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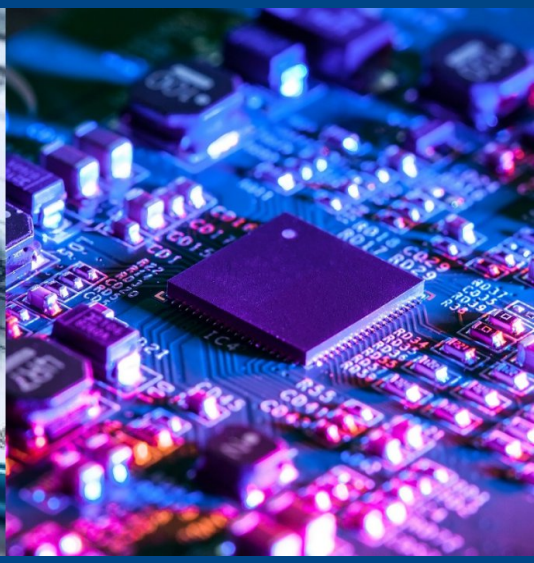

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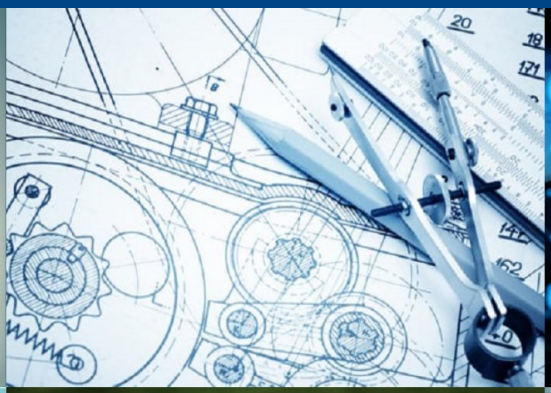

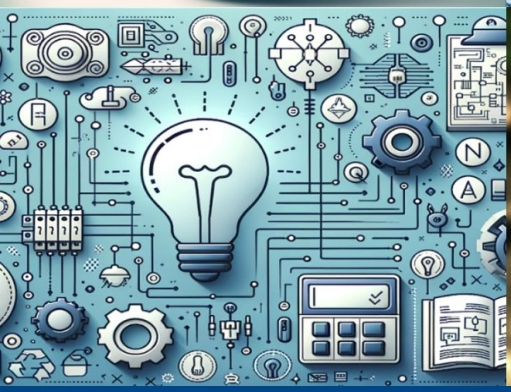

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Optimization of Inventory Management for Effective Supply Chain for Cost Reduction

Dhinesh K, Dr.Dhanalakshmi S

MBA Student, School of Management Studies, Sathyabama Institute of Science and Technology, Chennai, Tamil Nadu, India

Assistant Professor, School of Management Studies, Sathyabama Institute of Science and Technology, Chennai, Tamil Nadu, India

ABSTRACT: The control and maintenance of inventory is a problem common to all organizations in any sector of the economy. The problems of inventory do not confine themselves of profit making institutions. The same type of problems is encountered even by social and nonprofits institutions. Inventories are common to agriculture, manufacturers, wholesalers, retailers, hospitals, churches, prisons, zoos, universities, and national, state, and local Governments. Indeed, inventories are also relevant to the family unit in relation to food, clothing, medicines, toiletries, and so forth. On an aggregate national basis, the total investment in inventory represents a sizable portion of the gross national product. Inventory problems have been encountered by every society, but it was not until the twentieth century that analytical techniques were developed to study them. The term "inventory" implies the aggregate of tangible assets which are finished goods, work-in-progress, and materials and supplies. Since inventories reflect the investment of a firm's funds, it is necessary to have an efficient management of inventory. A firm, in order to survive, should have requisite level of inventories i.e. neither inadequate nor excessive. Inadequate inventories means interruption of productions and sales operations whereas excessive inventories means accumulation of idle funds and increasing in carrying cost. Therefore, with the help of an efficient inventory management, a proper balance between these two extreme situations should be maintained for the smooth operation of business. At the enterprise level, inventory holding assumes greater importance, as inventories constitute a large proportion of the total assets of many concerns. It requires a substantial investment of capital besides involving costs of storage and handling as well as risk of damage, loss and obsolescence. In order to minimize costs and also to ensure that the capital is not unnecessarily locked up, inventories must be efficiently managed. Errors in inventory management cannot be easily rectified, as it is the least liquid among all the current assets. The major problem of inventory control is to maximize profitability by balancing investment cost of materials against what is required to sustain smooth operations.

KEYWORDS: Inventory management optimization, Supply chain efficiency, Cost reduction strategies, Just-in-Time (JIT) inventory, Lean inventory practices.

I. INTRODUCTION

The control and maintenance of inventory is a problem common to all organizations in any sector of the economy. The problems of inventory do not confine themselves of profit making institutions. The same type of problems is encountered even by social and nonprofits institutions. Inventories are common to agriculture, manufacturers, wholesalers, retailers, hospitals, churches, prisons, zoos, universities, and national, state, and local Governments. Indeed, inventories are also relevant to the family unit in relation to food, clothing, medicines, toiletries, and so forth. On an aggregate national basis, the total investment in inventory represents a sizable portion of the gross national product. Inventory problems have been encountered by every society, but it was not until the twentieth century that analytical techniques were developed to study them. The term "inventory" implies the aggregate of tangible assets which are finished goods, work-in-progress, and materials and supplies. Since inventories reflect the investment of a firm's funds, it is necessary to have an efficient management of inventory. A firm, in order to survive, should have requisite level of inventories i.e. neither inadequate nor excessive. Inadequate inventories means interruption of productions and sales operations whereas excessive inventories means accumulation of idle funds and increasing in carrying cost. Therefore, with the help of an efficient inventory management, a proper balance between these two extreme situations should be maintained for the smooth operation of business. At the enterprise level, inventory holding

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assumes greater importance, as inventories constitute a large proportion of the total assets of many concerns. It requires a substantial investment of capital besides involving costs of storage and handling as well as risk of damage, loss and obsolescence. In order to minimize costs and also to ensure that the capital is not unnecessarily locked up, inventories must be efficiently managed. Errors in inventory management cannot be easily rectified, as it is the least liquid among all the current assets. The major problem of inventory control is to maximize profitability by balancing investment cost of materials against what is required to sustain smooth operations.

OBJECTIVES OF THE STUDY

- To identify the factors that affects the inventory movement.
- To study the inventory management and optimization decisions practices followed in the companies.
- To examine the inventory control techniques being adopted by the selected units.
- To find out the factors influencing inventory optimization decisions in the industry.
- To provide suggestions to improve the inventory optimization discuss with suitable parameters.

II. REVIEW OF LITERATURE

Jamal Abdul Nasir bin Syed Mohamad and Nurul Nadia Suraidi (2025), "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. After data were obtained from ratio analysis, the researchers then regressed the relationship to analyze descriptive statistics, and correlation coefficient in order to test the validity and reliability of the data for this study. If the recommendations are applied by the company Xit should be able to improve the inventory management practice and lead to better performance in terms of profits, reducing inventory cost and maximize utilization of resources.

Stephen Aro-Gordon and Jaideep Gupte (2024), "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. The sample size is 220 respondents. The respondents were selected by adopting Non-probability convenient sampling technique. The statistical technique like Chi-square, ANOVA, has been used for the analysis. The study recommended that sustained profitability, cost-reduction, competitive ability, and enhanced capacity-utilization, and market diversification prospects are among the several key benefits of a robust inventory management policy.

Dorothy Oballah, Dr. Esther Waiganjo and Elizabeth Wangu Wachiuri (2023), "Effect of Inventory Management Practices on Organizational Performance in Public Health Institutions in Kenya: A Case Study of Kenyatta National Hospital". The purpose of this study was to investigate the effect of inventory management practices on organizational performance in public health institutions in Kenya. A descriptive case study design was used. The sample size was 100 respondents. The statistical technique like Percentage Analysis, Chi-Square and Rank analysis was applied for the purpose of data analysis. The study recommended that the management should constantly expose its staff to training in order to improve their skills on inventory management.

III. RESEARCH METHODOLOGY

This study adopts a descriptive research design. Convenience sampling is adopted in this study. Both primary data and secondary data are applied to the study. The size of the sample to be used in this study is 75 respondents. Simple percentage analysis, chi square analysis and Anova have been used in this study.

Data analysis and interpretation

Table No. 1 AGE OF THE RESPONDENTS

Age Group	Number of Respondents	Percentage (%)
Below 25 years	12	16%

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25–40 years	35	46.70%
40–45 years	15	20%
55 and above	13	17.30%
Total	75	100%

Source: Primary data

Interpretation

Respondents reveal that 16% are below 25 years, 46.7% fall within the 25–40 years range, 20% are in the 40–45 years category, and 17.3% are 55 years and above.

Table No. 2 GENDER OF THE RESPONDENTS

Gender	Number of Respondents	Percentage (%)
Male	45	60%
Female	30	40%
Total	75	100%

Source: Primary data

Interpretation

Respondents reveal that 60% of the participants are male and 40% are female, based on a total sample size of 75.

Table No. 3 COST ELEMENTS INFLUENCE ON INVENTORY MANAGEMENT

Cost Element	HI – Highly Influencing	MI – Moderately Influencing	I – Influencing	SI – Somewhat Influencing	NI – Nominally Influencing	Total
Vendor search costs	25 (33.3%)	30 (40%)	10 (13.3%)	5 (6.7%)	5 (6.7%)	75 (100%)
Actual material costs	40 (53.3%)	25 (33.3%)	5 (6.7%)	3 (4%)	2 (2.7%)	75 (100%)
Procurement costs	30 (40%)	30 (40%)	10 (13.3%)	3 (4%)	2 (2.7%)	75 (100%)
Documentation costs	15 (20%)	25 (33.3%)	20 (26.7%)	10 (13.3%)	5 (6.7%)	75 (100%)
Quality control	35 (46.7%)	25 (33.3%)	10 (13.3%)	3 (4%)	2 (2.7%)	75 (100%)
Storage and issue control	25 (33.3%)	30 (40%)	10 (13.3%)	5 (6.7%)	5 (6.7%)	75 (100%)
Handling charges	20 (26.7%)	30 (40%)	15 (20%)	5 (6.7%)	5 (6.7%)	75 (100%)
HR costs	10 (13.3%)	20 (26.7%)	25 (33.3%)	15 (20%)	5 (6.7%)	75 (100%)

Source: Primary data

Interpretation

Respondents indicate that vendor search costs are highly influencing for 33.3%, moderately influencing for 40%, influencing for 13.3%, somewhat influencing for 6.7%, and nominally influencing for 6.7%, suggesting that the effort and resources spent in identifying suppliers play a notable role in overall procurement impact. Actual material costs are highly influencing for 53.3%, moderately influencing for 33.3%, influencing for 6.7%, somewhat influencing for 4%, and nominally influencing for 2.7%, highlighting their critical contribution to total expenses. Procurement costs are

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highly influencing for 40%, moderately influencing for 40%, influencing for 13.3%, somewhat influencing for 4%, and nominally influencing for 2.7%, reflecting the importance of administrative and transactional processes. Documentation costs are highly influencing for 20%, moderately influencing for 33.3%, influencing for 26.7%, somewhat influencing for 13.3%, and nominally influencing for 6.7%, indicating a moderate effect on operational efficiency. Quality control is highly influencing for 46.7%, moderately influencing for 33.3%, influencing for 13.3%, somewhat influencing for 4%, and nominally influencing for 2.7%, emphasizing its significant role in ensuring product standards. Storage and issue control are highly influencing for 33.3%, moderately influencing for 40%, influencing for 13.3%, somewhat influencing for 6.7%, and nominally influencing for 6.7%, showing the impact of inventory management. Handling charges are highly influencing for 26.7%, moderately influencing for 40%, influencing for 20%, somewhat influencing for 6.7%, and nominally influencing for 6.7%, reflecting the cost of logistics and material movement. HR costs are highly influencing for 13.3%, moderately influencing for 26.7%, influencing for 33.3%, somewhat influencing for 20%, and nominally influencing for 6.7%, indicating a comparatively lower impact of workforce-related expenses. Overall, the responses reveal that actual material costs, quality control, and procurement activities are the most critical cost drivers, while documentation and HR costs exert a moderate to low influence on the overall procurement process.

Table No. 4 CONSTRAINTS IN TECHNOLOGY ADAPTATION

Constraint	SA – Strongly Agree	A – Agree	N – Neutral	DA – Disagree	SDA – Strongly Disagree	Total
Investment capacity and working capital	25 (33.3%)	30 (40%)	10 (13.3%)	5 (6.7%)	5 (6.7%)	75 (100%)
Technology acquisition and deployment	20 (26.7%)	35 (46.7%)	10 (13.3%)	5 (6.7%)	5 (6.7%)	75 (100%)
Training and development of employees	18 (24%)	32 (42.7%)	15 (20%)	6 (8%)	4 (5.3%)	75 (100%)
Optimum utilization	22 (29.3%)	30 (40%)	13 (17.3%)	5 (6.7%)	5 (6.7%)	75 (100%)
Customization issues	15 (20%)	28 (37.3%)	18 (24%)	10 (13.3%)	4 (5.3%)	75 (100%)
Maintenance and control	18 (24%)	30 (40%)	15 (20%)	8 (10.7%)	4 (5.3%)	75 (100%)
Low level of economies of scale	12 (16%)	25 (33.3%)	20 (26.7%)	12 (16%)	6 (8%)	75 (100%)
Employee turnover	10 (13.3%)	28 (37.3%)	20 (26.7%)	12 (16%)	5 (6.7%)	75 (100%)

Source: Primary data

Interpretation

Respondents reveal that 33.3% strongly agree and 40% agree that investment capacity and working capital constrain technology adaptation, while 13.3% are neutral, 6.7% disagree, and 6.7% strongly disagree. Regarding technology acquisition and deployment, 26.7% strongly agree and 46.7% agree, with 13.3% neutral, 6.7% disagree, and 6.7% strongly disagree. Training and development of employees is strongly agreed by 24% and agreed by 42.7%, with 20% neutral, 8% disagree, and 5.3% strongly disagree. Optimum utilization is strongly agreed by 29.3% and agreed by 40%, with 17.3% neutral, 6.7% disagree, and 6.7% strongly disagree. Customization issues are strongly agreed by 20% and agreed by 37.3%, with 24% neutral, 13.3% disagree, and 5.3% strongly disagree. Maintenance and control is strongly agreed by 24% and agreed by 40%, with 20% neutral, 10.7% disagree, and 5.3% strongly disagree. Low level of economies of scale is strongly agreed by 16% and agreed by 33.3%, with 26.7% neutral, 16% disagree, and 8% strongly disagree. Employee turnover is strongly agreed by 13.3% and agreed by 37.3%, with 26.7% neutral, 16% disagree, and 6.7% strongly disagree. Overall, respondents indicate that financial capacity, technology deployment, employee training, and operational issues are significant constraints in adapting new technology.

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IV. CHI-SQUARE TEST: RELATIONSHIP BETWEEN GENDER OF THE RESPONDENTS AND COST ELEMENTS

H_0 = There is no significant association between gender of the respondents and their cost element.

Gender	Cost Element			Total
	High	Moderate	Low	
Male	14	25	1	40
Female	6	28	1	35
Total	**20**	**53**	**2**	**75**

Calculated $\chi 2$ Value: 3.050
Degree of freedom: 2
Table Value: Five per cent level: 5.991

INTERPRETATION

Since the calculated $\chi 2$ value (3.050) is less than the table value (5.991).Therefore it is concluded that there is no significant association between gender of the respondents and their cost element. Hence, Null hypothesis is accepted.

ANOVA

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	0.252	2	0.126	0.187	0.83
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.

V. SUGGESTION

- In order to reduce the outlay and to maintain inventories at optimum level so it becomes necessary to implement proper planning among all functional departments.
- If we reduce the receivables time, the operating cycle time will also be reduced.
- Top management needs to take notice of the impact of work in progress inventories on the performance and profits of the firm and exercise proper controlling measures through materials department to keep the work in progress inventories within acceptable levels.
- Management of inventory should preferably be decentralized. As a step towards this, budget on consumable should be allocated to each department.
- A proper management of the human resources is very essential for the effective function of the inventory management. On the job training is essential for these personnel. The inventory personnel should be fully aware of the purchasing system, quality control and marketing.
- It will be advantageous if they are sent through these departments. So as to enable them to pick up sufficient knowledge of the functioning of these departments.
- Scientific management of inventory would be possible only through training of the executives at all levels. The training courses should enable the candidates to acquire general commercial and specialist knowledge complementary to the practical skills and to learn to apply the skills needed in the purchasing and inventory function efficiently.

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VI. 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.

REFERENCES

1. Syed Jamal Abdul Nasir bin Syed Mohamad and Nurul Nadia Suraidi (2025), "A Study on Relationship between Inventory Management and Company Performance: A Case Study of Textile Chain Store", Journal of Advanced Management Science, Vol. 4, No. 4, pp. 299-304.
2. Stephen Aro-Gordon and Jaideep Gupte (2024), "Contemporary Inventory Management Techniques: A Conceptual Investigation", International Conference on Operations Management and Research, Vol 3, Issue 1, pp.01-20.
3. Dorothy Oballah, Dr. Esther Waiganjo and Elizabeth Wangu Wachiuri (2023), "Effect of Inventory Management Practices on Organizational Performance in Public Health Institutions in Kenya: A Case Study of Kenyatta National Hospital", International Journal of Education and Research, Vol. 3 No. 3, pp.703-714.
4. William Mwangi and Miriam Thogori Nyambura (2020), "The Role of Inventory Management on Performance of Food Processing Companies: A case study of Crown Foods Limited Kenya", European Journal of Business and Social Sciences, Vol. 4, No. 04, pp.64-78.
5. Fariza Ahmad Mahyadin and Rushami Zien bin Yusoff (2019), "The Influence of Inventory Management Practices towards Inventory Management Performance in Malaysian Public Hospitals", International Academic Research Journal of Business and Technology, Vol 1, Issue 2, pp.142-148.
6. Cynthia Mito Mukopi and Dr. Amuhaya Mike Iravo (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", International Journal of Scientific and Research Publications, Volume 5, Issue 5, pp.01-13.
7. Macharia Ngombo Wilson and Dr. Mike A Iravo (2015), "Effects of Information Technology on Performance Effects of Logistics Firms in Nairobi County", International Journal of Scientific and Research Publications, Volume 5, Issue 4, pp.01-26.

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