The Study on Inventory Management of UCAL Polymer Industries Limited

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Abstract- *In the contemporary manufacturing landscape, efficient inventory management is crucial for ensuring uninterrupted production, cost minimization, and sustainable profitability. This study, titled "A Study on Inventory Management of UCAL Polymer Industries Ltd.", examines the company's inventory management system to evaluate its effectiveness in maintaining operational efficiency and financial stability. The research highlights the significance of maintaining an optimal balance between inventory investment and production requirements to achieve smooth operations and cost efficiency. The study utilizes both primary and secondary data to analyze the firm's inventory control techniques, including Economic Order Quantity (EOQ), reorder levels, and material handling systems. Analytical tools such as the Inventory Turnover Ratio and ABC Analysis were employed to assess performance and control efficiency. The findings reveal that while UCAL Polymer Industries maintains a stable supply chain, excess inventory levels and delays in material movement occasionally hinder cost control. The study concludes that adopting scientific inventory management techniques and improving coordination between the production and procurement departments can enhance inventory efficiency and reduce holding costs*

Keywords- Inventory Management, Inventory Turnover, Economic Order Quantity (EOQ), Working Capital, Material Handling, Cost Control, Supply Chain Efficiency

I. INTRODUCTION

In the present competitive industrial environment, efficient inventory management has become an essential component of operational excellence and financial sustainability. Effective inventory control enables firms to maintain the right balance between stock availability and production needs, ensuring continuous manufacturing, cost efficiency, and customer satisfaction. Managing materials such as raw goods, work-in-progress, and finished products requires systematic planning and monitoring to prevent both shortages and overstocking.

This study focuses on evaluating the inventory management practices of UCAL Polymer Industries Limited, a leading manufacturer of polymer-based automotive components. Given the company's involvement in large-scale production and supply to the automobile sector, maintaining optimal inventory levels is critical for smooth operations and financial performance.

Proper inventory management directly impacts working capital utilization, cost control, and overall profitability. It helps reduce wastage, improve material handling efficiency, and enhance coordination between the procurement and production departments. Through an in-depth analysis of inventory control practices and key performance indicators, this research aims to assess how effectively UCAL Polymer Industries Ltd. manages its inventory to ensure operational continuity and financial stability.

II. OBJECTIVES OF THE STUDY

The main objective of this study is to evaluate the efficiency of inventory management practices followed by UCAL Polymer Industries Limited and to understand their impact on operational and financial performance. The specific objectives are as follows:

- To analyze the effectiveness of inventory control using the Inventory Turnover Ratio during the study period.
- To classify and evaluate inventory items using ABC Analysis, identifying high-value and frequently used materials that require close monitoring.

III. REVIEW OF LITERATURE

Inventory Management Practices (Kumar, 2024)

Kumar (2024) examined inventory management in the manufacturing sector and found that effective control of inventory improves production efficiency and cost management. The study highlighted that tools such as the

Inventory Turnover Ratio and ABC Analysis are instrumental in minimizing wastage and maximizing profitability**.**

Inventory Management and Financial Performance (Sharma, 2024)

Sharma (2024) investigated the relationship between inventory management and financial performance in small and medium enterprises. The research concluded that maintaining optimal inventory levels enhances cash flow, liquidity, and overall profitability by preventing both stockouts and excess holdings.

Just-in-Time (JIT) Inventory System (Rao, 2024)

Rao (2024) analyzed the adoption of Just-in-Time inventory practices in the automotive components industry. The study found that JIT systems help reduce holding costs and increase flexibility, though they require strong supplier coordination to avoid disruptions in production.

Demand Forecasting and Inventory Efficiency (Gupta, 2023)

Gupta (2023) studied the role of demand forecasting in improving inventory performance within polymer manufacturing firms. The findings emphasized that accurate demand forecasting minimizes overstocking and stockouts, leading to efficient working capital utilization and improved customer satisfaction.

ABC Classification and Resource Optimization (Patel, 2023)

Patel (2023) analyzed inventory classification methods such as ABC and VED analysis. The research concluded that categorizing materials based on value and importance enables better resource prioritization and helps in cost control and efficient stock monitoring.

Inventory Shrinkage and Loss Control (Khatri, 2022)

Khatri (2022) explored the causes and financial implications of inventory shrinkage in textile companies. The study identified theft, damage, and record discrepancies as key factors leading to losses and recommended technology-driven solutions for improved inventory accuracy.

Economic Order Quantity (EOQ) Models (Mehta, 2022)

Mehta (2022) applied EOQ models in manufacturing firms to determine optimal order quantities. The findings showed that balancing ordering and holding costs results in better cost management and improved cash flow efficiency.

IV. RESEARCH METHODOLOGY

Research Design

This study adopts a descriptive research design, as it aims to analyze and interpret the inventory management practices of UCAL Polymer Industries Limited. The design focuses on understanding actual inventory data to identify trends, strengths, and weaknesses in stock control systems. The purpose of this design is to provide a detailed evaluation of the company's inventory efficiency using quantitative tools and systematic interpretation.

Data Collection

The study is based entirely on secondary data, obtained from company records, annual inventory reports, stock statements, and internal documents of UCAL Polymer Industries Limited. In addition, relevant information has been collected from industry publications and research articles to support the analysis. The data covers a five-year period from 2020 to 2024, enabling a comprehensive assessment of inventory control performance during this time frame.

Tools Used for Analysis

To evaluate inventory efficiency and management performance, the following analytical tools were applied:

Inventory Turnover Ratio: To measure the speed at which inventory is converted into sales, indicating operational efficiency.
ABC Analysis: To classify materials based on their annual consumption value and identify items requiring different levels of control.

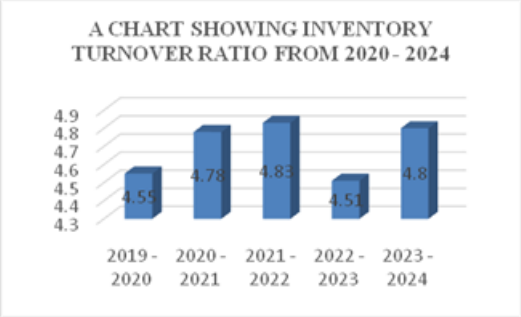
V. DATA ANALYSIS AND INTERPRETATION

1. INVENTORY TURNOVER RATIO OF UCAL POLYMER INDUSTRIES LTD (2020 – 2024)

Year	Cost of Goods Sold (COGS)	Average Inventory	Ratio
2019-2020	5000000	1100000	4.55

2020-2021	5500000	1150000	4.78
2021-2022	5800000	1200000	4.83
2022-2023	6200000	1375000	4.51
2023-2024	6600000	13475000	4.8

Source: secondary data



INTERPRETATION:

The Inventory Turnover Ratio reflects how efficiently a company manages its inventory relative to its sales. A higher ratio indicates faster inventory movement and better utilization of resources, while a lower ratio suggests slow-moving stock or overstocking.

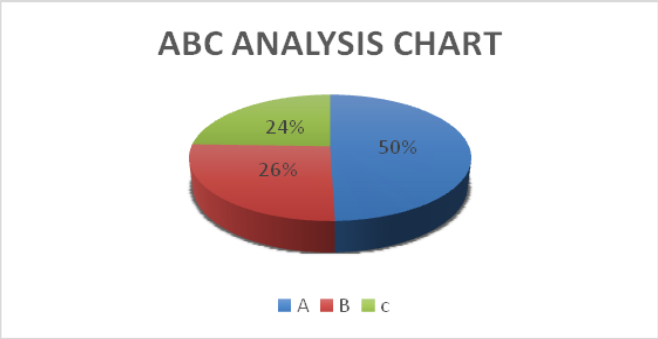
- In 2019–2020, the ratio was 4.55, showing stable performance in inventory movement.
- It improved steadily to 4.83 in 2021–2022, reflecting efficient inventory management and faster conversion of goods into sales.
- However, the ratio declined to 4.51 in 2022–2023, suggesting accumulation of stock or slower demand.
- In 2023–2024, the ratio recovered to 4.80, indicating improved stock utilization and better synchronization between production and sales.

2. ABC ANALYSISOF UCAL POLYMER INDUSTRIES LIMITED (2020-2024)

SI.No	**Material Description**	**Demand (Units)**	**Cost per Unit (₹)**	**Annual Value (₹)**	**% of Total Value**	**ABC Category**
1	Valve Plate	300	1000	300000	14.30%	A
2	Air Suction Valve	200	150	3000	14.30%	A
3	Throttle Body Assembly	100	2500	250000	11.92%	A
4	Fuel Pump Assembly	120	1650	198000	9.44%	A
5	Needle Valve	150	1000	150000	7.15%	B
6	Float Assembly	170	750	127500	6.08%	B
7	PCV Valve	180	600	108000	5.15%	B
8	Injector Assembly	190	500	95000	4.53%	B
9	Vacuum Pump Blade (Main)	300	300	90000	4.29%	C
10	Vacuum Pump Blade (Top)	350	220	77000	3.67%	C
11	Emission Air Sub-System	400	150	60000	2.86%	C
12	Carburetor Kit	550	100	55000	2.62%	C
13	Diaphragm Assembly	500	100	50000	2.38%	C
14	Fuel Filter Cartridge	600	75	45000	2.15%	C
15	Piston Ring Set	700	60	42000	2%	C
16	Gasket Kit	800	50	40000	1.91%	C
17	O-Ring Seal Pack	1000	35	35000	1.67%	C
18	Bearing Assembly	900	33	30000	1.43%	C

19	Spring Set	1000	25	25000	1.19 %	C
20	Rubber Hose	1000	20	20000	0.95 %	C

Source: secondary data



INTERPRETATION:

The ABC Analysis categorizes inventory items according to their annual consumption value, enabling organizations to focus resources on the most important materials and enhance inventory management efficiency.

- Category A includes the high-value components such as Valve Plate, Air Suction Valve, and Throttle Body Assembly, which together contribute about **50%** of the overall inventory value. These items are vital for uninterrupted production and must be managed with precise demand forecasting, stringent control measures, and frequent stock monitoring to minimize the risk of shortages or excess inventory.
- Category B represents medium-value items, including Fuel Pump Assembly, Needle Valve, Float Assembly, PCV Valve, and Injector Assembly, accounting for around **26%** of the total value. These materials require moderate oversight, with practices such as periodic inventory reviews, optimized order planning, and balanced stocklevels to maintain both cost efficiency and smooth operations.
- Category C covers low-value materials like Vacuum Pump Blades, Emission Air Sub-Systems, Carburetor Kits, Diaphragm Assemblies, and Gasket Kits, which collectively make up approximately **24%** of the total inventory value. Given their limited financial significance, these components can be handled using simplified inventory policies, including bulk purchasing, group ordering, and less frequent supervision.

VI. FINDINGS

Inventory Turnover Ratio

The analysis of the Inventory Turnover Ratio revealed that UCAL Polymer Industries Limited maintained moderate efficiency in managing inventory during the period 2019–2020 to 2023–2024. The ratio fluctuated between 4.51 and 4.83 times, showing an overall positive trend with temporary declines in certain years. The improvements up to FY 2021–22 indicate effective stock utilization, while the subsequent dip in FY 2022–23 reflects overstocking and slower inventory movement. The company demonstrated recovery in FY 2023–24, indicating improved synchronization between production and demand.

ABC Analysis

The ABC classification revealed that Category A items accounted for35.40%of the total annual usage value, highlighting the need for strict supervision, precise demand forecasting, and close inventory controlto prevent stock imbalances. Category B items contributed28.30%**,** indicating the requirement forbalanced managementthroughregular monitoringand optimized replenishment policies**.** Category Citems represented36.30%of the total value and consisted mainly oflow-cost materialsthat can be managed effectively through bulk procurementandsimplified control measures**.** The analysis confirms that the company has adopted anefficient inventory classification system**,** enabling it tofocus control efforts on high-value itemswhile maintaining cost-effective management of less critical components.

VII. SUGGESTIONS

Enhance Demand Forecasting:

The company should strengthen its demand forecasting methods to ensure that procurement aligns closely with production schedules. This will minimize excess stock levels and help stabilize the Inventory Turnover Ratio.

Adopt Technology-Based Inventory Systems:

Implementing an ERP-based inventory management system with features like real-time tracking, ABC categorization, and automated EOQ calculations can enhance visibility, reduce manual errors, and improve decision-making.

Optimize Category-Wise Control:

Category A items should be managed with strict supervision and regular audits, while B and C items can be controlled through cost-effective strategies such as vendor-managed inventory or bulk ordering.

Continuous Monitoring and Review:

The firm should establish a routine mechanism for monitoring inventory ratios and reviewing stock levels at periodic intervals. Regular analysis will enable early identification of inefficiencies and ensure timely corrective actions.

VIII. CONCLUSION

The study titled "A Study on Inventory Management of UCAL Polymer Industries Ltd." provides valuable insights into the company's stock control and material management practices. The analysis concludes that the firm has maintained a systematic approach to managing inventory through the use of tools such as the Inventory Turnover Ratio and ABC Analysis, ensuring smooth production flow and operational consistency.

Although overall efficiency has improved, fluctuations in turnover and the need for tighter control over high-value Category A items indicate areas for improvement. Strengthening demand forecasting, reducing excess stock, and integrating procurement with production planning will help the company enhance cost efficiency and optimize working capital utilization.

By adopting technology-driven inventory systems and implementing consistent monitoring, UCAL Polymer Industries Limited can achieve greater operational stability, better liquidity management, and sustainable growth in the competitive polymer manufacturing industry.

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