

Literature Review: Comparative Analysis of FIFO and FEFO Management Methods

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ABSTRACT: Efficient inventory management is a crucial factor in the success of a company's operations, especially in the midst of increasingly fierce business competition. The FIFO (First In, First Out) and FEFO (First Expired, First Out) methods are two commonly used approaches to managing stock, each with its own characteristics and advantages. FIFO, which emphasizes the principle that the first item in is the first item out, is more effective for products with a long shelf life. FEFO, on the other hand, is more suitable for products that have a limited expiration period, with priority given to products that are close to expiration. This research aims to provide a comparative analysis between the two methods based on a review of existing literature. The results of the analysis show that the FIFO method is more suitable for non-perishable products, while FEFO is very effective for perishable products. The decision in choosing an inventory management method should be based on the type of product, market characteristics, and the company's ability to implement the technology required to support each method. This research provides practical recommendations for companies in choosing the appropriate method to improve operational efficiency and minimize losses due to wastage or expired products.

KEYWORDS: FIFO, FEFO, inventory management, stock management, perishable products, risk control.

INTRODUCTION

In an era of increasingly fierce business competition and globalization that demands operational efficiency, inventory management is a crucial factor for the sustainability and success of the company. Various methods have been developed to optimize the process of storing and distributing goods, including FIFO (First In, First Out) and FEFO (First Expired, First Out), each of which offers a different approach to stock management.

Through this literature study, the author raises problem formulations that include identifying the characteristics, advantages, and limitations of each method, as well as how the two methods affect the effectiveness of inventory management and control the risk of loss due to expired products.

The purpose of this study is to present an in-depth comparative analysis between the FIFO and FEFO methods by reviewing existing theoretical and empirical sources, so as to provide strategic recommendations for companies in choosing the approach that best suits the operational characteristics and types of products handled.

The significance of the research lies in its contribution to enriching the inventory management literature and providing practical reference for businesses in optimizing the distribution and stock control process, so as to minimize losses and improve operational performance. To maintain the focus and accuracy of the analysis, this research is limited to

a review of literature taken from scientific journals, books, and verified articles without conducting direct primary data collection, so that the findings presented are more conceptual and comparative in nature.

THEORETICAL FOUNDATION

Inventory management is a crucial part of the supply chain as it seeks to optimize the availability of goods while minimizing storage costs. According to Heizer & Render (2017),

inventory management is not only limited to recording the number of items, but also includes strategizing about stock turnover to maintain product quality and avoid waste. Thus, the management of stock methods such as FIFO and FEFO is an important basis in determining the order of use of goods so that company operations can run efficiently.

The FIFO (First-In, First-Out) method emphasizes the principle that the first item into the warehouse should be the first item out. This approach is considered effective for non-perishable products because it ensures that the stock with the longest storage duration is processed immediately so that the risk of quality deterioration can be minimized. Nahmias (2013) states that the use of FIFO improves visibility of stock turnover and reduces depreciation costs, while Heizer & Render (2017) emphasize the importance of an accurate time-of-entry recording system to support efficient production and distribution planning.

On the other hand, the FEFO (First-Expired, First-Out) method is designed to solve the problem of perishable products that have expiration dates. By applying FEFO, products that are close to expiration will be prioritized for distribution first, so that the risk of losses due to expired products can be reduced. Bowersox, Closs, and Cooper (2002) suggest that the implementation of FEFO is an effective solution in maintaining the quality of perishable products and minimizing waste, while Chopra and Meindl (2010) illustrate that although this method requires a more complex monitoring system, its benefits in reducing the risk of financial losses are significant.

A comparison between the two methods shows that FIFO has the advantage of simplicity of implementation and is suitable for products with a relatively stable shelf life, while FEFO is superior for products that are prone to quality deterioration due to expiration factors. Therefore, the selection of inventory management methods should be tailored to product characteristics and market dynamics, so

that the management strategies implemented can optimize operational efficiency and minimize losses due to unsaleable products.

RESEARCH METHODS

This article adopts a literature review method with an in-depth qualitative approach through journal analysis. Research data was collected from national journal literature that has been published and is freely available on Google Scholar, with the time span of research limited between 2021 and 2025. Using the keywords "FIFO Method Management" and "FEFO Method Management" resulted in 6,250 articles. Then filtering articles based on the main topic of discussion that is more specific to the FIFO and FEFO Methods so that 16 journals are obtained. Furthermore, a detailed review and analysis was conducted on each journal about each method that is more efficient in the industry.

The following is an image and stages of the research flowchart as follows:

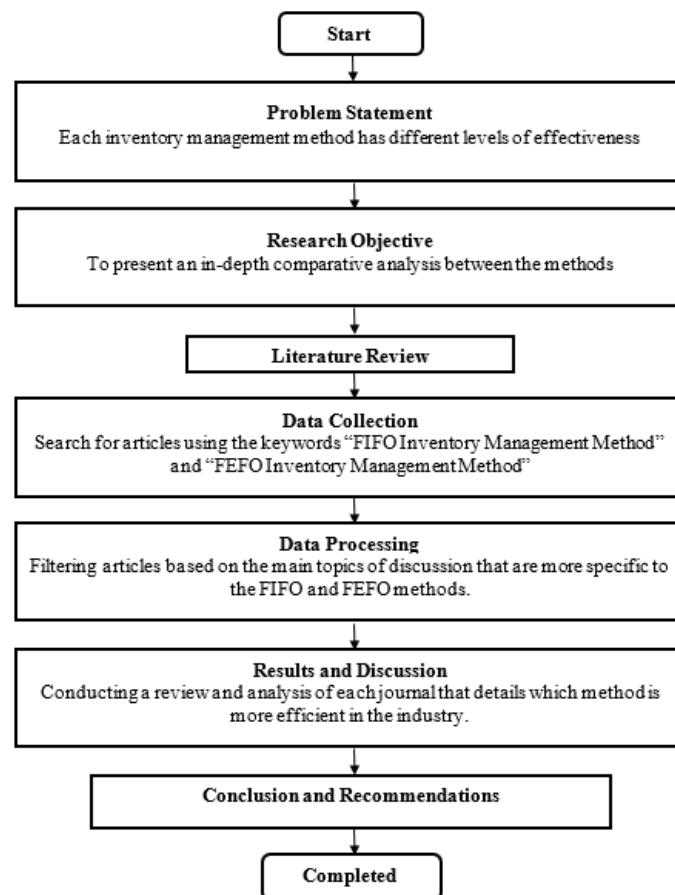


Figure 1 Flowchart of reference article filtering

RESULTS AND DISCUSSION

In this literature review, a comparative analysis is conducted between two frequently used inventory management methods, namely FIFO (First In, First Out) and FEFO (First Expired, First Out). These two methods have

different characteristics and their application is also influenced by the nature of the product and operational conditions in each industrial sector.

The following table summarizes the information from several journals referenced in this literature review:

Table1: Summary of journal information

No.	Journal Title	Author	Sector/ Industry	Methods	Key Results
1	Sistem Informasi Persediaan Obat Dengan Metode FEFO Berbasis Multiuser Di Apotek Jati Sayung Demak	Labib Ismail, Hafidzhoh	Pharmacy	FEFO	Developed a system for multiuser-based drug stock management, minimizing errors and improving stock use efficiency
2	Pengelolaan Free Goods Di PT.Griya Pratama Dengan Metode First Expired First Out (FEFO)	Rikky Wisnu Nugraha, Dea Apriliani	Retail (Free Goods)	FEFO	Optimizing free goods management with FEFO, avoiding accumulation and losses due to expired products
3	Pengembangan Sistem Informasi Berbasis FEFO untuk Pengendalian Obat Kadaluwarsa di Apotek	Ena Tasia, Eki Saputra, Fitriani Muttakin, Arif Marsal	Pharmacy	FEFO	FEFO-based system with barcodes improves the efficiency of expired drug management in pharmacies
4	Sistem Informasi Inventory Alat Kesehatan Menggunakan Metode FEFO	Chandra Kesuma, Vembria Rose Handayani, Oki Damayanti	Medical Devices	FEFO	Medical device stock management system using FEFO, speeding up and reducing errors in stock recording
5	Sistem Informasi Apotek Sidokes Berbasis Website Menggunakan Metode FEFO untuk Meningkatkan Efisiensi Waktu Pembuatan Laporan Pada Sidokes Polresta Banyumas	Azan Firmansyah, Endang Setyawati	Pharmacy	FEFO	Web-based system with FEFO for drug stock management, reducing losses due to expired drugs and improving reporting
6	Sistem Informasi Ketersediaan Bahan Baku Pada Toko Pizza Papigust Dengan Metode FEFO	Dewi Juliana, Rini Amalia, Riko	Retail (Raw Materials)	FEFO	FEFO is used for raw material management, simplifying management and reducing waste.
7	Sistem Informasi Manajemen Persediaan Obat Dengan Metode FEFO Dan Teknologi Barcode Pada Apotek Saras Mranggen	Yenita Aryana, Mustofa Andhy	Pharmacy	FEFO	The use of FEFO with barcode technology improves efficiency in drug stock management and reduces recording errors.
8	Optimasi Stok Obat Di Apotik Adin Farma Dengan Metode FEFO Solusi Efisien Menghindari Kadaluarsa	Sandi Ashriel Nugraha, Diana Laily Fithri, Yudie Irawan	Pharmacy	FEFO	FEFO improves the efficiency of drug stock management and reduces the risk of losses due to expiry.
9	Optimalisasi Sistem Manajemen Persediaan untuk Pengendalian Stok yang Efisien Menggunakan Metode FIFO	Fikri Hamidy	Retail	FIFO	FIFO successfully improves stock management efficiency with high scores on system quality, usage, and impact.
10	Optimalisasi Pengelolaan Bahan Baku Roti Dinar Dengan Implementasi Metode FIFO Untuk Meningkatkan Efisiensi dan Kelancaran Operasional	Sulistyo, Agustina Srirahayu, Sopingi	Retail (Raw Materials, Bread)	FIFO	FIFO improves operational efficiency, reduces wastage, and improves inventory rotation

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11	Penerapan Metode FIFO (First In First Out) Dalam Pengendalian Persediaan Barang	Tria Tirtaliany Agustin	Goods Warehouse use	FIFO	Using a serial number scanner for more efficient FIFO stock control, reducing losses due to expired goods.
12	Analisis Manajemen Pergudangan Pada Gudang Paris Superstore Kotamobagu	Herry Williams Waraney Pitoy, Arrazi Bin Hasan Jan, Jacky S. B. Sumarauw	Retail (Superstore)	FIFO	FIFO is implemented with a more efficient warehouse layout, reducing damage to goods and increasing productivity.
13	Sistem Aplikasi Manajemen Stok Gudang Berdasarkan Tanggal Kadaluaarsa Dengan Menggunakan Algoritma FIFO (Studi Kasus di Supermarket Superhiro)	Aditya Bayu Aji, Anita Ratnasari	Retail (Supermarket)	FIFO	FIFO-based stock management application implementation improves accuracy and efficiency of stock management with Blackbox testing
14	Perancangan Sistem Persediaan Barang Pada Toko Panglima Variasi Menggunakan Metode FIFO Berbasis Web	Muhamad Ma'ruf Al Afif, Dedy Rahman Prehanto	Retail (Motorcycle Accessories)	FIFO	FIFO-based web makes it easier to record and manage inventory, reducing the impact of damage due to goods that are stored for too long.
15	Analisis Tata Letak dan Penerapan Sistem First In First Out Pada Gudang Barang Jadi	Risma Aulia Dewi, Fahriza Nurul Azizah	Warehouse use (Finished Goods)	FIFO	Developed a warehouse layout to support FIFO implementation that saves area and improves the efficiency of warehousing activities.
16	Implementasi Aplikasi Manajemen Stok Dengan Metode FIFO Untuk Optimalisasi Inventori: Studi Kasus Aziz Helmet Store	Mochammad Darip, Ali Rohman, Aflahul Aziz	Retail (Helmets)	FIFO	Web application-based FIFO system improves stock management efficiency and accuracy, increasing customer satisfaction

The following table presents the advantages and disadvantages of the **FIFO** and **FEFO methods** based on the journals that have been analyzed:

Table 2: Advantages and disadvantages of each method

Methods	Excellence	Disadvantages
FIFO	Effective for items that do not have a quick expiration date (such as long- lasting products)	Not ideal for products with a very short expiration date or that spoil quickly
	Reduce wastage by ensuring first-in- first-out items	If the warehouse layout management is not optimized, it may cause difficulties in FIFO implementation.
	Easy to implement in various sectors such as pharmacy and retail, manage goods in order of arrival	Requires a strict record-keeping system to prevent old unsold goods from sitting too long in the warehouse
	Improve recording accuracy and minimize damage to goods	May cause problems if goods arrive early or spoil late (e.g. food or cosmetics)
	More suitable for products with a limited expiration period (medicines, food, etc.)	Requires stricter monitoring of expiration dates

FEFO	Reduce losses due to expired products, minimize waste and health risks on products that have lost their expiry date.	Must use tracking systems or additional technology (such as barcodes) for expiration date management
	Efficiently manage stocks with limited shelf life, such as in pharmacies, with web-based or barcode technology for further efficiency	Implementation requires careful monitoring of expiration dates, relying heavily on technology for accuracy
	Allows for faster and more efficient stock rotation	May add higher costs and time for management of more complex systems
	More effective for products that have a clear expiration date	Cannot be effectively applied to all types of products, especially goods that do not have a clear expiration date.

Based on the analysis of 16 journals used as references, the FIFO method is more effectively applied to products that do not have a fast expiration period or long-lasting products, such as medical devices, electronic equipment, and other consumer products. The main advantage of FIFO is that it is systematic and easy to implement, where items that come in first will go out first. This helps to reduce the accumulation of long-stored items, reduce damage, and improve stock management accuracy. In addition, FIFO also minimizes the wastage of items that remain unsold for a long time. However, FIFO has a major drawback when applied to products with a very short expiration date or perish quickly, such as pharmaceuticals or food. This can lead to losses as longer-stored items may remain in the warehouse, while items with closer expirations cannot get out quickly. In addition, FIFO implementation requires optimal warehouse layout management and strict record-keeping systems, which can be challenging if not managed properly.

Meanwhile, FEFO is more suitable for products that have a limited expiration period, such as food, medicine, and other products that are prone to spoilage after a certain time. FEFO ensures that items that expire the soonest are removed first, helping to reduce waste and losses due to unused or expired products. The main advantages of FEFO are its ability to improve stock rotation efficiency and reduce the risk of losses from expired goods. However, FEFO also has a significant drawback in that it requires a highly accurate record-keeping system and close monitoring of product expiry dates. If the monitoring of expiry dates is not well organized, FEFO can fail, and goods that should have been removed first remain in the warehouse. In addition, implementing FEFO usually requires investment in technology, such as barcodes or RFID, which can increase implementation and operational costs.

From this comparison, it can be concluded that the choice between FIFO and FEFO should be tailored to the type of product being managed. FIFO is more effective for products with a long shelf life that do not have strict expiry

restrictions, while FEFO is more ideal for products with limited expiry, where efficient stock management is essential to reduce losses due to expiry. The decision to use either method should consider the type of product, the existing infrastructure, and the company's capacity to implement the required system.

CONCLUSIONS

Based on the literature analysis, it can be concluded that the FIFO method is more effectively applied to products that have a long shelf life, such as medical equipment and electronic goods, as it is easy to implement and helps reduce waste and improve stock management efficiency. On the other hand, FEFO is more suitable for products that have a limited expiration period, such as medicines and foodstuffs, which require more careful stock management to avoid losses due to expired products. The choice between these two methods should be tailored to the characteristics of the product, the existing infrastructure, and the company's ability to implement the required system. The use of technology, such as barcodes or RFID, is an important factor in supporting the effectiveness of the FEFO method.

ADVICE

For future researchers, it is recommended that the research be continued with a primary data approach that can involve case studies in various industrial sectors. Further research should also develop additional variables such as the effectiveness of information technology implementation, employee training, and organizational change management to get a more comprehensive picture of the application of these two methods. By involving a wider number of respondents and various types of industries, it is hoped that the research results can provide a stronger empirical basis as well as more specific and applicable recommendations for companies in making strategic decisions related to inventory management.

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