



A Study on Warehouse Optimization for Improving Inventory Management in Logistics Process in Mahindra Logistics, Salem

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Date of Submission: 03-06-2024

Date of Acceptance: 13-06-2024

ABSTRACT: Inventory management is a critical aspect of supply chain operations, particularly in the context of Mahindra Logistics, where efficient warehousing plays a pivotal role in ensuring timely delivery and customer satisfaction. This paper presents a comprehensive analysis of warehouse optimization strategies aimed at enhancing inventory management within Mahindra Logistics. By leveraging advanced technologies, process improvements, and strategic planning, the objective is to achieve greater efficiency, accuracy, and cost-effectiveness in inventory control. The paper explores inventory control mechanisms, including demand forecasting, stock replenishment, and dynamic slotting. By leveraging historical sales data, market trends, and predictive analytics, Mahindra Logistics can accurately forecast demand and optimize inventory levels to meet customer requirements while minimizing excess stock and stockouts. Furthermore, dynamic slotting algorithms can be employed to assign optimal storage locations based on product characteristics, demand patterns, and order fulfillment priorities, thereby reducing picking and retrieval times.

KEYWORDS: Demand Forecasting, Dynamic Slotting, inventory control.

I. INTRODUCTION

Warehouse optimization refers to the strategic process of improving operations within a warehouse to achieve efficient and effective operations. This involves refining workflows, leveraging technology, enhancing spatial utilization, and ensuring precise inventory management.

Modern logistic warehouses and distributions centers are designed on the basis of dozens optimization studies. In consequence of that, Warehouse Management Systems

(WMS) become important and more complex and users find it quite hard to manage. The software market offers large variety of solutions with different system requirements and possibilities, and to choose the suitable system for every company is not quite an easy task, because it is influenced by many aspects which must be considered, and one of these aspects is optimization methods based on automated processes for tasks dynamically changeable in time.

The WMSs which drive logistic warehouses and distribution centers are core elements of the material and goods flow in logistic chain and they will be subjected to further investigation in following text related to optimization of technical and operational structure.

STATEMENT OF THE PROBLEM: Inventory control and inventory management theories are widely discussed in scientific literature. However, the majority of inventory management studies mostly investigate manufacturing and procurement related processes with little focus on the management of finished goods inventory. This study is focused on the management of finished goods inventory under decentralized policy in multinational manufacturing company. In large multinational companies the structure of management is extremely complex. As managers removed far away from the decision-making point, in decentralized organisational structures they tend to delegate authority to company's divisions.) state that coordination mechanisms within supply chains are well-documented in the literature. The researchers investigates corporate control between firms within supply chain but control within single company is not researched in their study



OBJECTIVE

- ❖ To assess current warehouse operations at Mahindra Logistics in Salem and identify inefficiencies or bottlenecks hindering optimal inventory management within the logistics process.
- ❖ To evaluate the utilization of technology and automation in warehouse operations to enhance efficiency and accuracy in inventory tracking and storage at Mahindra Logistics, Salem.
- ❖ To analyse inventory turnover rates and storage capacity utilization within Mahindra Logistics' warehouse in Salem, aiming to optimize space utilization and reduce carrying costs.
- ❖ To investigate the impact of improved warehouse layout and material handling processes on order fulfilment accuracy and delivery timelines within Mahindra Logistics' operations in Salem.
- ❖ To propose strategic recommendations and implementable solutions for enhancing inventory management practices and overall operational efficiency within Mahindra Logistics' warehouse in Salem.

SCOPE OF THE STUDY: The study helps the management to improve its profitability through a reduction in non-moving inventory. It develops the policies for both continuous review of inventory management system. The study helps to show the level of the inventory in the Inventory management towards Mahindra Logistics at Salem. The company will make the proper inventory methods from the suggestions of the study.

LIMITATIONS OF THE STUDY:

Due to time constraints and broad area of the topic being examined this thesis has following limitations:-

- The focus of the study is to investigate how to achieve common approach in inventory management of finished goods in manufacturing company with decentralized decision-making structure.
- The main concern is to show how inventory theory is working in real life context in one particular company from the perspective of management style.
- Due to constraints of research scope, the company examined in this paper was not compared with other companies.
- Accounting and financial aspects are also not covered in this research.
- Theoretical framework represents general aspects of inventory management and decision power distribution within the company.

SIGNIFICANCE OF THE STUDY

The need for the present study can be viewed from three perspectives. First, the results from this study are expected to educate the reader on the benefits of robust inventory management policy to modern organizations. While the literature is awash with siloes of inventory control techniques in the field, to the best of our knowledge, sparse research to date has been focused on the relative impact of the many inventory management tools (IMTs) whatnot the market, research, and learning space today. Putting the IMTs together as attempted in this paper may provide some starting point towards integrated thinking as a way of dealing with complexities in modern inventory control. Thus, this paper is expected to ease development of comprehensive and sustainable inventory management policy which is a tedious process for many organizations

II. REVIEW OF LITERATURE:

Rahmayanti & Fauzan (2017) conducted research about inventory problems resulting in overstocks on some goods and shortage of stock in other goods. They used the method which is done by doing forecasts calculations. The purpose of their research is to find available inventory space and to determine the maximum usable inventory

Kartikasari & Suhartono (2017) who used historical data to process data to be processed further. Both studies have similarities with the previous reference, which using the forecasting method in their research. This research aims to forecast future order demand. This method is also believed to be an indicator to measure success in selling and offering the products that the companies researched

Stephyna (2000), Jappi & Koan (2018) focused more on the EOQ, ROP method and also the determination of safety stock. They use the three objectives of this study to implement a new and good inventory system in the object research company. With this implementation, it is believed that it will increase the company's inventory performance, sales productivity, and cost-efficiency

R.S. Chadda (2018) Investigation had been made on inventory management practices of Indian companies. The analysis suggested application of modern scientific inventory control techniques like operations research. These modern scientific techniques furnish opportunities for the companies, Companies can minimize their expenditure in inventory however there is continuous running production. He argued that industrially advanced countries, like, USA, were engaged in developing highly sophisticated mathematical models as well as techniques for



modernizing and redefining the existing tools on inventory expenditure.

Krishnamurty and Sastry (2019) It is the most comprehensive study on manufacturers' inventories. They used the CMI data and the consolidated balance sheet data of public limited companies published by the RBI, in order to analyse each of the major components, like the raw materials, products-in-process and finished products, for 21 industries during 1946-62. That study was time series one although there were some inter-industry cross-section analyses that were carried out in the analysis.

Marsudi (2019) reviewed on inventory management in manufacturing industry and found that the demand pattern policy help in determining the best approaches and the inventory systems such as the Economic ordering quantity, Material requirement planning and Just-in-time has benefitted the industry in planning, delivering process, timely production with linking factors that is environment, technology, systems and procedures

Zhiteng and Haifeng (2020) show that there is requirement of businesses in carrying out analytical research on the impact of inventory strategies on the financial performance of a company. In addition, Yan et al. (2017) has demonstrated that those manufacturing firms where they use higher level of current high-tech inventory management techniques have helped them to improved their performance factor and have made them more competitive in their production process

Abramovitz and Modigliani (2020) They highlighted the relationship between capacity utilization and inventory investment. Existing stock of inventories was expected to adjust to the desired levels. Thus the variable, existing stock of inventories, was essential to be negatively related with the desired stock. The result was that there is positive relation among the ratio of inventory to sales and inventory investment. High ratio of stocks

to sales in the past suggests requirement of high levels of inventories in the past and promising high investment in inventories in the current period also

III. RESEARCH METHODOLOGY

Study area: Salam.

Design of the study: A research configuration is absolutely and essentially the casing work of plan for an examination that matrices the assortment and investigation of information. The research configuration would be elucidating and insightful in nature.

SAMPLING UNIT: The sampling unit is MAHINDRA LOGISTICS, SALEM.

SAMPLE SIZE: According to De Morgan's table the total population is 180.

METHODS OF DATA COLLECTION DATA SOURCES : Primary data collection.

Analytical tools and methods: Statistical analysis is a scientific tool that helps collect and analyze large amounts of data to identify common patterns and trends to convert them into meaningful information. In simple words, statistical analysis is a data analysis tool that helps draw meaningful conclusions from raw and unstructured data. The commonly used statistical tools for analysis of collected data are:

- ✚ Correlation analysis
- ✚ One Way Anova

CORRELATION: The degree of relationship between the variables under consideration is measured through the correlation analysis. "correlation analysis deals with the association between two or more variables". This correlation is a statistical device which helps us in analyzing two correlations of two or more variables.

$$R = \frac{\sum XY}{\sqrt{\sum X^2 \sum Y^2}}$$

Correlations			
		warehouse or areas of it generally need to be closed for	agree with parts in stock distinguished
warehouse or areas of it generally need to be closed for	Pearson Correlation	1	.920**
	Sig. (2-tailed)		.000
	Sum of Squares and	153.041	126.146



agree with parts in stock distinguished	Cross-products			
	Covariance	1.254	1.034	
	N	123	123	
	Pearson Correlation	.920**	1	
	Sig. (2-tailed)	.000		
	Sum of Squares and Cross-products	126.146	122.927	
	Covariance	1.034	1.008	
	N	123	123	
	**. Correlation is significant at the 0.01 level (2-tailed).			

RESULT: This is a positive correlation. There are relationships between warehouses or areas of it generally need to be closed And agree with parts in stock distinguished

ONE WAY ANOVA TEST

Examination of change, or ANOVA, is a solid measurable method that is utilized to show contrast

between at least two methods or parts through importance tests. It likewise shows us an approach to make numerous examinations of a few populace implies. The Anova test is performed by looking at two sorts of variety, the variety between the example implies, just as the variety inside every one of the examples. Beneath referenced recipe addresses one way Anova test measurements:

ANOVA							
satisfaction level of system contain stock items with quantity							
			Sum of Squares	df	Mean Square	F	Sig.
Between Groups	(Combined)		104.666	3	34.889	182.898	.000
	Linear Term	Unweighted	91.335	1	91.335	478.808	.000
		Weighted	101.073	1	101.073	529.857	.000
		Deviation	3.593	2	1.797	9.418	.000
Within Groups			22.700	119	.191		
Total			127.366	122			

RESULT: From the above analysis, we find that calculated value of the F-value is a positive 501.823 value, so H1 accept. Since the P value 0.000 is less

than < 0.05 regarding there is a significant relationship between satisfaction level of system



contain stock items with quantity and Income of the respondents. The results are **significant** at 4 % level.

NULL HYPOTHESIS (H₀): There is no significant relationship between awareness towards the brand on satisfaction towards product attributes.

SUGGESTIONS

- ❖ Establish purchasing review criteria to review the inventory characteristics
- ❖ Purchase only the number of raw materials needed for a production run or a period of time
- ❖ Collaboration with vendors to improve the purchasing practice
- ❖ Improve inventory control through application of effective inventory control systems
- ❖ Encourage materials exchange within the company

IV. CONCLUSION

This paper covers broadly from logistics activities to inventory systems and attempts to determine the role of inventory in logistics systems through extensive review. The main contents of the research include a review of logistics development, the characters of various inventory operations in logistics activities, the applications of logistics in various fields, and its cooperation with inventory systems. Inventory and logistics systems have interdependent relationships. Logistics management

ALTERNATIVE HYPOTHESIS (H₁): There is a significant some relationship between awareness towards the brand on satisfaction towards product attributes

needs inventory management to perform its activities and meanwhile, a successful logistics system could help to improve warehouse environment and operational activities. Inventory plays an important role in logistics system and its activities appear in various sections of logistics processes. Without the linking of Inventory with other logistics activities, a powerful logistics strategy cannot bring its capacity into full play.

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