International Journal of Scientific Research in Engineering and Management (IJSREM)
Volume: 09 Issue: 04 | April - 2025 SJIF Rating: 8.586 ISSN: 2582-3930

Optimization of Inventory Management for Effective Supply Chain for Cost Reduction

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ABSTRACT

Optimizing inventory management is crucial for enhancing supply chain efficiency and achieving cost reduction. By leveraging real-time data analytics and demand forecasting, businesses can minimize stockouts and overstocking. Implementing just-in-time (JIT) inventory systems reduces holding costs and improves cash flow. Automation and integrated inventory software enhance visibility and streamline operations. Strategic supplier partnerships support lean inventory practices and improve replenishment cycles. Efficient inventory turnover leads to lower warehousing costs and increased responsiveness. Risk mitigation strategies further ensure supply chain resilience. Overall, optimized inventory management drives profitability and customer satisfaction.

KEYWORDS

Inventory Optimization , Supply Chain Management, Cost Reduction, Demand Forecasting, Just- In-Time (JIT), Inventory Turnover, Lean Inventory

INTRODUCTION

Inventory management focuses on maintaining the optimal level of stock to ensure smooth production and sales without causing shortages or excess. It aims to prevent stockouts that disrupt operations and overstocking that ties up capital and increases holding costs. Efficient inventory control enhances operational flow and profitability. In the Indian context, awareness of effective inventory management remains limited due to historically sheltered markets and fear of stockouts.

This has often led to a “production at any cost” mindset. Therefore, every rupee invested in inventory must be rigorously justified by its contribution to profitability.OBJECTIVES

- To identify the factors that affect the inventory management.
- To examine the inventory control techniques being adopted by the selected units.
- To provide suggestions to improve the inventory optimization discuss with suitable parameters.

SCOPE OF THE STUDY

Inventory optimization decisions are based on the accuracy of the information, and the reliability of the key variables identification. The present study is focused in identifying the factors influencing the optimization decisions in inventory management. The classification of items as internal and external and measuring the sensitivity of it is tested in the second level of analysis. The primary level of analysis is done by using descriptive and inferential statistics and specially by grouping the items influencing inventory optimization decisions among Madras Hardtools Pvt Ltd in Ponneri. The survey technique is used to collect the data on the reliability of the factors identified as the influencing items in the optimization of inventory decisions in Madras Hardtools Pvt Ltd in Ponneri. The factors are rerotated and

tested under two categories namely internal factors and external factors. Internal factors are more related and based on the organization structure. External factors are more related to external environment conditions.

REVIEW OF LITERATURE

Jamal and Nurul Nadia (2024), "A Study on Relationship between Inventory Management and Company Performance: A Case Study of Textile Chain Store". The study aims to explore the problem in inventory management at company. For quantitative research, information has been analyzed using statistical data, such as ratio analysis of data that obtained from financial statement in five years starting from year 2008 until 2012 to see in clear picture how does inventory management affect the company performance.

Stephen and Jaideep (2023), "Contemporary Inventory Management Techniques: A Conceptual

Investigation". Thus, the main objective of this study is to explore the development of effective integrated inventory management policy with emphasis on applicability in emerging market economies.

William and Miriam (2015), "The Role of Inventory Management on Performance of Food Processing Companies: A case study of Crown Foods Limited Kenya". The study aimed at determining the role of inventory management on performance of food processing Companies in Kenya.

Fariza and Rushami (2015), "The Influence of Inventory Management Practices towards Inventory Management Performance in Malaysian Public Hospitals". The objectives of the study is to investigate if any relationship exists between inventory management practices and inventory management performance in the public hospitals.

Cynthia and Dr. Amuhaya (2015), "An Analysis of the Effects of Inventory Management on the Performance of the Procurement Function of Sugar Manufacturing Companies in the Western

Kenya Sugar Belt". The study examined the effect of inventory management on performance of the procurement function of sugar manufacturing companies in the western sugar belt.

Kwame and Kwame (2014), "Outbound Logistics Management in Manufacturing Companies in Ghana". The purpose of this study is to assess outbound logistics of a manufacturing company (Guinness Ghana Breweries Limited) using the services of a third party logistics provider (DHL). Empirical research was employed to explore outbound logistics performance of the manufacturing company.

RESEARCH METHODOLOGY

RESEARCH

The validity of any research depends on the systematic method of collecting the data and analyzing the same in a logical and sequential order. In the present study, an extensive use of both primary and secondary data was made.

RESEARCH DESIGN

Research design is generally a pure and simplified framework and certain plan for a study that will guide the collection and analysis of data where information needed. The function of the research design is to ensure that the required data is obtained and collected accurately and economically. Research design is basic framework, which provides guideline for the best of research purpose.

DATA COLLECTION

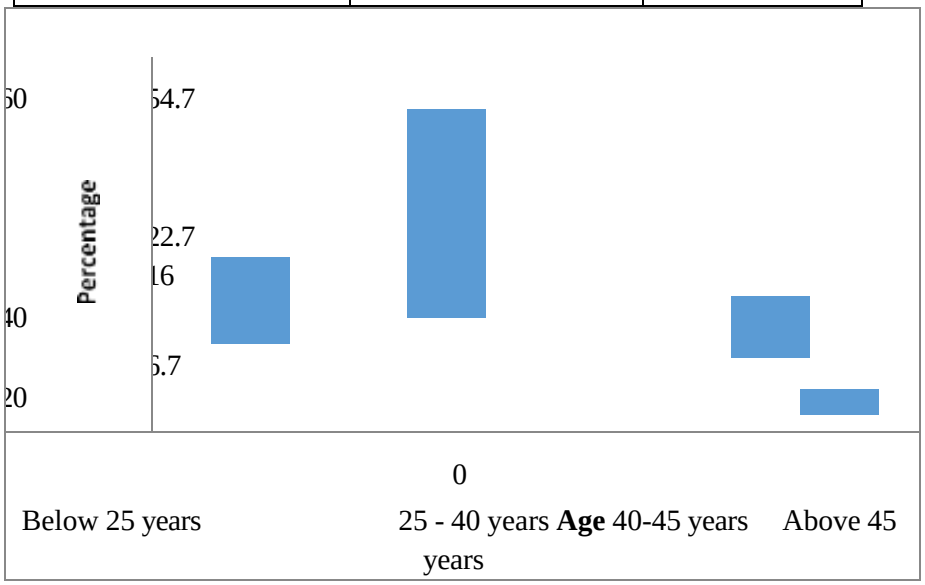
- **PRIMARY DATA**The researcher used self prepared interview schedule for collecting data. The data were collected directly from the respondents.
- **SECONDARY DATA**Secondary data are collected from books, magazines, web sites etc, and both open ended & close-ended questions are incorporated in the questionnaire for the collection of data.

TOOLS USED IN THE ANALYSIS

- Percentage Analysis
- Chi – square test
- ANOVA

PERCENTAGE ANALYSIS:TABLE SHOWING AGE OF RESPONDENT

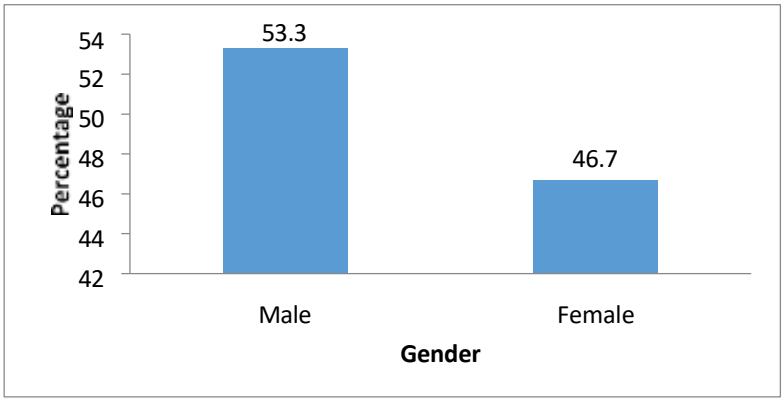
Age	No of respondents	Percentage
Below 25 years	17	22.7
25 - 40 years	41	54.7
40-45 years	12	16.0
Above 45 years	5	6.7
Total	**75**	**100.0**



Out of 100 respondents, 17 (22.7%) of the respondents are belong to the age group of below 25 years, 41 (54.7%) of the respondents are belong to the age group between 25 – 40 years, 12 (16.0%) of the respondents are belong to the age group between 40-45 years and remaining 5 (6.7%) of the respondents are belong to the age group of above 45 years.

1. TABLE SHOWING GENDER OF RESPONDENT

Gender	No of respondents	Percentage
Male	40	53.3
Female	35	46.7
Total	**75**	**100.0**



2.CHART SHOWING GENDER OF RESPONDENT
INTERPRETATION

The above table reveals that out of 105 respondents, 60 (53.3%) of the respondents are male and the remaining 45 (46.7%) of the respondents are female.

CHI – SQUARE ANALYSIS

AGE AND COST ELEMENT

Age	**Co st Element**			**Total**
	High	**Moderate**	**Low**	
Below 25 years	2	15	0	17
25 - 40 years	13	27	1	41
40-45 years	5	6	1	12
Above 45 years	0	5	0	5
Total	**20**	**53**	**2**	**75**

Calculated $\chi 2$ Value: 8.403

Degree of freedom: 6

Table Value: Five per cent level: 12.592

INTERPRETATION

Since the calculated $\chi 2$ value (8.403) is less than the table value (12.592).Therefore it is concluded that there is no significant association between age of the respondents and their cost element. Hence, Null hypothesis is accepted.

PLACE OF RESIDENCE AND COST ELEMENT

H0 = There is no significant association between place of residence of the respondents and their cost element.

Place of Residence	Cost Elemen :			Total
	High	Moderate	Low	
Rural	10	28	2	40
Urban	10	19	0	29
Semi-urban	0	6	0	6
Total	**20**	**53**	**2**	**75**

Calculated $\chi 2$ Value: 4.898 Degree of freedom: 4
Table Value: Five per cent level: 9.488

INTERPRETATION

Since the calculated $\chi 2$ value (4.898) is less than the table value (9.488).Therefore it is concluded that there is no significant association between place of residence of the respondents and their cost element. Hence, Null hypothesis is accepted.

ANOVA ANALYSIS

ANOVA TABLE SHOWING THE DIFFERENCE IN MEAN SCORES BETWEEN CONSTRAINTS IN TECHNOLOGY ADAPTATION & AGE

Age	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	252	2	0.126	0.187	0.830
Within Groups	48.415	72	0.672		
Total	**48.667**	**74**			

INTERPRETATION

The above table shows that the P value (0.830) is greater than 0.05. So, there is no significant difference in the mean scores of the respondents based on constraint in technology adaptation with respect to age of the respondents. It is inferred that age of the respondents does not influence the constraint in technology adaptation.

TABLE

ANOVA TABLE SHOWING THE DIFFERENCE IN MEAN SCORES BETWEEN CONSTRAINTS IN TECHNOLOGY ADAPTATION & PLACE OF RESIDENCE

Place of Residence	**Sum of Squares**	**df**	**Mean Square**	**F**	**Sig.**
Between Groups	0.030	2	0.015	0.035	0.965
Within Groups	30.557	72	0.424		
Total	**30.587**	**74**			

INTERPRETATION

The above table shows that the P value (0.965) is greater than 0.05. So, there is no significant difference in the mean scores of the respondents based on constraint in technology adaptation with respect to place of residence of the respondents. It is inferred that place of residence of the respondents does not influence the constraint in technology adaptation.

FINDINGS

- Majority 41 (54.7%) of the respondent belong to the age group between 25-40 years.
- Most of the respondents are male.
- The majority 40 (53.3%) of the respondents are residing in rural area.
- Most of the respondents are graduates.
- Majority 52 (69.3%) of the respondents are belongs to nuclear family.
- Majority 51 (68%) of the respondents are employed.
- Majority 34 (45.3%) of the respondents monthly income level between Rs.10,001Rs.15,000.
- The majority 58 (77.3%) of the respondents have 3-4 members in their family.

CONCLUSION

- Inventory Analysis and Control has become inevitable for a manufacturing industry. In order to refrain from having an inventory go dead it is of utmost importance to stay abreast with the number and condition of items in that particular inventory.

- Inventory management has to keep accurate records of goods. It is important for keeping cost down. The better inventory management will surely help in solving problems the company would be facing with respect to inventory and will help in reducing huge investment or blocking of money in inventory. Through this study we concluded that companies can follow economic order quantity for optimum purchase and can maintain safety stock for components in order to avoid stock out conditions and helps in continuous production flow. This will reduce the cost and will increase the profit. If we could properly

execute and follow the all the techniques of inventory management, we will be able to enhance the profit with minimum cost.

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Malaysian Public Hospitals