

## Lean Thinking (5S System) in E-commerce Supply Chains: A Path to Inventory Optimization and Work Management

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### Abstract

In the world of e-commerce enterprises, effective inventory management is critical since maintaining ideal stock levels is essential to satisfying client requests and maximizing operational profitability. The 5S technique provides a formal framework for organizing and simplifying inventory procedures since it is based on the concepts of lean management. The Sorting phase is the primary focus, which includes the inventory Turnover Analysis, a vital tool for identifying slow-moving or obsolete material. Inventory turnover rates span about 0.62 to 1.72, indicating significant variances in inventory efficiency. Certain items, such as those with serial numbers 9, 4, 6, and 2, have lower turnover ratios, about 0.6, and a longer inventory period of 33 to 48 days. This suggests places for improvement. This research emphasizes the inherent value of the "Set in Order" phase in inventory management. This phase, by exploiting the insights of an ABC analysis, not only promotes enhanced inventory placement but also aligns nicely with the 5S technique's underlying principles. The Shine phase, which focuses on rigorous cleaning and maintenance, helps to organize the workspace. This not only boosts staff morale but also speeds up order processing and increases job satisfaction. Furthermore, the study emphasizes the need of the Standardize stage, which includes Failure Modes and Effects Analysis (FMEA) to identify probable failure spots and standardize practices. According to the research findings, the risk priority numbers for replenishing inventory and analyzing inventory performance are the highest, measuring 448 and 441, respectively. This emphasizes the importance of standardizing these two critical process phases. To summarize, implementing the 5S technique in e-commerce inventory management provides a methodical path to optimize inventory, and improve efficiency, and production. This methodology easily connects with the demands of the shifting e-commerce industry, resulting in higher consumer happiness, increased employee engagement, and significant cost savings.

**Keywords:** Inventory Management, Lean, 5S, E-commerce, Inventory Turnover analysis, ABC Analysis, Failure Mode and Effect Analysis (FMEA)

### 1. Introduction

The 5S methodology is a set of workplace organizing and standards techniques aimed to promote efficiency, safety, and productivity in supply chain management (SCM). It has risen in favor over time in a variety of industrial fields, although it appears to be less widely used in the service industries. In order to compete in the global market, enterprises seek strong strategies for optimizing inventory management. This paper focuses on improving inventory performance in the service business. Three main elements are demonstrated to provide an outline of the research. This section, often

known as 1, provides an overview of lean philosophy and 5S. By providing a summary of the previously written literature as well as the gaps that the study intends to fill, the background of the research is illustrated. The research's historical context is provided, along with an explanation of the theoretical and philosophical underpinnings of the study. Furthermore, it is demonstrated that the problem statement highlights the importance of having efficient and effective processes and systems. Establishing the objectives is greatly aided by the problem statements. In objectives, it is indicated which particular goals or results will be attained. The main goal of section 2 is to assess relevant literature in order to gain more knowledge about the idea of 5S, its application, and its applicability in the various sectors of Bangladesh. Additionally, section 3 carefully plans and executes numerous steps of the study procedure to produce precise and trustworthy outcomes.

## **1.1 Background of the research**

Lean concepts and principles (or ways of thinking) offer structured methods to address organizational activities that focus on more profitable outcomes on optimized investments (i.e., with optimal resource utilization through minimized waste in terms of time, money, etc.) [1]. Lean plays a significant part in ensuring that all stages of production and manufacturing can offer their optimal processes [2]. Lean implementation can be done using a variety of tools, one of which is the 5S. The 5S method, which was first utilized by the Japanese and is derived from five Japanese terms that begin with S and are translated into English to provide the best explanation for them, is a strategy that helps enhance performance and organize the entire system [3]. The terms Sort (seiri), Set in Order (seiton), Shine (seiso), Standardize (seiketsu), and Sustain (shitsuke) make up the 5S idea. The 5S method can address issues with excess materials, inefficient workspace organization, the working environment, and the need for extra time to search through inventory [4]. Through monitoring an organized environment, this system assists in organizing a workplace for efficiency, reducing non-value-added operations, and optimizing inventory [3]. Although the majority of management innovations that turned into "lean" organizational structures (i.e., created by Japanese businesses using the initial concepts originating in the United States after World War II) have focused on manufacturing firms, there has also been a tendency to use lean principles and philosophies within the service sector [1]. The implementation of 5S technique in service sectors can help spread out a design, increase communication, and assist individuals develop their personalities to cut down on downtime, lead times, inventory, and associated costs [3]. Reducing the amount of space required overall and reducing the amount of time spent searching are two advantages of 5S implementation [4]. 5S, which derives from the lean manufacturing process, is a helpful environmental tool for organizational management [3]. There has been much less adoption of lean methodologies in the service sector, despite the manufacturing sector's focus on providing integrated bundles of physical goods and services via a product-service system with lean principles and philosophies. As a result, it is crucial to look into the potential for applying lean principles in service processes [1].

Lean, which was first used in the auto manufacturing sector, has always resulted in advantages including improved quality, increased production, and decreased costs and waste. In addition to these benefits, lean holds the promise of attempting to stabilize operations while simultaneously increasing quality and lowering expenses. The goal of using lean concepts in an e-commerce company is to maximize operations, improve client satisfaction, and spur profitability. Inventory management is the term used to describe "all aspects of managing a company's inventories: purchasing, shipping, receiving, tracking, warehousing and storage, turnover, and reordering." The operation and financial success of an organization depend so heavily on inventory management that it cannot be left to chance or outdated technology. That is why so many businesses decide to invest in inventory control systems, allowing for the management of all inventory control components by a single, cohesive system. The outcomes of inventory management are risk reduction, improved customer satisfaction, increased efficiency, improved accuracy, increased sales and improved cash flow [5]. Sort, Set in Order, Shine, Standardize, and Sustain are the five words that make up the 5S approach of workplace organization. They all begin with the letter "S" when transliterated or translated into English. By identifying and storing the objects utilized, maintaining the area and the items, and preserving the new order, the list explains how to organize a workspace for efficiency and effectiveness. [6]. Customer satisfaction in Bangladesh is significantly impacted by e-commerce logistics. One of the most important deciding variables, in this case, is the distribution method. Clients want their things delivered right to their door anywhere in the world. It matters a lot where customers choose their products from. Customer satisfaction is significantly impacted by how quickly a product is delivered. According to some, less is better. Even the cost of the transit service has an impact on consumer happiness [7].

The 5S tool is a valuable resource that can assist e-commerce businesses in succeeding by improving how they manage their stocks. By using the 5S principles, businesses can lower costs, improve safety, raise employee and customer happiness, and increase productivity. In summary, the 5S tool may be used to improve ecommerce inventory management by making items simpler to find, reducing errors, and maintaining a spotless warehouse. This could benefit businesses in a number of ways, such as enhanced productivity, less waste, improved safety, happier employees and clients, and lower prices.

### 1.3 Problem Statements

This research project hopes to solve a few existing problems while also exploring some novel prospects in the field of inventory management in the e-commerce business. The research will attempt to find answers to the following questions through systematic investigation and analysis:

1. How much overstock is observed in inventory management in an E-commerce industry?
2. Is it possible to perform an inventory turnover analysis to implement the sorting stage of the 5S Framework?
3. Is it possible to utilize ABC analysis to organize items in inventory according to their high value or demand?
4. Is it possible to execute Failure Mode and Effect Analysis to Standardize inventory working procedure?
5. Can the 5S methodology be used comprehensively to optimize inventory management and build a foundation for an efficient work environment?

**1.4 Objectives:** The main objectives for this research are as follows:

1. To quantify overstock levels.
2. To implement inventory turnover analysis for sorting inventory level.
3. To utilize ABC analysis for set in order.
4. To execute Failure Mode and Effective Analysis (FMEA)
5. To comprehensively apply the 5s Methodology.

## 2. Literature Review

### 2.1 Introduction

This chapter digs into the e-commerce industry, where the rapid growth of internet buying is changing customer habits. Within e-commerce supply chain management, it navigates through the complexities of inventory optimization, Lean techniques, and the powerful 5S framework. The review investigates the relationship between consumer demand, production, and inventory dynamics in supply chain management (SCM). It explores Lean methodologies, such as the revolutionary 5S method. The chapter also emphasizes the importance of optimizing inventories, with a focus on excess inventory in e-commerce businesses. Recent studies emphasize the importance of effective inventory management and customer-centered tactics for long-term e-commerce growth. The context for examining inventory optimization techniques in the context of e-commerce is established in this chapter.

### 2.2 Literature Review

The e-commerce industries are expanding quickly due to people's growing interest in making purchases online. Since technological development is becoming more widespread in Bangladesh, people are becoming more adept at using

the internet and creating a wide range of connections. As a result, individuals choose to purchase goods through online retailing platforms as opposed to physical markets because doing so saves time and increases productivity [8]. Customers prefer to obtain their desired products from the source directly when shopping online, since this minimizes or lessens the risk of damage brought on by frequent shifting of hands [9].

Supply Chain Management is a crucial component of the majority of firms including e-commerce sectors in today's fast-paced world and is essential to corporate success. An effective supply chain is a requirement in any industry. A company's capacity to sustain a balanced supply chain determines how long it can continue to function [10]. The more evenly distributed a company's supply chain is, the more effectively its results will be. The three factors that make up the supply chain are demand, production, and inventory. These characteristics are interconnected, so if one of them changes, the other two will follow. Inventory will be affected if demand increases since production must grow; on the other hand, if demand declines, production and inventory levels will also change in some ways. The goal of every business is to reduce expenses as much as possible, which typically means cutting back on production and inventory costs since the other costs are almost always within a specific range but may still be managed if handled properly [11]. Supply Chain Uncertainties should be taken into consideration. Uncertainty in the supply chain is defined as a shift in the natural order, balance, or sustainability associated with the supply chain that is mostly brought on by possible, unforeseen, and unanticipated occurrences and necessitates a response to maintain the equilibrium [12]. Unexpected orders, late deliveries, transportation issues, and stock-outs are examples of possible events. By removing supply chain management uncertainty, it's possible to improve efficiency and secure a stronger position in the market [12].

In this aspect, Inventory optimization is crucial for ensuring an effective supply chain. Companies may gain significant benefits and increase overall operational efficiency and profitability by employing lean methods in inventory control. Many significant businesses around the world have been seeking to adopt the lean mindset as one of their efforts to streamline the production process and achieve optimum utilization of resources according to Womack et al. (1991) and Schonberger (2007). Lean is an approach and a method that places an emphasis on simplifying operations by carefully coordinating all actions in order to reduce nonvalue-added activities and boost productivity [13]. The use of just-in-time (JIT) production, 5S, and other lean manufacturing principles is crucial for optimizing inventory and its effects on the company. These procedures follow the fundamentals of lean production, which emphasize reducing processes like overproduction, excess inventory, and waiting times that do not add value to the finished product. Lean production and inventory management work together to increase efficiency, cut waste, and boost customer satisfaction. The 5S technique is one of the most fundamental and important instruments for implementing lean manufacturing. It is a system to control workflow by systematizing the workplace, hence promoting the continual improvement culture [14]. In order to effectively manage inventory levels and reduce waste, 5S is a wonderful Lean practice. By implementing it, businesses may improve their competitiveness and increase their profitability. For the e-commerce sector, inventory optimization greatly benefits from the 5S concept. The 5S method (Sort, Set in order, Shine, Standardize, Sustain) offers an organized method for efficiently organizing and managing inventories and is based on Japanese ideas. E-commerce companies can benefit in a number of ways by using the 5S principles. It makes it possible to arrange goods in a systematic way, ensuring that they are simple to find, get hold of, and replenish, improving the effectiveness of order fulfillment. Maintaining product quality and preventing faults through routine cleaning and maintenance. Maintaining the 5S principles fosters a culture of continuous development, which results in long-term efficiency improvements and overall inventory management optimization in the e-commerce industry.

Many organizations face the problem of excess and unnecessary stocks. In the e-commerce sector, excess inventory and unneeded items can result in higher storage costs, less effective order fulfillment, possible stock obsolescence, and a reduction in cash flow owing to money being locked up. Additionally, it can make it difficult to maintain inventory levels effectively, leading to overstocked or out-of-stock products that eventually affect customer satisfaction and overall efficiency in operation. These lead to disorganization of stocks and increase lead time, non-value added time also affects the quality of the products kept in the inventory. Our Research aims to provide solutions to these problems through the implementation of 5S. This article will analyze data collected from a renowned e-commerce firm and suggest proper solutions for the optimization of inventory.

### **2.3 Review of Recent Paper in the Relevant Field of Study**

Das (2022) et al. conducted an in-depth examination of the pharmaceutical industry which is defined by its complexity and multifaceted supply chain operations and which focuses on the crucial function of inventory management within

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[supplychaininsider.org](http://supplychaininsider.org) | **4** | Page

this industry. The study largely concentrates on inventory management systems and their operational procedures, and it offers three potential answers to problems in this area. The need of obtaining a faster growth rate for pharmaceutical companies is emphasized in the study, which also puts inventory management as a key factor in reaching this goal. The study makes the case for decreasing cycle time and improving record accuracy by utilizing inventory management strategies. These two objectives are thought to be essential for efficient inventory management, requiring expert and devoted work. Although the study provides valuable perspectives on the function of inventory management in the pharmaceutical industry, it would benefit from a more in-depth discussion of the unique difficulties this sector faces and the subtle nuances of implementing the suggested solutions. Additionally, the paper's practical implications should be strengthened by a more thorough examination of the empirical data that supports the suggested solutions. Overall, Das's work lays the groundwork for comprehending the significance of efficient inventory management in the pharmaceutical industry and opens doors for further investigation in this crucial area of supply chain optimization.

Research conducted by Ridwan (2021) et al. where investigate the impact of e-commerce return policies on customer satisfaction and purchase intentions. The findings suggest that enhanced return procedures are urgently needed to reduce consumer dissatisfaction and encourage a "win-win" situation for both sellers and customers. Customers are willing to pay more for a smooth return experience, highlighting the significance of a clear and accepting policy. Furthermore, the provision of a "Change of Mind" option appears as a critical component influencing purchasing decisions. This study offers useful insights for e-commerce sellers, highlighting the need of prioritizing consumer demands in order to develop trust and loyalty.

Rahman (2020) et al. conduct research where they demonstrate customers' demand for freshness while purchasing agricultural food goods. Unfortunately, the presence of too many middlemen not only causes delivery delays, but also compromises the freshness of the goods. The process offers valuable solutions to overcome these difficulties, including improved warehousing facilities, direct selling through start-ups, efficient utilization of existing warehouses, and internal fulfillment versus third-party logistics.

### 3. Research Methodology

#### 3.1 Introduction

The guiding framework that enables the systematic and objective pursuit of knowledge is research methodology, which is the backbone of any scientific study. It is a set of concepts, processes, and techniques used by researchers to conduct investigations, collect data, analyze findings, and draw legitimate conclusions. A well-designed research methodology is required to create trustworthy and credible results in all areas of science, social sciences, humanities, and business.

#### 3.2 Steps Involved in the Research

The steps included in this research must be carried out in a methodical and thorough manner to ensure that the conclusions are valid, dependable, and appropriate. This will provide a structured approach for conducting research and writing the conclusion of the paper. The following are the steps in the research:

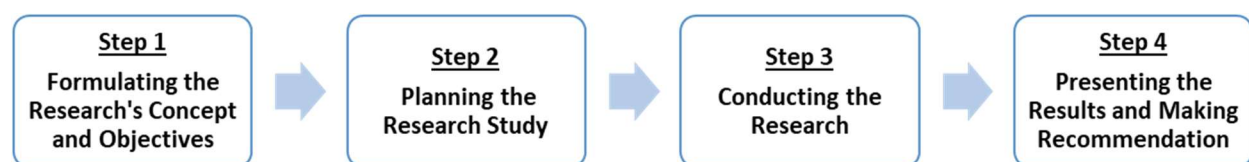


Figure 3.1: Steps Involved in the Research

##### 3.2.1 Formulating the Research's Concept and Objectives

This stage is carried out during the research to create a clear road map for the concept and objectives of this research. This is the research's fundamental base. These steps include concept selection, problem statement identification, objective identification, and literature investigations and after that finally, 5S concept is selected.

### 3.2.2 Planning the Research Study

The process of planning a research project is critical since it lays the framework for the dissertation's conclusion. A well-structured research strategy ensures that the research will be viable and will handle the research objectives successfully. A research study for a paper involves a variety of stages, all of which contribute to the creation of a comprehensive and well-organized research plan.

### 3.2.3 Conducting the Research

Conducting research is a vital and dynamic process that is fundamental to the advancement of knowledge and understanding. It entails a systematic and structured strategy to gather, analyze, and interpret data in order to answer specific questions or address hypotheses. The procedure begins with the formulation of a specific research question or purpose, the definition of the scope of the study, and the identification of the target population or sample. Quantitative and qualitative both data are collected to conduct the research

### 3.2.4 Presenting the Results and Making Recommendations

On the basis of the analysis and execution, the results are presented and further recommendations for the result also be suggested in the next sections.

## 3.3 Analysis Formulas for 5S Implementation:

All the necessary analysis performed and the formulas required for the implementation of 5S is discussed in this section as follows,

**3.3.1 Inventory Turnover:** Inventory turnover is a financial indicator that assesses the effectiveness with which a company maintains its stock by counting the number of times the inventory is sold and replaced over a given time frame, which may be a month or a year. The Inventory turnover ratio provides a more tangible illustration of the concept of inventory turnover. By computing the ratio of cost of goods sold (COGS) to the average inventory value, the inventory turnover ratio quantifies the idea of inventory turnover. It offers a quantitative assessment of how effectively a business is handling its inventory. The formulas used for the measurement of inventory turnover is as follows,

I. Inventory Turnover Ratio (ITR):

$$\text{Costs of Goods Sold (COGS) / Average Inventory}$$

II. Days in Inventory (For a Month):

$$30 / \text{ITR}$$

**3.3.2 ABC Analysis:** ABC analysis is a technique used for inventory management and classifying products according to their worth and relevance. Items are separated into three categories by the analysis: A, B, and C. The most vital items with high value or demand are classified as Category A, and they require close monitoring and stringent inventory control. Category B contains items that are somewhat important, have a mid-range worth or demand, and require regular attention. Category C items are the least critical, have a lower value or demand, and often necessitate more relaxed inventory management. Here are the formulas used for ABC analysis:

I. The Monthly Usage Value (MUV) for Each Item:

$$(\text{Monthly Demand}) * (\text{Sold Price Per Unit})$$

## II. The Percentage of Total Usage Value (PUV) For Each Item:

$$\{(\text{MUV for the item}) / (\text{Total Monthly Usage Value for all items})\} * 100$$

**3.3.3 FMEA (Failure Mode and Effects Analysis) :** The FMEA (Failure Mode and Effects Analysis) process for standardizing inventory entails a thorough assessment of potential failure modes. It helps the organization maintain a well-organized, effective, and affordable inventory management system that satisfies consumer requests and company goals. These factors should be taken into account while conducting an FMEA for inventory standardization:

### I. Risk Priority Number (RPN):

$$\text{Severity} * \text{Occurrence} * \text{Detection (Each Scores on a Scale of 1 to 10)}$$

## 4.Result & Discussion:

### 4.1 Sort:

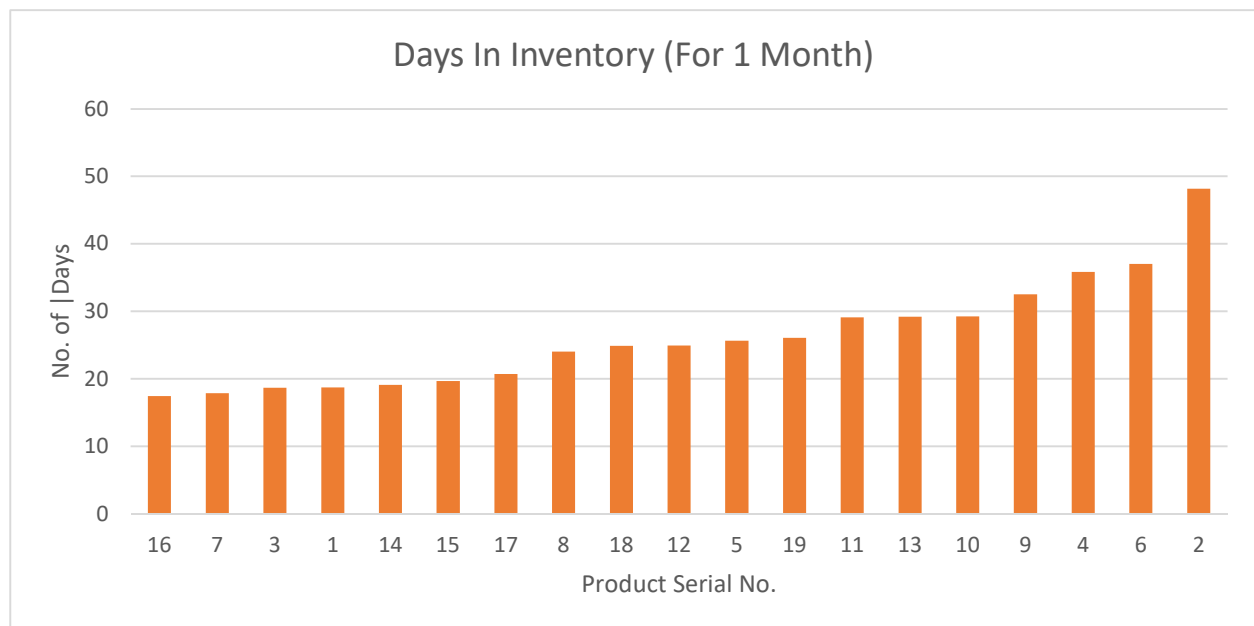
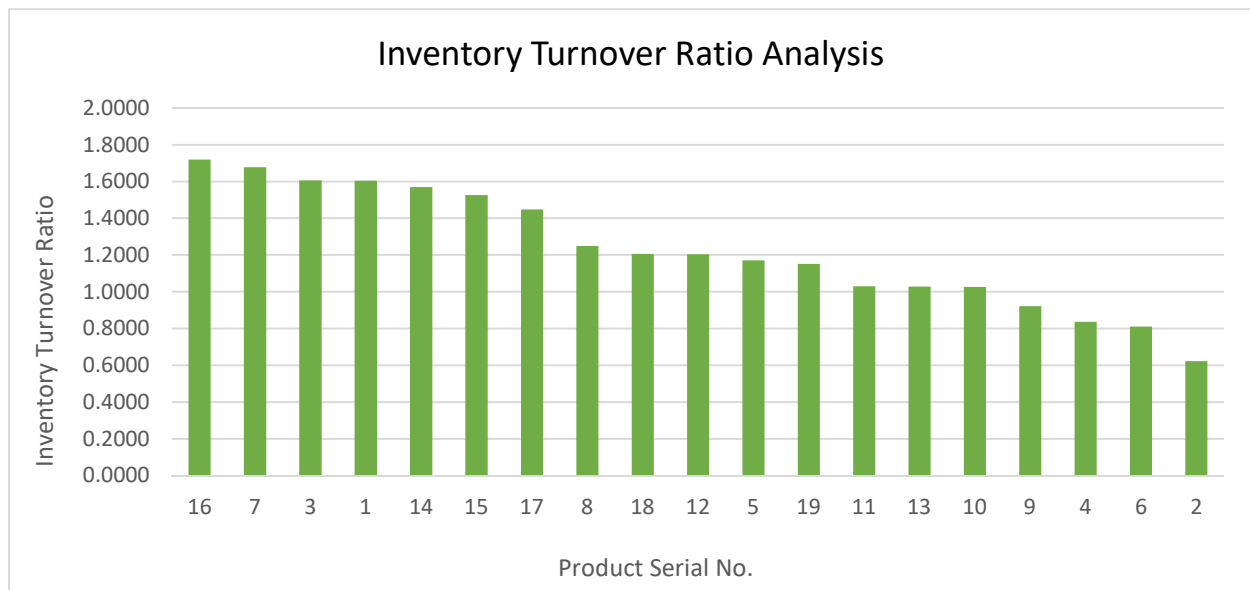
The first phase of the 5S methodology, known as Sorting, is concerned with clearing out clutter and organizing a workspace in order to improve efficiency, safety, and productivity. The Sorting step of 5S involves carefully assessing and categorizing inventory items in terms of inventory management and optimization. Its main goals are to get rid of unimportant things, cut down on inventory, and establish well-structured, efficient inventory management.

In this study, Inventory Turnover Analysis is performed in the Sorting stage of the 5S technique in order to detect products with low turnover ratios, which indicate slow-moving or obsolete inventory. By effectively categorizing objects for removal or optimization, this analysis helps to achieve the inventory's decluttering and organization objectives.

Based on the data collected from a renowned e-commerce industry and the performed analysis, it is seen that the inventory turnover ratios across various items vary significantly. The goods' inventory turnover ratios range from roughly 0.62 to 1.72. This shows that inventory efficiency varies, with certain items selling and being replaced more frequently than others. The days in inventory also vary, ranging from 17 to 48 days. This reflects the typical number of days needed to sell and replenish the inventory for each item. The products having the serial no. 16, 7, and 3 have better inventory turnover ratios (closed to 1.7 or above) and fewer days (around 17-19 days) in stock, which point to effective management and stronger demand. These products experience quicker sales and replenishment cycles. However, the turnover ratios (closer to 0.6) and days in inventory (around 33-48 days) for the goods having serial no. 9, 4, 6, and 2 are lower, indicating possible areas for improvement. In order to optimize inventory levels and improve turnover, products with lower turnover ratios and longer days in stock (such as products 9, 4, 6, and 2) may require attention in terms of demand forecasts, inventory reduction, or sales techniques.

| Serial No. | Product                                                       | Unit Price (Taka) | Beginning Inventory | Ending Inventory | Quantity Sold | Beginning Inventory Value (Taka) | Ending Inventory Value (Taka) | Costs of Goods Sold (Taka) | Average Inventory (Taka) | Inventory Turnover Ratio | Days in Inventory (For 1 Month) |
|------------|---------------------------------------------------------------|-------------------|---------------------|------------------|---------------|----------------------------------|-------------------------------|----------------------------|--------------------------|--------------------------|---------------------------------|
| 16         | Glow & Lovely Face Cream (BB) Blemish Balm 18g                | 165               | 425                 | 32               | 393           | 70125                            | 5280                          | 64845                      | 37702.5                  | 1.7199                   | 17                              |
| 7          | Sunsilk Shampoo Stunning Black Shine 330ml                    | 400               | 285                 | 25               | 260           | 114000                           | 10000                         | 104000                     | 62000                    | 1.6774                   | 18                              |
| 3          | Lifebuoy Handwash (Soap) Care Refill 170ml                    | 75                | 265                 | 29               | 236           | 19875                            | 2175                          | 17700                      | 11025                    | 1.6054                   | 19                              |
| 1          | Glow & Lovely Facewash Instaglow with Multivitamins 100g      | 190               | 565                 | 62               | 503           | 107350                           | 11780                         | 95570                      | 59565                    | 1.6045                   | 19                              |
| 14         | Wheel Washing Laundry Bar 125G                                | 30                | 3020                | 364              | 2656          | 90600                            | 10920                         | 79680                      | 50760                    | 1.5697                   | 19                              |
| 15         | Pond's Face Wash Daily 100g                                   | 150               | 380                 | 51               | 329           | 57000                            | 7650                          | 49350                      | 32325                    | 1.5267                   | 20                              |
| 17         | Rin Advanced Synthetic Laundry Detergent Powder 1kg           | 185               | 2350                | 376              | 1974          | 434750                           | 69560                         | 365190                     | 252155                   | 1.4483                   | 21                              |
| 8          | Dettol Lasting Fresh Antibacterial Body Wash Shower Gel 250ml | 200               | 212                 | 49               | 163           | 42400                            | 9800                          | 32600                      | 26100                    | 1.2490                   | 24                              |
| 18         | Lux Soap Bar Velvet Glow Multipack 100g                       | 56                | 1250                | 310              | 940           | 70000                            | 17360                         | 52640                      | 43680                    | 1.2051                   | 25                              |
| 12         | Revive Perfect Fairness Talcum Powder - 200g                  | 90                | 185                 | 46               | 139           | 16650                            | 4140                          | 12510                      | 10395                    | 1.2035                   | 25                              |
| 5          | Lifebuoy Handwash (Soap) Total Bottle 1L                      | 350               | 1200                | 314              | 886           | 420000                           | 109900                        | 310100                     | 264950                   | 1.1704                   | 26                              |
| 19         | Parachute Coconut Oil 500ml                                   | 345               | 635                 | 171              | 464           | 219075                           | 58995                         | 160080                     | 139035                   | 1.1514                   | 26                              |
| 11         | Parachute Just for Baby - Baby Wash 200ml                     | 285               | 450                 | 144              | 306           | 128250                           | 41040                         | 87210                      | 84645                    | 1.0303                   | 29                              |
| 13         | Dettol Soap Original 75gm Bathing Bar.                        | 60                | 2050                | 658              | 1392          | 123000                           | 39480                         | 83520                      | 81240                    | 1.0281                   | 29                              |
| 10         | Parachute Hair Oil Advanced Aloe Vera Enriched Coconut 150ml  | 165               | 920                 | 296              | 624           | 151800                           | 48840                         | 102960                     | 100320                   | 1.0263                   | 29                              |
| 9          | Parachute SkinPure skin care product Aloe Vera Gel 100ml      | 190               | 415                 | 153              | 262           | 78850                            | 29070                         | 49780                      | 53960                    | 0.9225                   | 33                              |
| 4          | Pond's Men Facewash Acne Solution Facial Foam 100g            | 280               | 800                 | 328              | 472           | 224000                           | 91840                         | 132160                     | 157920                   | 0.8369                   | 36                              |
| 6          | Studio X Clean & Fresh Soap for Men 125gm                     | 80                | 300                 | 127              | 173           | 24000                            | 10160                         | 13840                      | 17080                    | 0.8103                   | 37                              |
| 2          | Parachute Just For Baby - Milky Glow Wash 100ml               | 215               | 120                 | 63               | 57            | 25800                            | 13545                         | 12255                      | 19672.5                  | 0.6230                   | 48                              |

**Table 1.1:** Inventory Turnover Analysis



**Figure 1.1:** Inventory Turnover Analysis

The inventory turnover study shows opportunities for development in the inventory management process as well as effective methods. Based on the data-driven insights from the analysis, the industry can develop their strategies accordingly in order to achieve optimal inventory levels, prevent stock-outs and maintain a lean and efficient inventory system.

**4.2 Set in Order:** In inventory management, the "Set in Order" approach is characterized by the systematic and efficient organization of inventory items.

A major goal of Set in Order is to provide a well-organized inventory storage system that facilitates item access, minimizes handling time, and improves overall inventory control. An ABC analysis was in this study to categorize products based on their demand and value, allowing for improved inventory placement.

| serial no | Product Name                                                  | Sold Unit's (last 30) | Price   | Monthly Revenue | Percentage | Cumulative percentage | Category |
|-----------|---------------------------------------------------------------|-----------------------|---------|-----------------|------------|-----------------------|----------|
| 17        | Rin Advanced Synthetic Laundry Detergent Powder 1kg           | 1974                  | 185.00₹ | 365,190.00₹     | 20.00%     | 36.98%                | A        |
| 5         | Lifebuoy Handwash (Soap) Total Bottle 1L                      | 886                   | 350.00₹ | 310,100.00₹     | 16.98%     |                       |          |
| 19        | Parachute Coconut Oil 500ml                                   | 464                   | 345.00₹ | 160,080.00₹     | 8.77%      | 32.57%                | B        |
| 4         | Pond's Men Facewash Acne Solution Facial Foam 100g            | 472                   | 280.00₹ | 132,160.00₹     | 7.24%      |                       |          |
| 7         | Sunsilk Shampoo Stunning Black Shine 330ml                    | 260                   | 400.00₹ | 104,000.00₹     | 5.70%      |                       |          |
| 10        | Parachute Hair Oil Advansed Aloe Vera Enriched Coconut 150ml  | 624                   | 165.00₹ | 102,960.00₹     | 5.64%      |                       |          |
| 1         | Glow & Lovely Facewash Instaglow with Multivitamins 100g      | 503                   | 190.00₹ | 95,570.00₹      | 5.23%      |                       |          |
| 11        | Parachute Just for Baby - Baby Wash 200ml                     | 306                   | 285.00₹ | 87,210.00₹      | 4.78%      | 30.45%                | C        |
| 13        | Dettol Soap Original 75gm Bathing Bar.                        | 1392                  | 60.00₹  | 83,520.00₹      | 4.57%      |                       |          |
| 14        | Wheel Washing Laundry Bar 125G                                | 2656                  | 30.00₹  | 79,680.00₹      | 4.36%      |                       |          |
| 16        | Glow & Lovely Face Cream (BB) Blemish Balm 18g                | 393                   | 165.00₹ | 64,845.00₹      | 3.55%      |                       |          |
| 18        | Lux Soap Bar Velvet Glow Multipack 100g                       | 940                   | 56.00₹  | 52,640.00₹      | 2.88%      |                       |          |
| 9         | Parachute SkinPure skin care product Aloe Vera Gel 100ml      | 262                   | 190.00₹ | 49,780.00₹      | 2.73%      |                       |          |
| 15        | Pond's Face Wash Daily 100g                                   | 329                   | 150.00₹ | 49,350.00₹      | 2.70%      |                       |          |
| 8         | Dettol Lasting Fresh Antibacterial Body Wash Shower Gel 250ml | 163                   | 200.00₹ | 32,600.00₹      | 1.79%      |                       |          |
| 3         | Lifebuoy Handwash (Soap) Care Refill 170ml                    | 236                   | 75.00₹  | 17,700.00₹      | 0.97%      |                       |          |
| 6         | Studio X Clean & Fresh Soap for Men 125gm                     | 173                   | 80.00₹  | 13,840.00₹      | 0.76%      |                       |          |
| 12        | Revive Perfect Fairness Talcum Powder - 200g                  | 139                   | 90.00₹  | 12,510.00₹      | 0.69%      |                       |          |
| 2         | Parachute Just For Baby - Milky Glow Wash 100ml               | 57                    | 215.00₹ | 12,255.00₹      | 0.67%      |                       |          |

**Table 1.2:** ABC Analysis for Set in Order

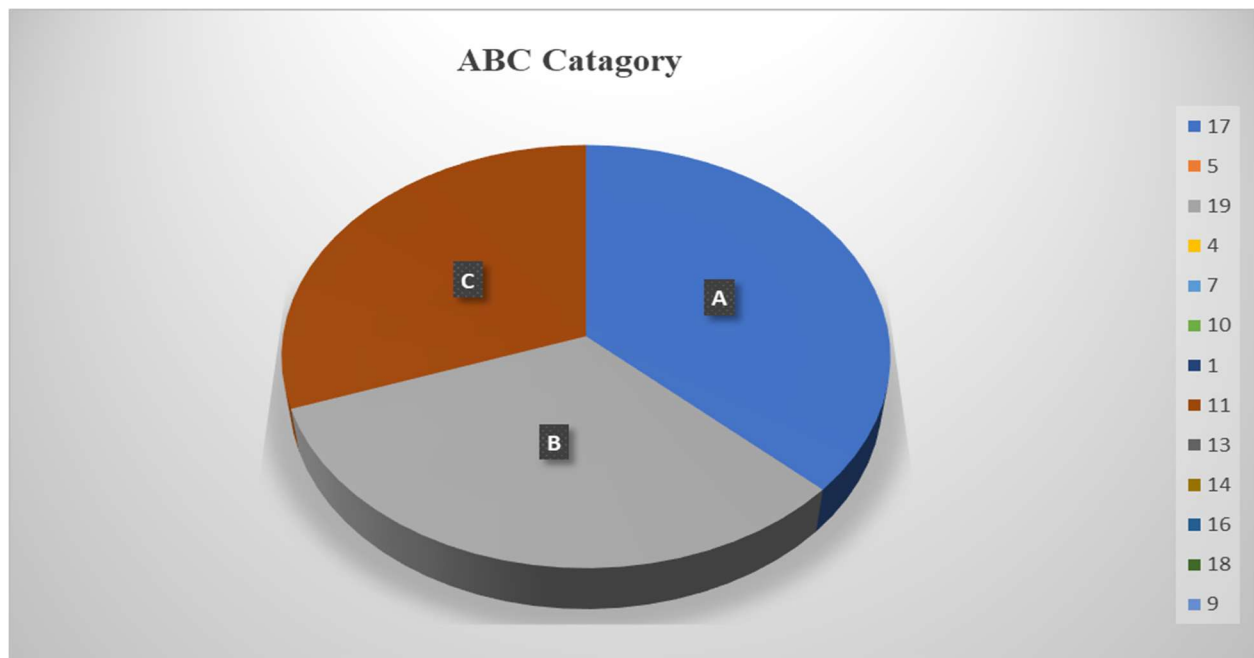
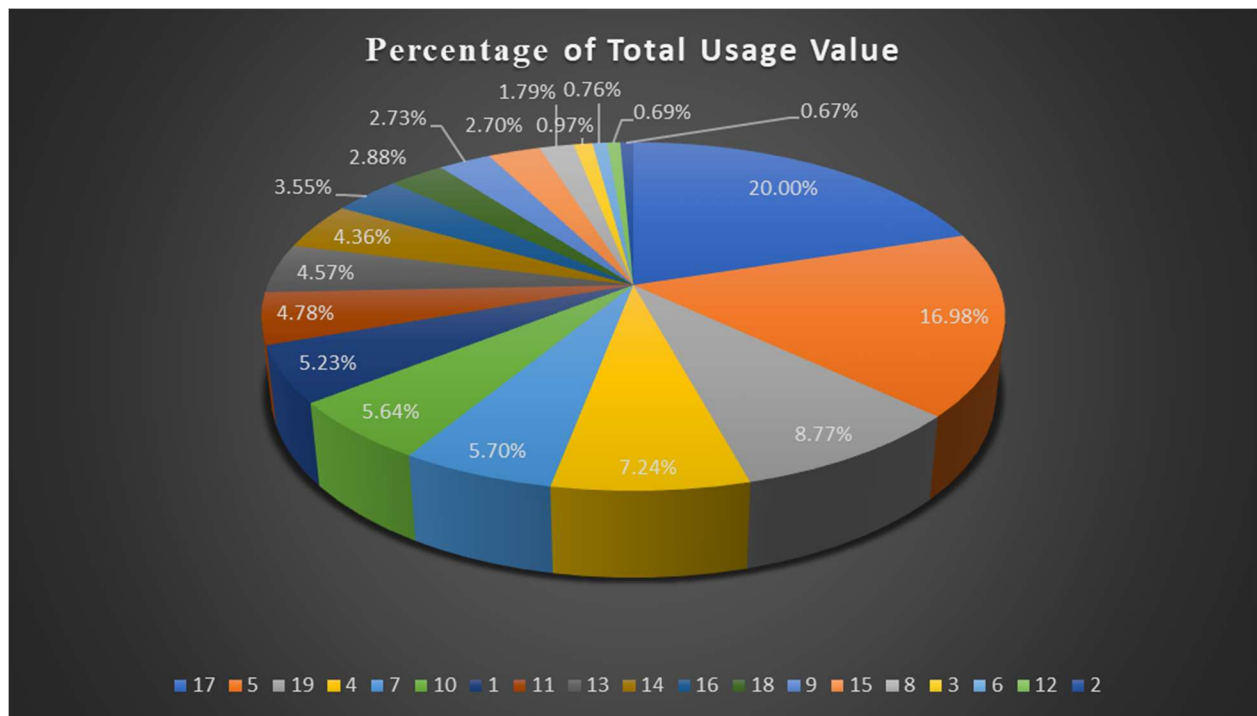


Figure 1.2: ABC Analysis for Set in Order

According to the data analysis, two items, Rin Advanced Synthetic Laundry and Lifebuoy Handwash (Soap), were classified as A, accounting for 38.98% of the total usage value. With five products, category B accounted for 32.5% of usage value, indicating moderate demand. The remainder fell into group C, indicating weaker value and demand.

This study enables products to be arranged in ascending order depending on their worth, precisely fitting with the 5S technique. High-demand items are conveniently accessible, saving handling time and increasing productivity. At the same time, smart positioning optimizes storage and streamlines inventory management. This data-driven approach enables e-commerce to improve inventory control and foster a productive workplace

### 4.3 Shine

The five phases of the 5S approach are each identified by a Japanese word that begins with the letter "S." The "Shine" phase, which is the third step in this process, focuses on precisely cleaning and maintaining the work environment. The main goals of the Shine phase are to make the workstation clean and organized by getting rid of any dirt, dust, clutter, and other sources of contamination.

The implementing procedure should begin with defining a target region; following that, with the help of cleaning supplies, surfaces, and equipment are thoroughly cleaned. Visual cues need to be introduced to simplify item identification, which will improve operational efficiency. Workforce training has to be provided so that employees have a thorough awareness of the need for diligent inventory maintenance. The ongoing progress should track closely, which will guarantee a consistent path of efficiency and organizational optimization. If the following processes are properly followed, finding goods from a well-organized and clean inventory will be much easier, as packing the goods efficiently and sending them to the next step, resulting a speedier order processing. The "Shine" phase creates a happier and more enjoyable workplace, increasing employee morale and engagement. This, in turn, leads to increased job satisfaction, less turnover, and a more pleasant working environment.

The "Shine" phase makes the workplace happier and more fun, enhancing employee morale and involvement. This results in higher job satisfaction, lower turnover, and a more pleasant place to work. This innovative optimization not only cut inventory costs but also freed up valuable storage space.

### 4.4 Standardize

The implementation of FMEA (Failure Modes and Effects Analysis) in the Standardize step of inventory management for e-commerce can considerably improve risk analysis and prioritize risk reduction. Potential failure modes are systematically discovered by FMEA, allowing e-commerce to proactively address risks and build standardized methods that improve their e-commerce inventory operations.

| Process Step      | Failure Mode               | Potential Effects                              | S<br>e<br>v<br>e<br>r<br>i<br>t<br>y | Causes                   | O<br>c<br>c<br>u<br>r<br>r<br>e<br>n<br>c<br>e | Detection | RPN |
|-------------------|----------------------------|------------------------------------------------|--------------------------------------|--------------------------|------------------------------------------------|-----------|-----|
| Receive Inventory | Unreliable inventory count | Customer displeasure due to out-of-stock items | 6                                    | Manual data entry errors | 4                                              | 7         | 180 |

|                               |                                                    |                                                                                         |   |                                                             |   |   |     |
|-------------------------------|----------------------------------------------------|-----------------------------------------------------------------------------------------|---|-------------------------------------------------------------|---|---|-----|
| Update Inventory Records      | delayed or inaccurate updates to inventory records | Increased shipping expenses owing to split shipments caused by erroneous inventory data | 6 | Poor integration of the inventory system and sales channels | 7 | 6 | 252 |
| Fulfill Customer Orders       | Late shipment                                      | Negative impact on customer trust and reputation                                        | 7 | Lack of measure in the order fulfillment process            | 7 | 6 | 294 |
| Monitor Inventory Levels      | Human error in tracking                            | Sales opportunities lost due to stockouts or overstocking                               | 5 | Lack of automated inventory monitoring system               | 4 | 8 | 160 |
| Replenish Inventory           | Incorrect inventory replenishment                  | Inefficient resource allocation and increasing carrying costs                           | 8 | Inaccurate demand forecasting                               | 7 | 8 | 448 |
| Analyze Inventory Performance | Inefficient inventory utilization                  | Inadequate product selection and higher storage costs                                   | 7 | Improper inventory performance analysis tools               | 7 | 9 | 441 |

**Table 1.3:** Failure Mode and Effects Analysis

According to the examination, the risk priority number for replenishing inventory and analyzing inventory performance is the greatest. These two process steps have to be standardized first. To standardize it, the following actions can be performed:

- Establish criteria for calculating reorder points and amounts based on variables such as demand estimates, lead times, and safety stock levels.
- Explain how different inventory goods are classified (for example, fast-moving versus slow-moving) and how their replenishment techniques differ.

- Hold training workshops to familiarize new staff with existing procedures and expectations.
- Employees who are involved in the process to identify bottlenecks or issues that need to be addressed.
- Plan regular assessments of inventory performance and replenishment processes that include all key parties.

#### **4.5 Sustain**

The fifth phase of 5S in “Sustain” in easy word means “Discipline”, which creates a culture of continuous development following the 5S program. The main objective of the “Sustain” phase is to ensure long-term viability. Establishing a culture of performing regular audits, inspections, and involving staff participation emerges as critical for maintaining the previous four phases. One of the most important aspects of ensuring the sustainability of the previous four phases is regular auditing and inspection. These will help detect potential issues, highlight areas for improvement, and provide data-driven advice for maintaining and increasing overall performance.

Overall, using 5S in an e-commerce inventory can result in a more organized, efficient, and productive environment, resulting in higher customer happiness, employee engagement, and cost savings.

#### **5. Conclusion**

The 5S model may significantly improve productivity, streamline processes, and optimize resource use in e-commerce inventory management. Identification and management of slow-moving or obsolete items are made possible by the careful use of the Sorting phase, during which Inventory Turnover Analysis is carried out. This analysis forms a foundation for decluttering the inventory, thereby establishing a well-structured and efficient management system. Additionally, the Set in Order step gives a data-driven approach to categorizing goods based on their demand and worth, enhanced by the use of ABC analysis. High-demand products are now easily accessible because of this tactical layout, which ultimately cuts handling time, boosts productivity, and maximizes storage efficiency. The Shine phase guarantees a tidy and organized workplace as well as increased staff engagement and morale. Using visual signals, following cleaning protocols, and receiving training all help create a pleasant workplace and speed up order processing. Additionally, the Standardize stage promotes risk reduction and standardized practices by including Failure Modes and Effects Analysis (FMEA). By methodically addressing possible weak points, this strategy strengthens inventory operations and their work management.

The sustain phase is where these efforts come to fruition because it involves maintaining a continuous improvement culture through discipline and routine audits. The sustainability of the optimization achieved in the earlier phases is ensured by maintaining the established practices through regular staff engagement and monitoring.

In the end, adopting the thorough 5S methodology in e-commerce inventory management offers a road to a painstakingly organized, resource-efficient, and fruitful environment. This strategic improvement translates to greater customer pleasure, increased employee engagement, and tremendous cost-saving potential, which aligns neatly with the larger goals of a dynamic e-commerce market.

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