

# Study on the Process of Reducing the Volume of Expired Products in a Paint Store

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## ABSTRACT

*To achieve operational excellence, competitiveness, and long-term sustainability in the global market, contemporary companies need to implement quality management and inventory management systems. The research is characterized by following a qualitative approach and being exploratory and descriptive, using bibliographic research as the methodological procedure. The general objective of this research is to develop a study of the process of reducing the volume of expired products in a paint store. Finally, the research has shown that not only but also permeating the entire production process of these activities with the purpose of reducing waste of time, labor, and resources employed, the implementation of a computerized control tool like WMS makes management perennial and scalable.*

**Keywords:** *Expired products; Volume reduction; Operational excellence; Competitiveness; Sustainability.*

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## I. INTRODUCTION

The employment of a quality management system is now a requisite for any company aiming to stand out in the competitive market. Companies are prone to change, thus necessitating swift adjustments to uphold product quality and market trust. Consequently, businesses are increasingly investing in inventory management systems to minimize waste and secure their market position.

This research is characterized by a qualitative, exploratory, and descriptive approach, utilizing bibliographic research as the methodological procedure.

The overarching objective of this study is to conduct an investigation into the process of reducing the volume of expired products in a paint store. The specific objectives of this study include the following: demonstrating the importance of purchasing appropriate quantities to avoid excess and stockouts, discussing the frequency of purchases from suppliers, substantiating the need to establish a suitable space for storing expired or soon-to-expire products, and highlighting the use of warehouse management software (WMS - Warehouse Management System).

This research is structured into four sections. The first section introduces the research objectives. The second section focuses on the theoretical framework, drawing on insights from authors who have explored similar themes. The third section outlines the methodological procedures employed for the comprehensive execution of the research, while the fourth and final section presents the concluding remarks.

## II. MATERIAL AND METHODS

The objective of this study was to address the process of controlling items that a company engaged in paint sales should pay closer attention to when negotiating, evaluating their financial importance, and the potential for inventory reduction to minimize avoidable losses.

The research is characterized by a qualitative, exploratory, and descriptive approach, utilizing bibliographic research as the methodological procedure [1]. The viewpoints of the consulted authors helped shape the corpus of this study, and the opinions shared during the development of this article were thus theoretically grounded [1].

According to Campos et al. (2023), bibliographic review involves surveys of theoretical references that have already been analyzed and published through written and electronic means, such as books, scientific articles, web pages, and so forth [2].

Among the authors surveyed, the following can be highlighted for the quality of their contributions: Kosvoski (2019), Freitas et al. (2020), and Cruz et al. (2023).

### III. THEORETICAL FRAMEWORK

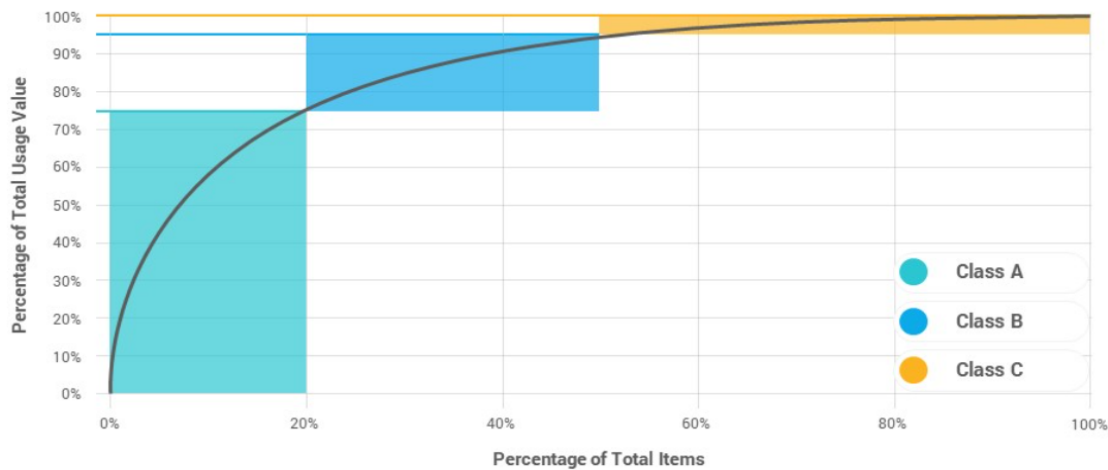
This research is grounded in the application of methods, process monitoring, and activity qualification to ensure a continuous reduction in losses due to product expiration. To achieve this, the subtopics are arranged according to the cadence of the product cycle, which encompasses the research object including supply, internal storage, handling, and outbound processes.

#### 3.1 Purchase in Appropriate Quantities to Avoid Excess and Stockouts

Increasing inventory control is necessary to ensure the smooth operation of an organization. According to Freitas et al. (2020), inventory management involves stock planning, whose objectives primarily include planning stock levels, the quantity of materials entering and leaving, the duration of inputs and outputs, necessary lead times, and reorder points [3].

Peres et al. (2020) assert that the ABC curve allows for the identification of items with higher demand that need to be handled with greater precision in inventory management, rendering it a useful tool for administrative processes of this nature [4]. Please observe Graph 1 below.

Graph 1 - ABC Curve



Source: Pinheiro (2021) [5]

According to Almeida (2020), maintaining stocks will assist the manager in upholding the optimal inventory policy, at the very least. In addition to issuing regular reports on inventories, they will also control and be accountable for the quantity of supplies and finished products, locating physical inventory when necessary [14].

#### 3.2 Frequency in Supplier Purchases

When it comes to production control planning, it encompasses all elements and steps of production, including raw material suppliers and other materials, machine schedulers, and even customers [6].

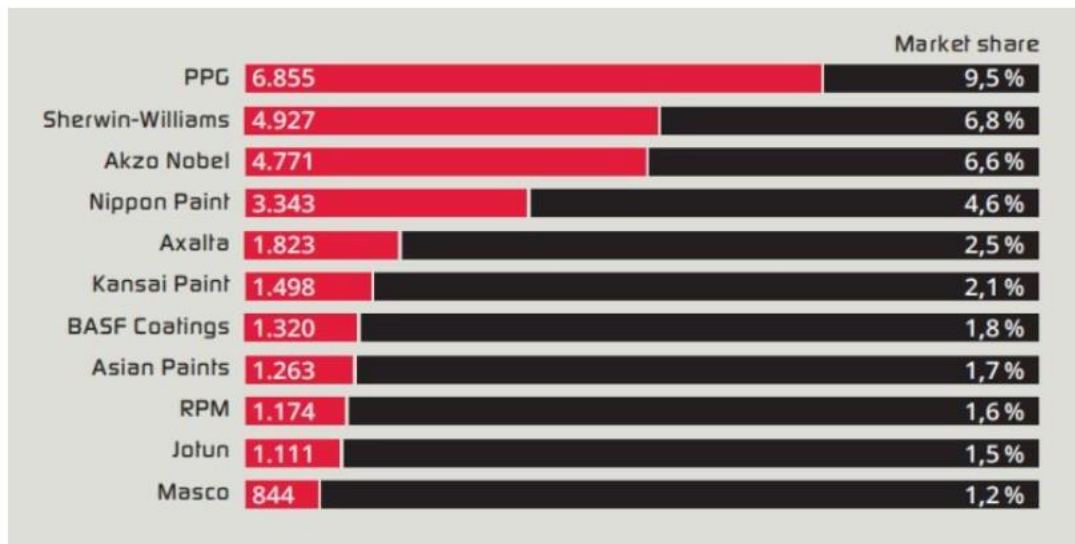
According to Guagliardo (2020), companies need to recognize that logistics and supply chain are vital functions for the smooth performance of their activities and can have significant impacts on the company's financial outcome, as proper management can minimize expenses and increase sales. Employing strategies to enhance product delivery differentiation can distinguish them amidst a competitive market [7].

Therefore, planning and controlling the purchase of materials, receiving, storage, material flow, inventory control management, material transportation, and supplier development and evaluation become crucial [8].

Often, it's not necessary to buy products, but to secure discounts by bargaining prices, particularly during supplier promotions, goods are purchased in larger quantities to increase stocks [6].

According to SEBRAE (2018), the main global suppliers of raw materials and inputs for paints are present in the country directly or through delegates, alongside national companies, many of which are exporters and high-tech [9]. Please refer to Figure 1 below.

Figure 1 - The 11 Largest Paint and Coating Manufacturers in the World.



Source: Monteiro (2021) [10]

The primary objective of the company is to reduce costs per unit. This entails purchasing larger quantities, securing better payment terms, reducing transportation costs, and being able to offer products in the store at a more competitive price, while maintaining or even increasing profitability [6].

### 3.3 Appropriate Space for Storage

Considering that inventory management involves stock planning, whose objectives are essentially to plan the stock, quantities of materials entering and leaving, periods of inputs and outputs, the time they require, and reorder points [3].

As Anselmo and Sousa Júnior (2021) assert, inventory management constitutes a series of actions that allow the administrator to verify whether the stocks are being well utilized, well located in relation to the sectors that use them, well-handled, and well-controlled [11].

Cruz et al. (2023) recommend creating a specific location to separate expired or soon-to-expire material. Additionally, they suggest using spreadsheets and an ABC curve for the control of this material to determine which items and quantities are nearing expiration without being utilized [12].

Paints contain complex chemical substances and can be extremely hazardous. Paints and varnishes are classic examples of products that require careful handling due to the substances that can be toxic.

Mariath and Figueiró (2018) share some knowledge and precautions regarding paints and their derivatives:

**Toxic Substances:** Volatile organic compounds (VOCs) present in many paints and varnishes can be harmful to health if inhaled in large quantities or for long periods. These substances can irritate the eyes, nose, and throat, as well as cause respiratory problems and even harm the central nervous system [13].

**Allergic and Sensitivity Reactions:** In addition to VOCs, pigments and other additives used in paints and varnishes can cause allergic reactions in some people. Sensitivity to some chemicals makes this particularly concerning [13].

**Proper Disposal:** In addition to risks during use, improper disposal of paints and varnishes can also pose a risk to the environment. Many of these products have components that can harm aquatic life and contaminate soil and water resources if not disposed of properly [13].

**Protection during Handling:** People working with paints and varnishes should use respiratory masks, gloves, and protective goggles to reduce their exposure to hazardous chemicals [13].

**Regulations:** Many countries have laws and guidelines for the safe and proper use of chemicals, such as paints and varnishes [13].

To protect human health and the environment, it is essential to be aware of and carefully follow these regulations. Finally, paints and varnishes can be extremely dangerous if not handled and disposed of correctly. It is essential to be aware of the risks associated with these products and take appropriate precautions when working with them [12].

### **3.4 Usage of Warehouse Management System (WMS) Software for Inventory and Storage Management**

Globalization and technological advancements have driven companies to seek new options and innovations to enhance their outcomes and reach a broader customer base. Companies face fierce competition in the marketplace, prompting the need for strategies to overcome competition. Inventory control stands out as a crucial action, particularly in preventing losses due to expired materials.

According to Arnold (1999, cited in Almeida, 2020, p. 265),

Inventory represents a significant portion of a company's assets, essential for manufacturing and selling products. Consequently, its management significantly impacts the economy, incurring substantial losses if poorly handled. For instance, perishable materials poorly managed may result in spoilage and financial losses, whereas efficient management can yield economic benefits and flexibility [14].

The utilization of Warehouse Management System (WMS) software provides numerous advantages for companies involved in the storage and movement of inventory, particularly in the paint and derivatives industry, as outlined by Rocha et al. (2021):

1. **Inventory Control:** WMS facilitates precise real-time control of stock levels across various storage locations, preventing stockouts or excess inventory and optimizing inventory levels [15].
2. **Movement Tracking:** The software enables tracking of all stock movements from warehouse entry to customer delivery, offering complete visibility of the product lifecycle, thereby facilitating bottleneck identification and optimizations [15].
3. **Operational Efficiency Enhancement:** Automation of processes such as receiving, storage, picking, and dispatch reduces human errors and time spent on manual tasks. Warehouse layout optimization minimizes travel time and maximizes employee productivity [15].
4. **Inventory Accuracy Improvement:** Implementation of technologies like barcodes, Radio Frequency Identification (RFID), and barcode scanners enhances inventory counting accuracy, reducing manual counting errors and product losses [15].
5. **Order Management and Customer Service:** WMS streamlines order processing, from picking products in stock to delivering to the customer, expediting the order cycle and enhancing customer satisfaction with faster and more accurate delivery times [15].
6. **Analysis and Reporting:** Generation of reports and analyses on warehouse performance, such as cycle time, order accuracy rates, and space utilization, facilitates identification of improvement areas and data-driven decision-making to optimize operations [15].

In conclusion, Warehouse Management System (WMS) software offers a plethora of benefits, enhancing operational efficiency, reducing costs, improving inventory accuracy, and delivering better customer service. It stands as an essential tool for companies engaged in warehousing and distribution operations.

## **IV. DISCUSSION AND CONCLUSION**

The production of this study emphasized the importance of the proposed actions across various points, satisfactorily demonstrating when, where, and how to achieve the desired results in the subject area. The research scope was limited to retail paint stores in the real estate and automotive sectors; however, its application and concepts extend to the industrial sector and other retail segments dealing with similar or related products.

The placement of purchasing as a fundamentally responsible and necessarily impacted stage at the end of the product commercialization cycle was justified by the conditioning and commercial policies subjected to logistical and financial factors. Intrinsically linked to the supply stage, storage was addressed in this research inseparably from employee training for its handling and the application of the FIFO (First In, First Out) method.

However, permeating the entire production process of these activities with the aim of reducing waste of time, labor, and resources employed, the implementation of a computerized control tool like WMS makes management enduring and scalable. Endorsing the achievement of the objective of this research, effectiveness is demonstrated by addressing the sensitive points leading to product expirations resulting from failures in the purchasing, storage, and FIFO processes, while efficiency lies in the appropriate containment occurring at the sales stage, namely, in the product exits through proactive signals based on their turnover.

Thus, prioritizing the sale of slow-moving products enables cash flow generation that will foster better purchasing conditions for replenishment, continuously reducing the volume of expired products with each new cycle.

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