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## **Analyzing the Scenario of Warehousing Cost Reduction in a Textile Factory after Implementation of Effective Supply Chain Management (SCM) Department: A Case Study of "Asrotex Group"**

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### **Abstract**

Implementation of the supply chain management (SCM) department has a significant assertive impact on the planning sector of an organization. Sourcing and purchasing an adequate amount of raw material for processing is an essential and considerable factor in the manufacturing industry. Effective demand forecasting can reduce the excess purchase of raw materials. Sourced raw materials are required to stock in inventory for further processing. An excess inventory needs additional space for warehousing, which expends additional costs. A bulk amount of sourcing without proper forecasting can lead the materials towards long-time ageing. Excessive ageing can decrease the quality of the raw material and directly impact production performance. Unorganized sourcing can result in a higher amount of raw material waste due to the amount of small unused lots. In this assessment, the data of "Asrotex Group" will be evaluated after the implementation of the SCM department. A comparison of the previous records will be done with the company's current scenario and assess how the scenario changed after the supply chain management (SCM) department's installation.

**Keywords:** supply chain management; inventory; warehouse; wastage reduction.

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## **1. Introduction**

Minimization of non-value-added activities in the production process is mandatory to increase productivity in an organization. An organization where any manufacturing process was carried on, excluding the mining, is known as a factory. Factories are responsible for every type of production procedure that occurs within the industry. Supply chain management is controlling the tasks and steps of a production process efficiently to ensure more accuracy in output acquisition [1].

Inventory management is a significant branch of the SCM department [2]. Implementation of the SCM department will facilitate the inventory management procedure pleasingly. Demand and supply forecasting will significantly impact the inventory management scenario [3]. The installment of the SCM department in a company will improve the warehousing scenario significantly. Effective demand forecasting will ensure adequate raw material sourcing in regular time intervals. As a result, excess warehousing tendency will be decreased. Warehousing of raw materials requires specific premises within a company [4]. Surplus warehousing will block the door to evaluating the excess premises that can be used in manufacturing. When an immense amount of raw materials are sourced at once, sometimes it will become challenging to stock them together in the predetermined place of inventory due to the high volume of purchased products. So, additional places have to rent usually for inventory purposes in that scenario. Holding cost of the products will be increased due to renting a different place for raw material stock [5]. Transportation of raw materials from warehouses is another principal consideration if the raw material inventory situates far from the manufacturing plant [6].

An additional cost is required in this situation which is not profitable for the organization. Implementation of an effective SCM department will assure accuracy in demand forecasting. Due to that, the surplus sourcing tendency of raw materials will be reduced, and the inventory management process will become more persuasive. Holding cost of raw materials also declined after an efficient SCM department was installed in an organization [7].

Ageing of material is another important factor for consideration during the evaluation of the inventory performance. In most cases, the standard ageing time for yarns is approximately 180 days. When a significant amount of products are sourced at a predetermined production capacity, additional raw materials are kept in stock for a long time. This scenario increments the material's ageing time and decreases the product quality. If the SCM department works correctly, the excess sourcing will be reduced and eliminates the concept of excess aging. Installing an efficient SCM department will facilitate the quality of stored raw materials [8].

Overbuying raw materials will increase the tendency of wastage in diversified forms. Usually, some yarns will remain leftover in yarn packages. This wastage occurs due to small lots. A small lot is the raw material package weighing 1-100 kg. Efficient implementation of the SCM department will assure planning in every phase of the sourcing procedure, which reduces the wastage due to small lots as well.

This experimental procedure explains the facilitation of "Astrotex Group" after implementing an effective supply chain management department in their organization. The benefits of installing the SCM department can

be explained by comparing the earlier scenario with the present situation. This analysis will help the industrial authorities drive towards the area of SCM effectively by calculating the cost-benefit scenario.

## 2. Materials and Methods

"Asrotex Group" started their journey towards implementing individual department for supply chain management (SCM) in 2019. A comparison of data related to the total volume of inventory and warehousing cost of the company will be made in this assessment. The data was collected from the company's ERP. Relevant data for 2018 and 2022 were assessed to evaluate the impact of SCM department implementation.

### 2.1. Depletion of total inventory

After the implementation of the successful SCM department, the total inventory value was compared for the years 2018 and 2022 to determine the benefits of implementing the supply chain department. Total inventory value of the number of products in the entire stock, order allocation for processing and unallocated order. Minimization of product warehousing can be determined using the equation (1).

$$\text{Depletion of total inventory \%} = \frac{\text{Inventory in 2018} - \text{Inventory in 2022}}{\text{Inventory in 2018}} \quad (1)$$

### 2.2. Reduction of Cost

The supply chain management (SCM) department worked as an effective organizer in an organization's inventory and warehousing sector. Effective implementation of the SCM department impacts the raw material cost and holding cost for warehousing affirmatively. The cost reduction will be calculated by following the below-mentioned equation (2).

$$\text{Reduction of Cost (Material/ Holding)} = \text{Cost (Material/ Holding) in 2018} - \text{Cost (Material/ Holding) in 2022}$$

(2)

### 2.3. Minimization of wastage

SCM department implementation strongly impacts waste minimization in the organizational sector. SCM department directly impacts the waste reduction process by reducing the material ageing and the number of small remaining lots in the warehouse. The waste minimization scenario was evaluated by using the equation (3).

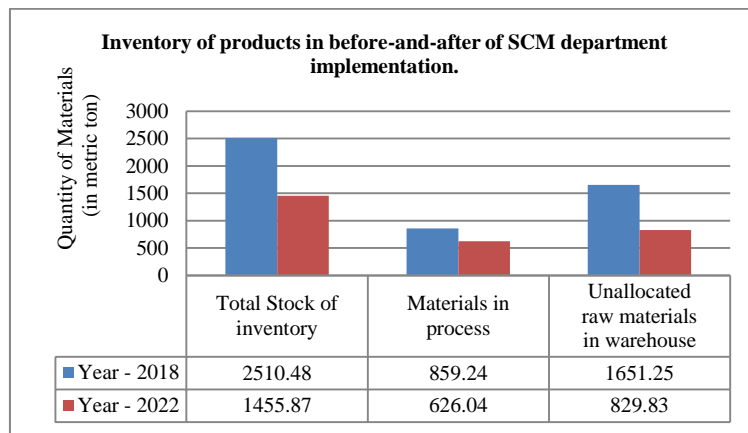
$$\text{Minimization of wastage} = \text{Amount of wastage in 2018} - \text{Amount of wastage in 2022} \quad (3)$$

### 3. Result & Discussion

#### 3.1. Impact on total inventory

SCM department impacts significantly on the organizational inventory. Effective inventory management is required to ensure the proper warehousing and storage of material. The scenario of the total stock of "Asrotex Group" was presented in figure 1.

An organization's inventory was diversified into three significant portions, including the raw material stock in the warehouse, materials in the process of converting raw material to finished goods, and an unallocated amount of raw materials kept in stock for further proceedings.



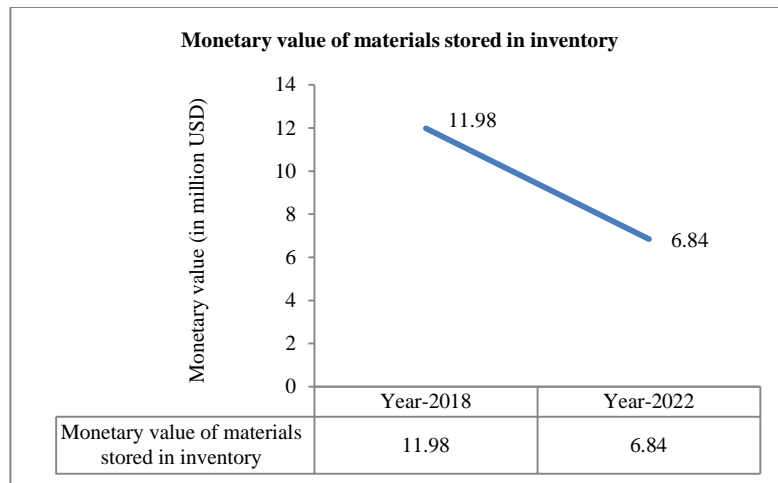
**Figure 1:** Inventory of products in before-and-after of SCM department

Figure 1 represents the total stock of raw materials was reduced after the implementation of the SCM department in the organization. As the SCM department deals with the demand forecasting process, effective forecasting of the required amount of raw materials for processing will impact the inventory management directly. The total stock of raw materials in the warehouse was reduced 42.01% after the implementation of SCM department. The total volume of a stock in "Asrotex Group" was approximately 2510.48 and 1455.87 metric tons in 2018 and 2022. Due to accuracy in forecasting, the in-progress volume was reduced slightly as per the scheduled T&A. As the total inventory volume was decreased with the effective SCM department, the volume of unallocated materials also followed its trend to move downwards. The reduction of material in progress and unallocated raw material was 27.14% and 49.75% consecutively.

### 3.2. Investigation of total cost

#### 3.2.1. Reduction of material cost

The successful implementation of the SCM department reduced the tendency of unplanned sourcing. As a result, excess purchasing of raw materials was minimized. The monetary value of products stored in inventory was 11.98 million USD in 2018 before the implementation of the SCM department in the company. In 2022, the

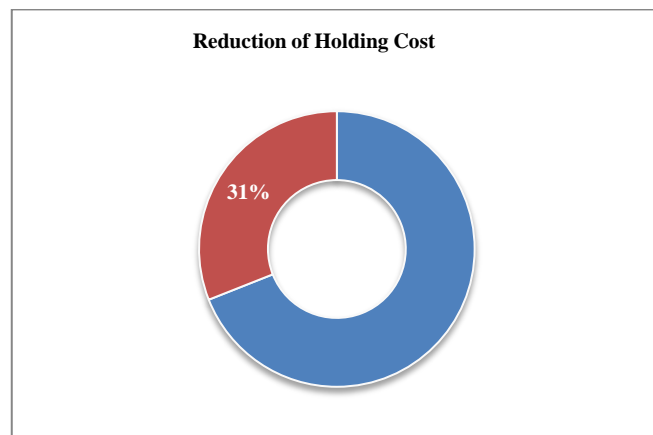


**Figure 2:** Monetary value of raw materials stored in inventory

value of material stored in inventory was reduced 42.84%. The monetary value of products in the warehouse was 6.84 million USD after implementing the effective SCM department.

#### 3.2.2. Minimization of holding cost

The stock of products in the warehouse was minimized after the implementation of the SCM department. The holding cost of materials also shows a minimization tendency. Figure 3 represents the materials' holding costs reduction after the SCM department's successful implementation.

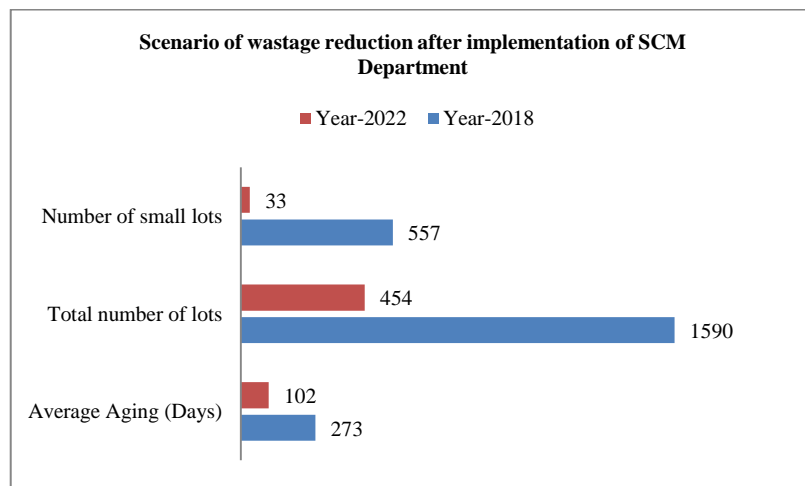


**Figure 3:** Reduction of holding cost in inventory

Before the implementation of the SCM department, "Asrotex Group" had three warehouses within the factory and rented another warehouse outside the factory premises. After the victorious implementation of the SCM department in the factory, "Asrotex Group" left their rented warehouse, which minimizes both the inventory and material transportation costs from warehouse to factory premises.

### 3.3. Reduction of wastage

Wastage reduction was another parameter that varies after SCM department implementation in an organization. The effect of SCM department execution on the average aging of raw materials and the number of small lots in the inventory were described in figure 4.



**Figure 4:** Scenario of wastage reduction in the organization (Year 2018)

After the implementation of the SCM department in "Asrotex Group," the total amount of raw material inventory decreased significantly. Raw material purchasing was unplanned, and keeping raw material in stock for a long timeframe was an ordinary matter in 2018. The quality of yarns fell if the total days of stock crossed the limit of 180 days. The unwanted ageing decreased yarns' properties, which couldn't perform as required. In 2018, the average ageing time was 273 days, significantly higher than the required timeframe (180 days). Implementation of the SCM department directly impacts the sourcing and purchasing of raw materials. As a result, the average aging time for stocked material decreased to 102 days, the desired timeframe for effective production.

The total number of raw material lots stored in inventory was reduced to 454 units from 1590 units after the implementation of the successful SCM department. As a result, the warehouse capacity can be utilized properly.

Small lots are known as the lots where the lot size was within 1-100 kg. With an increment in the total number of lots stocked as raw material, the wastage and number of small lots were also incremented. At the end of every cone, there were some remaining yarns that the machine could not use to produce fabric. This minimal quantity of remaining materials creates small lots of stock, which drastically increases material wastage. The SCM department resolved the issue with planned purchasing. After the installment of SCM departments, the required amount of raw material was purchased in big lots with proper calculation of materials necessity. The number of

small wastage lots was reduced significantly for that. Figure 4 represented that the number of small lots in "Asrotex Group" was reduced to 33 units in the year 2022 after the implementation of the SCM department. Before that, the number of small lots was 557 units in 2018 which denoted a higher amount of wastage.

#### **4. Conclusion**

Implementing a supply chain management department (SCM) in a factory will significantly increase the performance standard. SCM department deals with planning and adequate decision-making in every phase of production. The effect of the SCM department on warehousing cost minimization is significant. In the experimental procedure, the scenario of "Asrotex Group" was presented after SCM installation, and the current scenario was compared with the previous picture.

Unplanned sourcing and purchasing are one of the fundamental reasons for an increasing amount of inventory. Improper forecasting of raw material requirements impacted the suppliers of the finished goods and created the tendency to source more products than the actual requirement. A higher amount of inventory requires more places to stock the products. More aging time is another problem of the consequence. As more raw materials will be sourced, they must keep in stock for a longer time, which will reduce the quality of material and hampers the properties of the final product. A huge amount of small lots is another problem of sourcing more products together, which significantly increases the wastage value.

Installation of the SCM department makes the forecasting process accurate, ensuring perfection in sourcing and purchasing of raw materials. Due to proper planning in sourcing risk of having additional stock for a long time will be decline. As a result, the requirement for extra space for inventory is declined, and cost minimization has occurred, which was stated clearly for "Asrotex Group". Implementation of the SCM department helped them leave the rented warehouse, significantly minimizing the company's cost. Adequate planning of raw material sourcing will reduce the impact of a large amount of raw material purchasing at once. So the aging time of warehoused material will be at a satisfactory level. Proper demand forecasting will ensure purchasing raw material in more oversized lots. As a result, the wastage due to more small lots will also be minimized.

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