05$).
- Multicollinearity test (Variance Inflation Factor – VIF), which shows that there is no multicollinearity because the VIF values for X1 and X2 are all below 10.
- Heteroscedasticity test, which ensures that there is no heteroscedasticity in the model.

3.1 Statistical Table

Table 1. Reliability Test

Reliability Statistics	
Cronbach's Alpha	N of Items
.890	18

Source: Processed Primary Data (2025)

Cronbach's Alpha = 0.890 (Can be used).

Table 2. Multicollinearity Test

Coefficients ^a							
Model	Unstandardized Coefficients		Standardized Coefficients	t	Sig.	Collinearity Statistics	
	B	Std. Error	Beta			Tolerance	VIF
1 (Constant)	4.347	2.663		1.632	.125		
X1	.144	.133	.170	1.082	.298	.451	2.216
X2	.699	.140	.785	4.986	.000	.451	2.216

a. Dependent Variable: Y

VIF for X1 and X2 = 2.216, indicating no multicollinearity.

Table 3. Regression Result

Model	B	Std. Error	Beta	t
Constants	4.347	2.663	-	1.632
X1	0.144	0.133	0.170	1.082
X2	0.699	0.140	0.785	4.986

Dependent Variable: Operational Efficiency

Source: Data analytics Results (2025)

X1 ($\beta = 0.144$, $p = 0.298$) (Not Significant) & X2 ($\beta = 0.699$, $p = 0.000$) (Significant)

Table 4. ANOVA Test

ANOVA ^a						
Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	70.644	2	35.322	37.688	.000
	Residual	13.121	14	.937		
	Total	83.765	16			

Source: Processed Primary Data (2025)

$F = 37.688$, $p = 0.000$, which proves the significance of the regression model.

4. Results and Discussion

4.1 Discussion of Regression Results

1. The Effect of Inventory Planning on Operational Efficiency

T-test results indicate that the inventory planning variable (X1) does not have a significant effect on operational efficiency (Y), with a p-value of 0.298 (> 0.05). This indicates that although inventory planning is executed effectively, this factor has not entirely succeeded in enhancing operational efficiency at Toko Dedeh. Various factors that can elucidate these results include:

- Inaccuracy of Historical Data:** The utilization of manual tools for inventory recording may result in inaccuracies in demand forecasting. Planning has become less effective in anticipating changes in demand due to inaccurate data.
- Seasonal Demand Fluctuations:** Highly variable demand, especially during specific periods such as Ramadan or holidays, makes it difficult to accurately plan based on historical data.

Although inventory planning does not produce a significant impact, it does not indicate that it does not have important value. More precise planning and advanced technology-based planning, such as more structured seasonal forecasting, can improve the efficiency of inventory planning.

2. The Effect of Inventory Control on Operational Efficiency

Conversely, inventory control (X2) significantly influences operational efficiency (Y), with $p = 0.000$ (< 0.05). These results show that the increase in inventory control is directly proportional to the operational efficiency achieved. This aligns with theories indicating that stringent inventory control, including the implementation of FIFO (First-In-First-Out) methods, precise monitoring of goods, and digital stock management, significantly enhances operational efficiency.

4.2 Research Limitations

Although the analysis results provide important information, there are several limitations that need to be considered, including:

1. Small sample size (n=18)

This study used a relatively small sample (n = 18), which may affect the statistical significance and generalization of the results. A small sample size increases the likelihood of type II errors, which result in the inability to detect significant effects, for example, in the “Inventory Planning” variable (X1). Therefore, these results should be treated with caution and not generalized to a larger population.

2. Single-case research design

This study uses a single-case research design, namely Dedeh's Shop in Ciamis, which limits the possibility of generalizing these results to other places or types of businesses. This type of research design provides a more in-depth picture of one place, but cannot describe inventory management practices in various places or business sectors as a whole. Future research could include comparisons between stores or between regions to obtain more representative results.

3. Distortion in self-reported data

Data collection through questionnaires and interviews is based on self-reported data, which is susceptible to social bias or bias due to the desire to provide answers that are favorable to the researcher. This bias can affect the accuracy and reliability of the data, especially in measuring the variable of “inventory planning and control,” which is based on respondents' personal perceptions of existing guidelines.

4.3 Recommendations for Future Research

While this study offers valuable insights into the impact of inventory planning and control on operational efficiency at Toko Dedeh, there are several recommendations for future research that may reinforce these findings:

1. Multi-Store Comparison

Future research may involve multiple stores operating in different locations or types of businesses to confirm these findings outside of Ciamis. This will broaden the understanding of the effectiveness of inventory planning and control in many contexts.

2. Qualitative Research to Address Seasonal Forecasting Challenges

Given that seasonal demand fluctuations play a significant role in the results of this study, additional qualitative research can investigate the challenges of seasonal forecasting and faced by retail stores. Conducting interviews with store managers and business owners can provide a deeper understanding of seasonal forecasting strategies that can be applied to improve inventory planning accuracy.

3. Implementation of Technology in Inventory Management

Further research can focus on the application of technology-based information systems for inventory management. The utilization of advanced inventory management software can diminish reliance on manual planning and enhance the accuracy of data employed in inventory management.

The significant and insignificant results in this study can be associated with broader inventory management theory. A relevant example is more effective inventory control according to Inventory Control Theory, which emphasizes the importance of maintaining optimal inventory levels to prevent shortages or overstocks, which ultimately improves operational efficiency.

Conversely, insignificant inventory planning can be elucidated through Forecasting Theory, which posits that demand uncertainty, particularly seasonal demand, might impact the accuracy of predictions in inventory planning. Consequently, this theory advocates for the

adoption of more sophisticated forecasting methods in inventory planning to address demand fluctuations

5. Conclusion and Recommendations

5.1 Conclusion

The results of this research conclude that inventory planning has no significant effect on operational efficiency at Toko Dedeh, while inventory control has a positive and significant influence. Together, both variables contribute 84,3% to the variation in operational efficiency. this finding emphasizes that effective inventory control such as implementing FIFO, maintaining accurate stock records, and continuously monitoring product movement plays a dominant role in enhancing operational performance. Strengthening these practices enables traditional retail businesses to operate more efficiently, reduce losses, and better meet customer demand.

5.2 Recommendations

Based on the findings, it is recommended that Toko Dedeh enhance its inventory planning by utilizing historical sales data and implementing simple yet systematic forecasting methods to anticipate fluctuating demand. Furthermore. Adopting digital or semi digital inventory systems could strengthen monitoring accuracy and data transparency, which in turn would improve decision making efficiency. Future studies are encouraged to include additional variables such as technological adoption, supply chain collaboration, and organizational culture to obtain a more comprehensive understanding of factors influencing operational efficiency within traditional retail business.

References

- American Productivity & Quality Center (APQC). (2024). *Operational efficiency and productivity metrics*.
- Badan Pusat Statistik. (2023). *Produk domestik bruto Indonesia menurut lapangan usaha 2019–2023*. Jakarta: BPS. Retrieved from <https://www.bps.go.id>
- Chopra, S., & Meindl, P. (2019). *Supply chain management: Strategy, planning, and operation (7th ed.)*. Pearson.
- Deloitte Insights. (2024). *Operational efficiency and its impact on business performance*.
- Heizer, J., & Render, B. (2017). *Operations management (12th ed.)*. Upper Saddle River, NJ: Pearson Education.
- Kumar, L., Sharma, K., & Khedlekar, U. (2024). Dynamic pricing Strategies for Efficient Inventory Management with Auto-Correlative stochastic demand 34 forecasting using exponential smoothing method. *Result in Control and optimization*.
- Mangando, Y. P., Mongan, B., & A., J. (2025). Improving Inventory Efficiency: A Case Study on The Application of Economic Order Quantity (EOQ) in Coffee Raw material Management at PT. Toarco Jaya. *Journal of artificial Intelligence and Digital Business (RIGGS)*.
- Sagaert, Y. R., & Kourentzes, N. (2025). Inventory Management with Leading Indicator Augmented Hierarchical forecast. *the International Journal of Management Science*.
- Schiffels, S., & Jost, C. (2025). The Role of scarcity Behavior in Inventory Management. *European Journal of operational Research*.
- Zainul, M. (2019). *Manajemen Operasional*. Penerbit Deepublish.