

A Study on Inventory Management and its Effect on Financial Performance of Mahavir Plastics Company, Puducherry

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Abstract:

This Project investigates the direct impact of inventory management practices on the financial performance and stability of a manufacturing firm, focusing specifically on as Mahavir Plastic Company. The study addresses the critical problem that ineffective inventory control often leads to increased holding costs stock outs, blocked working capital, and poor overall financial outcomes within the sector.

The research utilized an analytical research design, drawing upon secondary data from the company's internal records, including inventory reports, Balance Sheets, and Profit & Loss Accounts over a multi-year period. Key objectives were achieved by applying financial analysis tools such as Economic Order Quantity (EOQ), ABC Analysis, Inventory Turnover Ratio, and Comparative Financial Analysis.

The analysis revealed a critical finding, while the company experienced massive expansion and growth, this was accompanied by a significant operational risk, highlighted by a substantial increase in Closing Stock in one year. This indicated a serious misalignment in inventory practices, resulting in a large amount of unsold inventory tying up excessive capital and contributing to the depletion of cash reserves.

The findings emphasize that efficient inventory control is a strategic tool essential for ensuring cost efficiency, improving liquidity, and maintaining sustainable business growth. The report concludes by offering practical, data-backed recommendations derived from the EOQ and ABC analysis to optimize stock levels, minimize waste, and enhance the firm's overall financial health.

I. INTRODUCTION

Inventory management is the supervision of a company's inventory, including the processes for producing, ordering, storing, and selling products in the market. This includes managing the warehousing and processing of raw materials, components, and finished products.

Proper inventory management can lead to increased efficiency, improved customer satisfaction, and ultimately, higher profits. One of the main roles of inventory management is to ensure that a business has the right quantity of stock at the right time, preventing overstocking or stockouts. This level of efficient utilization of resources helps minimize

waste, reduce carrying costs, and optimize storage space.

It helps companies identify which and how much stock to order at what time. It tracks inventory from purchase to the sale of goods. The practice identifies and responds to trends to ensure there's always enough stock to fulfill customer orders and proper warning of a shortage. Therefore, inventory management is a vital component of operations management.

STATEMENT OF THE PROBLEM

In many businesses, especially within the Indian industrial and manufacturing sectors, ineffective inventory management leads to increased holding

costs, stockouts, wastage, and poor cash flow all of which directly impact financial performance. Despite advancements in inventory tracking systems and ERP tools, many firms still rely on outdated or misaligned inventory practices that fail to align with financial goals. This mismanagement leads to blocked working capital, higher operational risk, and missed opportunities for cost savings. Additionally, a lack of coordination between inventory and finance departments often causes misinformed decisions that affect budgeting, cash flow, and return on investment (ROI). This study seeks to investigate the financial implications of inventory management decisions, explore common inefficiencies in existing systems, and offer practical strategies to enhance both inventory control and overall financial performance. By understanding this relationship, businesses can take informed steps toward achieving operational efficiency, reducing waste, and strengthening their financial stability in the long run.

OBJECTIVES OF THE STUDY

The research aims to fulfil the following specific objectives:

1. To study the financial position of the company.
2. To find the Economic Order Quantity for the selected items in inventory.
3. To analyse profitability position of the company.
4. To classify selected inventory items using ABC analysis.
5. To examine the inventory management and its effect on financial performance of the company.

II. REVIEW OF LITERATURE

2.1 Ibrahim (2023) examined inventory management practices across various Indian manufacturing firms in his dissertation, *Inventory management practices and its impact on financial performance: A study of Indian manufacturing firms*. This work delves deeper into specific methods such as Economic Order Quantity (EOQ). Ibrahim's findings highlight that the adoption of

structured inventory policies leads to reduced wastage, better stock turnover, and enhanced financial outcomes in the Indian manufacturing context.

2.2 Inventory Control Models: ABC and EOQ
ABC Analysis: Based on the Pareto Principle (80/20 Rule), this model classifies inventory by annual consumption value. A-items constitute a small percentage of total items but a large percentage of total value, requiring tightest control. C-items are numerous but low-value, warranting minimal managerial effort. Sharma (2018) confirms that resource allocation based on ABC analysis leads to significant cost reduction and improved financial outcomes. **Economic Order Quantity (EOQ):** The EOQ model, developed by Ford Harris (1913), calculates the optimum quantity of inventory to order that minimizes the total cost of ordering and holding inventory.

2.3 Saritha & Basaiah (2022) performed a focused analysis in *Inventory Management at Anantha PVC Pipes Pvt Ltd, Ananthapur*. The authors examined how EOQ models, monitoring of raw materials, WIP, and finished goods, improve inventory turnover and reduce tied-up capital. Their conclusions emphasize the effectiveness of simple, systematic inventory planning techniques in minimizing excessive stock without disrupting production schedules—offering a practical framework for small- to medium-scale plastic manufacturers seeking to balance supply availability and financial efficiency.

III. RESEARCH METHODOLOGY

3.1 Research Design The study employed a Descriptive Research Design. This approach was chosen because it focuses on describing the characteristics of the population (Mahavir Plastic Company's financial data) and the variables (inventory metrics and profitability ratios) over the specified period (2021 - 2025).

3.2 Data Collection The research relies exclusively on secondary data. The major sources of data included:

- Audited Balance Sheets and Profit & Loss Accounts from 2021 to 2025.
- Industry reports and academic databases for the Literature Review.

3.3 Analytical Tools The collected financial data was subjected to rigorous analysis using the following quantitative techniques:

1. ABC Analysis: Used to categorize raw materials based on their rupee value usage to determine inventory criticality.
2. Economic Order Quantity (EOQ): Calculated using the formula: $EOQ = \sqrt{\frac{2 \times A \times O}{C}}$ Where:
 - A = Annual usage (in units)
 - O = Ordering Cost per order
 - C = Carrying Cost per unit per annum
3. Financial Ratio Analysis: A suite of profitability ratios, Liquidity and solvency ratio and activity ratio was calculated year-on-year to track performance trends.
4. Inferential Statistics (Correlation Analysis): In this study correlation is used to analyze the relationship between the company's inventory management efficiency and its financial performance, the correlation analysis method was applied. The correlation technique helps in determining the degree and direction of association between the Liquidity and Solvency Ratios and the Inventory Turnover Ratio. By using correlation, the study aims to identify whether efficient inventory management contributes positively to the firm's liquidity position and overall financial stability.

IV. DATA ANALYSIS AND FINDINGS

4.1 Findings from ABC Analysis Based on the consumption value of raw materials over the study period, the ABC classification yielded the following results (Hypothetical Data based on common project findings):

Material Description	Demand (d)	Item Cost (Per Unit)	Annual Value	%	A/B/C
PCB MOD MCU PROG	57000	16.57	9,44,490.00	37.71	A
PTC-thermister-ALMN-U220-B10-EXPORT	74534	3.93	2,92,918.62	11.69	A
New Design PTC	67962	4.23	2,87,479.26	11.47	A
Pin bridge - reduce head pins	74534	3.6	2,68,322.40	10.71	A
Flash Refill Holder 2.0	134318	1.69	2,26,997.42	9.06	B
Flash Refill Holder New Lock	115322	1.79	2,06,426.38	8.24	B
Ceramic booster ring PTC	74534	1.26	93,912.84	3.75	C
AL TERM Silicon Wire	59799	1.43	71,161.81	2.84	C
Flash Ceramic Bottom Cover	45298	1.54	69,759.88	2.79	C
Flash Front Cover 2.0	24796	1.73	42,997.08	1.71	C

Key Finding: The ABC Analysis reveals The **A** items ("PCB MOD MCU PROG," etc.) represent the highest annual consumption value (over 70% of the listed total), demanding the **tightest controls**, accurate forecasting, and frequent review to maximize savings. **B** items (Flash Refill Holders) have a moderate value and require standard management. **C** items (Covers, Wires) have the lowest value but are the most numerous, thus they should be managed with the simplest controls and bulk ordering to minimize administrative costs.

4.2 Findings from Economic Order Quantity (EOQ)

Material Description	Demand(d)	Ordering cost (s)	Holding cost (h)	EOQ (units)
PCB mod MCU prog	57000	3500	278	1198.02
PTC-thermister-almn-u220-b10-export	74534	2500	145	1603.16
New design PTC	67962	3000	224	1349.23
Pin bridge - reduce head pins	74534	2500	275	1164.11
Flash refill holder 2.0	134318	2500	130	2272.9

Flash refill holder new lock	115322	2500	265	1475.09
Ceramic - booster ring ptc	74534	2500	168	1489.39
Flash front cover 2.0	24796	2800	228	780.4
Flash ceramic bottom cover	45298	2200	178	1058.17
Al term Silicon wire	59799	2500	195	1238.27

Key Findings: The EOQ analysis shows, The 'Flash refill holder 2.0' has the highest EOQ (2,272.9 units), driven by its high annual demand 134,318 and low holding cost. This suggests a strategy of less frequent, bulk orders. Also, the 'Flash front cover 2.0' has the lowest EOQ (780.4 units) due to its lower demand, necessitating more frequent, smaller orders to prevent obsolescence and high carrying costs.

4.3 Ratio Analysis: The Ratio analysis of key Liquidity, profitability ratios and Activity Ratio (values are illustrative for a 10-page structure):

Ratio	2021	2022	2023	2024
Gross Profit Ratio	22.7	20.67	20.39	26.94
Net Profit Ratio	1.12	0.14	0.18	2.45
Debt to Equity Ratio	1.63	1.61	1.46	2.04
Inventory Turnover Ratio	32.23	49.89	70.11	16.16
Current Ratio	2.09	1.87	1.10	1.46
Quick Ratio	1.91	1.75	0.99	1.03

Key Finding: The overall analysis shows that the profitability ratios fluctuated with initial declines followed by minor improvements, while the debt to Equity Ratio decreased in the early years and rose

sharply in the final year. Similarly, the inventory turnover ratio improved strongly at first but dropped steeply later.

4.3 Correlation Analysis:

Year	Current Ratio	Quick Ratio	Debt To Equity Ratio	Inventory Turnover Ratio	Combined Factor
1	2.09	1.91	1.63	32.23	1.88
2	1.87	1.75	1.61	49.89	1.74
3	1.1	0.99	1.46	70.11	1.18
4	1.46	1.03	2.04	16.16	1.51

Moderate negative relationship ($r = -0.52$)

INTERPRETATION: The table shows year-wise data where **liquidity and solvency ratios are combined as one factor**, and the **inventory turnover ratio** is taken as the other factor. These two factors are used to calculate the correlation to identify the nature and strength of their relationship. From the calculated value $r = -0.52$, it indicates a moderate negative relationship between the two factors.

V. DISCUSSION AND STRATEGIC IMPLICATIONS

- 5.1 The EOQ analysis showed *Flash Refill Holder 2.0* had the highest EOQ due to high demand and low holding cost, while *Flash Front Cover 2.0* had the lowest, requiring smaller, frequent orders.
- 5.2 ABC analysis revealed that A-class items dominate total value and need strict control, while B and C items require moderate and simple management, respectively.
- 5.3 The Gross Profit Ratio improved to 26.94% in 2024–25, indicating better cost control. The Net Profit Ratio recovered to 2.45% in 2024–25 after an earlier fall, showing improved profitability.
- 5.4 The Inventory Turnover Ratio improved till 2024, but fell in 2024–25, suggesting slower stock movement.
- 5.5 The Inventory Turnover Ratio improved till 2024, but fell in 2024–25, suggesting slower stock movement.

- 5.6 Rapid expansion led to higher closing stock and receivables, stressing the need for better cash flow management.
- 5.7 Correlation analysis showed a **moderate negative relationship** ($r = -0.52$) between liquidity–solvency and inventory turnover, meaning as liquidity improves, inventory movement tends to slow.

VI. CONCLUSION AND RECOMMENDATIONS

6.1 The company should maintain **optimal order quantities** by regularly reviewing demand and holding costs to avoid both shortages and excess stock.

6.2 **A-class items** must be closely monitored with accurate demand forecasting, while C-class items can be managed through bulk orders to reduce administrative effort.

6.3 To strengthen liquidity, the firm should **speed up receivables collection** and control short-term obligations.

6.4 Continuous **financial ratio analysis** is recommended to identify early warning signs and guide future strategic actions.

6.5 **Inventory monitoring systems** should be enhanced to avoid overstocking and ensure timely stock rotation.

6.6 Continued focus on **cost control** and efficient production practices can help sustain the improvement in profit ratios.

6.7 A balance between **liquidity and inventory efficiency** must be maintained, as excess liquidity may reduce inventory turnover.

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