Syntax Literate: Jurnal Ilmiah Indonesia p–ISSN: 2541-0849
e-ISSN: 2548-1398
Vol. 9, No. 12, Desember 2024

IMPROVING INVENTORY MANAGEMENT POLICIES FOR PERISHABLE ITEMS IN H SUPERMARKET

Farhana Safira[1], Akbar Adhi Utama[2]
Institut Teknologi Bandung, Indonesia[1,2]
Email: farhana_safira@sbm-itb.ac.id[1], akbar@sbm-itb.ac.id[2]

Abstract

Effective inventory management can reduce costs, minimize waste, and ensure product availability, directly impacting a supermarket's revenue and operational efficiency. This study aims to investigate and improve inventory management policies for perishable items at H Supermarket, located in Riau. The research addresses fluctuating revenue and the gap between target and actual profit by optimizing inventory management through different policies. It specifically addresses the challenges of managing inventory for bread and fruits, which contribute significantly to the supermarket's revenue but are prone to high levels of waste and stockouts due to their short shelf lives. The research employs both qualitative and quantitative methods, including interviews with key stakeholders and analysis of three years of sales data, to identify root causes of inventory inefficiencies. Two distinct inventory policies were analyzed: a continuous review system for bread and a periodic review system for fruits. The continuous review system allows for real-time inventory monitoring, enabling more responsive restocking processes. In contrast, the periodic review system schedules inventory checks at regular intervals, optimizing the balance between freshness and stock levels. The results indicate that the continuous review system significantly reduces total annual costs for bread by approximately 61.4%, while the periodic review system, with a five-day review period, effectively manages fruit inventory, reducing annual costs by 19.1%. The research underscores the importance of tailored inventory management strategies for different types of perishable items. It highlights the need for accurate inventory tracking systems and comprehensive staff training to ensure precise inventory records. The findings suggest that implementing these optimized inventory policies can substantially enhance operational efficiency and reduce waste.

Keyword: *Inventory management, perishable items, cost reduction, continuous review, periodic review, supermarket, optimization.*

Introduction

The availability of products depends on customer demand, which is rarely deterministic in nature. In most situations, planning becomes more complicated when demand behaves stochastically, causing severe fluctuations in demand (Chiadamrong & Lhamo, 2017). This demand fluctuation challenge is experienced by H Swalayan, where demand is always fluctuating for almost all goods. It can be seen from the self-service revenue in 2021-2023 which tends to decline. This decline is contrary to the economic

How to cite: Safira, F., & Utama, A. A. (2024). Improving Inventory Management Policies for Perishable Items in H Supermarket. *Syntax Literate. (9)12.* http://dx.doi.org/10.36418/syntax-literate.v9i12
E-ISSN: 2548-1398

growth of Riau Province which has strengthened after COVID-19, with growth reaching 4% in 2022-2023 and is predicted to continue to increase to 4-4.8% in 2024 (Sujanawati et al., 2021; Weske, 2007).

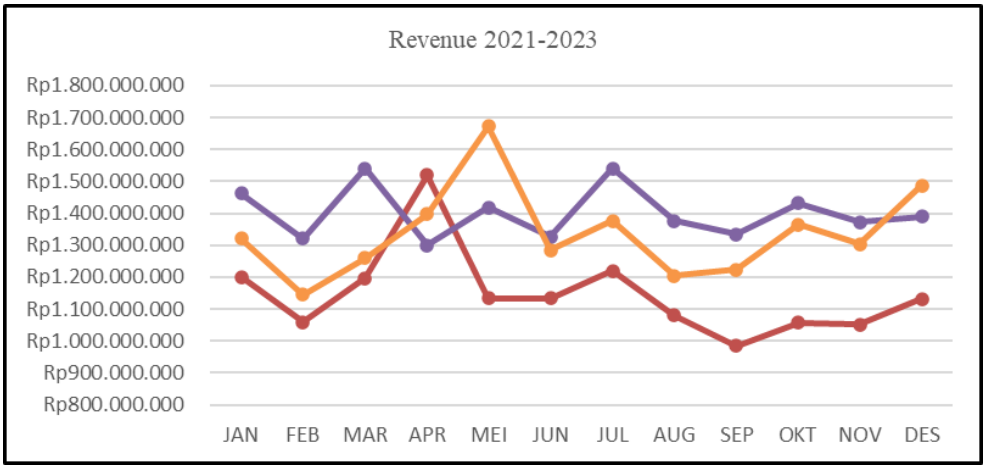


Figure 1. H Supermarket Revenue in 2021-2023

One of the products that significantly contribute to revenue is bread and fruit, which have a short shelf life and tend to require special handling, known as perishable items. Efficient inventory management is essential to ensure that perishable products remain fresh for the expected duration to satisfy customer demand (Nurbiyanto et al., 2021; Priniotakis & Argyropoulos, 2018; Sandroto, 2009). Proper inventory management, considering expiration dates, is critical to minimizing waste and ensuring product freshness (Chiadamrong & Lhamo, 2017; Lohman et al., 2004). As one of the leading supermarkets in Riau Province, H Supermarket must maximize its operations to capitalize on Riau's economic growth momentum and maximize its revenue growth.

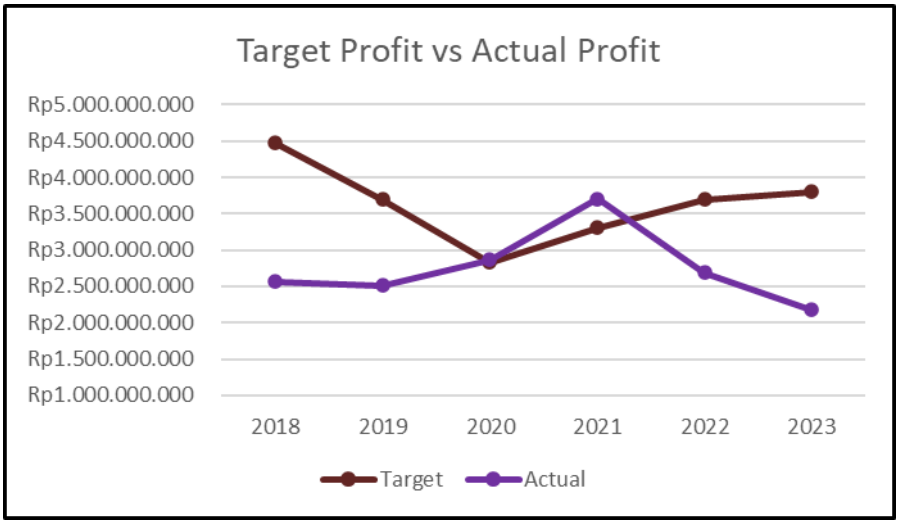


Figure 2. Comparison of Target Profit and Actual Profit

The target profit vs. actual profit graph shows that from 2018 to 2023, H Supermarket often did not achieve the set target profit. In 2023, the gap reached Rp1,624,454,934. Despite a decline in revenue in 2023, the supermarket achieved total revenue of Rp2,175,545,066, with 8 SKUs being the biggest contributors to revenue.

Of the 8 SKUs, bread and fruit are noteworthy because they are the top two revenue-generating items in the supermarket. However, further analysis shows that their revenues are also fluctuating and even declined in 2023. If the operational manager wants to increase revenue, it is essential to further investigate the issues affecting these two items, namely bread and fruit.

Based on the revenue graph for bread and fruit from 2022 to 2023, there is a significant decline in income for both products in 2023. This revenue decline can be linked to several operational issues that may be occurring at H Supermarket. One primary possibility is suboptimal inventory management.

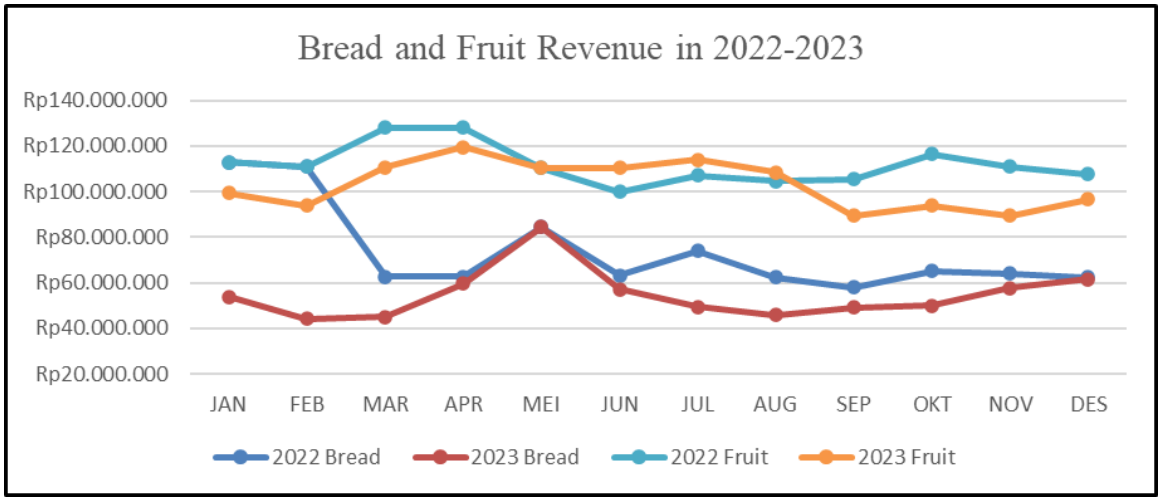


Figure 3. Bread and Fruit Revenue in 2022-2023

Poor inventory management can lead to either overstocking or understocking, which is critical for perishable products like bread and fruit (Madamidola et al., 2024; Vazquez Hernandez & Elizondo Rojas, 2024). Overstocking can cause waste due to spoiled or expired products while understocking can result in lost sales opportunities because products are not available when needed by customers (Bharadwaj, 2024; Kumar, n.d.).

This research aims to study the root causes of revenue fluctuations in bread and fruit sales at H Supermarket. It seeks to understand methods to optimize the inventory management system for these perishable items to reduce waste and improve revenue. Additionally, the research focuses on implementing strategies to enhance inventory management at H Supermarket.

Research Methods

The research methodology employed is a mixed methods approach, integrating both qualitative and quantitative data (Creswell & Creswell, 2018). Initially, interviews with the owner, manager, and operational staff were conducted to uncover the root causes of inventory management issues. This was followed by quantitative analysis of sales data from H Supermarket to calculate inventory management metrics. The research identified business problems related to perishable products like bread and fruit. A literature review was then performed to explore theories on inventory management and best practices for handling perishable goods. The study proposed two replenishment policies: periodic review and continuous review, both evaluated based on total costs. Finally, the most cost-effective and practical approach was recommended for implementation at H Supermarket.

Results and Discussion

Rootcause Analysis

Based on the analysis of BPMN diagrams and the Current Reality Tree (CRT), the fluctuations in sales and revenue at H Supermarket are primarily caused by two main factors: poor purchasing decisions and unrecorded sales and waste. Poor purchasing decisions occur because the ordering process is often based on subjective assessments rather than accurate and reliable data. This is due to the lack of an effective demand forecasting system and insufficient use of sales data for inventory decision-making. Additionally, the inability to track and manage inventory efficiently stems from the absence of an integrated inventory system. This leads to issues in handling damaged or expired goods, which are not adequately recorded, resulting in significant waste. Without a proper system, management struggles to oversee stock and ensure product availability. To address revenue fluctuations, the supermarket needs to implement an integrated inventory system and develop standard procedures for handling damaged or expired goods.

Develop Replenishment Policy

Table 1. Comparison of Total Cost in Different Policy

System	Total Cost	
	407 Bread	**409 Fruit**
Existing	Rp 120.911.805	Rp 54.201.613
Periodic RP1	Rp 209.591.031	Rp 81.707.549
Periodic RP3	Rp 92.740.629	Rp 57.726.841
Periodic RP5	Rp 74.027.407	Rp 43.906.619
Continuous	Rp 46.585.526	Rp 197.461.442

The periodic review policy mandates that inventory replenishment be conducted at predetermined intervals (RP). Based on the analysis, H Supermarket should consider RP 1, RP 3, and RP 5 for bread and fruit products. The selection of these periods is based on the relatively short shelf life of the products, which is 6 days. By choosing an appropriate RP, the company can balance the frequency of stock checks with the risk of product expiration.The continuous review policy requires inventory replenishment to be carried out whenever the inventory position reaches or falls below the reorder point. This approach is more responsive to demand changes and helps prevent stockouts. However, it necessitates a more sophisticated and real-time monitoring system to ensure that the inventory position is always accurate and up-to-date. Implementing the continuous review policy involves setting a fixed reorder quantity (Q) for each product.

A total cost comparison analysis between various inventory management systems indicates that for bread products, the continuous review system has the lowest total cost (Rp 46,585,526), while periodic review with RP1 has the highest total cost (Rp 209,591,031). For fruit products, periodic review with RP5 has the lowest total cost (Rp 43,906,619), while the continuous review system has the highest total cost (Rp 197,461,442).

With this data, H Supermarket can make strategic decisions to optimize inventory management, reduce costs, and enhance operational efficiency. The choice between periodic review and continuous review should be based on the characteristics of the products and the operational needs of the company (Ewim et al., 2024; Mahida, 2024; Ngcobo et al., 2024). Implementing the appropriate policy will help H Supermarket address inventory management challenges, reduce demand fluctuations, and increase profitability.

Conclusion

This study highlights key insights into optimizing inventory management for perishable goods at H Swalayan. Implementing a continuous review replenishment policy proves most effective for managing items like fruits and bread, allowing for responsive restocking and reducing both overstocking and understocking. For fruits, a periodic review with a 5-day interval strikes a balance between freshness and waste reduction. The analysis identified inefficiencies in inventory tracking and staff training as root causes of stock misalignments, leading to financial losses. Addressing these, the study recommends comprehensive training programs and improved replenishment policies to enhance operational efficiency and reduce waste.

To improve inventory management, H Swalayan should invest in advanced tracking systems for real-time stock data, ensuring accurate records. Regular training programs for staff are crucial to instill best practices in inventory management. Adopting a continuous review policy for bread and a 5-day periodic review for fruits will maintain optimal stock levels. Future research should include longitudinal studies to assess the long-term impacts of these strategies and explore their application to other perishable goods. These steps

aim to refine inventory control, reduce waste, and boost H Swalayan's profitability and efficiency

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