A Study on The Effect of Inventory Management on The Financial Performance of Chengalrayan Co-Opertive Sugar Mills Ltd., Villupuram District

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Abstract- This project, titled "A Study on the Effect of Inventory Management on the Financial Performance of Chengalrayan Co-operative Sugar Mills Ltd.", investigates the role of inventory management in influencing the financial efficiency and profitability of the sugar mill. In manufacturing industries, especially in agro-based sectors like sugar production, managing inventory effectively is critical to balancing production demands and cost control. The study aims to analyze how different types of inventory - raw materials, work-in-progress, and finished goods are managed and how their turnover ratios affect the financial performance of the organization. These turnover ratios act as important financial indicators that reflect the speed and efficiency of inventory movement within the production cycle. By reviewing inventory records, financial statements, and turnover data, this research applies analytical techniques to assess how inventory management contributes to operational stability and financial strength. The study also identifies areas where inventory-related inefficiencies may be impacting overall performance. The results of this research are intended to provide practical insights for improving inventory control and enhancing the financial decision-making process within the organization.

Keywords- Inventory Management, Financial Performance, Inventory Turnover Ratio, Production Efficiency, Profitability.

I. INTRODUCTION

Inventory management plays a crucial role in the success of any business, regardless of its size or industry. It is a critical component of any manufacturing company's operations, encompassing the processes and strategies used to oversee the flow of goods and materials within an organization. From procurement to production and distribution, effective inventory management ensures that businesses maintain optimal inventory levels to meet customer demand while minimizing costs and maximizing efficiency. It involves various activities such as inventory planning, procurement, storage, tracking, and replenishment to ensure that the right products are available in the right quantities at the right time. It plays a pivotal role in its success, profitability, and customer satisfaction. Financial performance, on the other hand, refers to the measurement of how well a company is doing in terms of generating revenues and profits. Analyzing financial performance provides insights into the overall health of the business, its growth prospects, and its ability to meet financial obligations. Financial performance and inventory management arecritical aspects of businesses that significantly impact the success and sustainability of an organization.

II. OBJECTIVES OF THE STUDY

- To Study the inventory management techniques available in chengalrayan co-operative sugar mills.
- To calculate and analyze the impact of the mill's inventory position on its return on assets(ROA).
- To classify the raw materials through ABC analysis.
- To analysethefinancial position of chengalrayan co-operative sugar mills.
- To offer suggestions based on the study.

III. REVIEW OF LITERATURE

A review of literature refers to a comprehensive survey and analysis of existing research, studies, theories, and writings on a specific topic. It synthesizes and evaluates the current body of knowledge to identify trends, gaps, and areas for further exploration. In academic or research contexts, the review of literature helps to establish the foundation for new research, providing background information, definingkey concepts, and supporting the development of research Questions or hypotheses.

Timothy Et Al. (2022)

The study found that efficient inventory practices such as JIT, EOQ, and ABC analysis significantly improve the

financial performance of manufacturing firms. It showed a strong link between inventory turnover and financial indicators like ROA and gross profit margin. Firms using structured inventory systems achieved better cash flow, reduced holding costs, and minimized material wastage. Overall, the research highlights that effective inventory control is essential for long-term profitability and competitiveness, especially in seasonal industries like sugar.

Park And Kim(2021)

The study found that manufacturing firms using integrated inventory systems like ERP and automated stock tracking achieved stronger financial performance, including higher ROA and improved net profit margins. It showed that inventory turnover ratio is a key predictor of profitability and liquidity. Firms with low inventory turnover struggled with higher holding costs and poor working capital efficiency, which negatively impacted overall profitability.

AartiPatki,(2021)

The study explained that cash flow and inventory play a vital role in determining a company's profitability. It highlighted that asset utilization and inventory turnover ratios reflect how efficiently management handles assets and receivables. A high inventory turnover indicates lean operations and effective resource use, while a low turnover signals slow-moving stock.

Nish(2019)

The study examined hospitals facing issues with expired drugs and used demand, ordering cost, and storage cost data for analysis. It applied ABC, EOQ, and ROP methods to classify drugs, determine optimal order quantities, and identify the correct reorder time.

Marsudi(2018)

The study showed that understanding demand patterns helps firms choose the most effective inventory approaches. It highlighted that systems like EOQ, MRP, and JIT support better planning, timely production, and smoother delivery processes.

RESEARCH METHODOLOGY

Research Design:

The study uses a descriptive and analytical design to examine how inventory management affects the financial

performance of Chengalrayan Co-operative Sugar Mills Ltd. Descriptive analysis explains trends in inventory components, while analytical methods evaluate performance using key inventory ratios. The design also includes time-series analysis to track changes over the years, showing how inventory practices influence the mill's financial efficiency and overall functioning.

Data Collection:

Secondary Data:

The study is based on secondary data collected from five years of financial and inventory records of Chengalrayan Co-operative Sugar Mills Ltd., along with relevant industry reports and publications. This data was classified and tabulated year-wise to analyze trends and assess how inventory management influences the firm's financial performance.

Study Period:

The data covers a period of **five financial years(2020– 2024)**.

Tools usedin analysis:

- ABC Analysis
- Ratio Analysis
- Trend Analysis
- Correlation Analysis

ABC Analysis:

ABC Analysis is an important inventory control technique that classifies materials into three categories—A, B, and C—based on their annual consumption value. This method helps management give proper attention to high-value items while applying simpler control to less important ones. It ensures effective utilization of working capital and better control over inventory.

- A items – high-value, low-quantity items that need strict control.
- B items – moderate-value, moderate-quantity items with normal control.
- C items – low-value, high-quantity items that require simple control.

Ratio Analysis - Ratio analysis helps assess how efficiently inventory is managed and how it affects financial performance. Key ratios like Inventory Turnover, DIO, Current Ratio, and Gross Profit Margin reveal stock

movement, liquidity, and profitability, helping identify inefficiencies and support better financial decisions**.**

- **Trend Analysis -** Trend analysis helps identify the direction and pattern of financial performance over time by examining changes in key indicators like sales, COGS, and inventory levels. It shows whether these values are rising or falling and helps assess how inventory management influences overall financial results.
- **Correlation Analysis-**Correlation analysis measures the strength and direction of the relationship between two variables. In this study, it helps identify whether changes in inventory management are linked to changes in financial indicators such as sales, profit margin, and turnover ratios.

IV. DATAANALYSISAND INTERPRETATION

Data analysis and interpretation is the process of assigning meaning to the collected information and determining the conclusions, significant and implications of the findings. The steps involved in data analysis are a function of the type of information collected, however, returning to the purpose of the assessment and the assessment question will provided structure for the organization of the data and focus for the analysis.

4.1-TABLE SHOWING ABC ANALYSIS

Item	Value	Cumulative Value	% Of Total	Category
Process Material	55770.52	55770.52	44.91%	A
Sugarcane	49204.68	104975.20	39.62%	A
Scrap	8804.68	113779.88	7.09%	B
Molasses	6625.96	120405.84	5.34%	B
Coal	2117.16	122523.00	1.70%	C
Power, Fuel, Lubricants	750.59	123273.59	0.60%	C
Packing Materials	660.56	123934.15	0.53%	C
Other Chemicals	101.88	124036.03	0.08%	C
Bagasse	93.37	124129.40	0.07%	C
Press mud	54.18	124183.58	0.04%	C
Total	124183.58		100	

CATEGORY	NO OF ITEMS	% OF ITEMS	% OF VALUES
A	2	16.67%	84.53%
B	2	16.67%	12.43%
C	6	66.66%	3.04%
TOTAL	10	100%	100%

SOURCE:SECONDARYDATA

INTERPRETATION:

The ABC analysis shows that Category A items (Process Materials and Sugarcane) make up only 16.67% of items but contribute 84.53% of inventory value, requiring strict control and accurate planning. Category B items (Scrap and Molasses) contribute 12.43%, needing periodic review due to their revenue potential. Category C items form 66.66% of total items but only 3.04% of value, requiring simple routine checks. Overall, the mill follows the Pareto principle, where focusing on Category A will greatly improve inventory efficiency and financial performance.

4.2-TABLE SHOWING INVENTORY TURNOVER RATIO

Years	Cost Of Goods Sold	Average Inventory	Inventory Turnover Ratio
2019-2020	3761.28	6058.51	0.62
2020-2021	3404.54	9645.41	0.35
2021-2022	3747.74	9781.63	0.38
2022-2023	3621.51	9417.63	0.38
2023-2024	4178.03	9951.84	0.42

SOURCE:SECONDARYDATA

INTERPRETATION:

The inventory turnover ratio from 2019–2020 to 2023–2024 shows low and fluctuating efficiency. The ratio fell from 0.62 to 0.35, remained almost unchanged at 0.38, and slightly rose to 0.42 in 2023–2024. This indicates slow inventory movement, high stock levels, and increased holding costs. Overall, the mill needs to improve sales performance and strengthen inventory control to avoid overstocking and enhance liquidity.

4.3-TABLE SHOWING 4.4.3 RETURN ON ASSET

Years	Net Profit	Total Asset	ROA Ratio
2019-2020	-300.22	26124.78	-1.14
2020-2021	-495.71	26611.88	-1.86
2021-2022	-102.91	29189.01	-0.35

| 2022-2023 | 182.71 | 30417.65 | 0.60 |
| 2023-2024 | 410.01 | 30346.61 | 1.35 |

SOURCE: SECONDARY DATA

INTERPRETATION:

The ROA analysis shows a clear shift from losses to profitability. From 2019–2020 to 2021–2022, ROA remained negative due to continued losses, hitting a low of –1.86 in 2020–2021. Recovery began in 2021–2022, and a major improvement occurred in 2022–2023 with a positive ROA of 0.60. By 2023–2024, ROA increased further to 1.35, indicating strong profitability and efficient asset use. Overall, the company moved from financial difficulty to stability and growth.

4.4-TABLESHOWINGINVENTORY TO SALES RATIO

Years	Inventory	Sales	Inventory To Sales Ratio
2019-2020	8824.54	5531.67	1.59
2020-2021	10466.29	8737.16	1.19
2021-2022	9096.98	11395.46	0.79
2022-2023	9738.29	13742.50	0.70
2023-2024	10165.4	16540.50	0.61

SOURCE:SECONDARY DATA

INTERPRETATION:

The inventory-to-sales ratio shows a steady decline from *1.59 in 2019–2020* to *0.61 in 2023–2024*, indicating improved efficiency. The continuous drop reflects better demand forecasting, reduced overstocking, and stronger alignment between inventory and sales. Overall, the company is managing inventory more effectively and improving operational performance.

4.5-TABLESHOWINGINVENTORY TO CURRENT ASSET RATIO

Years	Inventory	Current Asset	Inventory To Current Asset Ratio
2020	8824.54	16356.33	53.95
2021	10466.29	19628.86	53.32
2022	9096.98	19654.87	46.28
2023	9738.29	21636.43	45.00
2024	10165.4	24931.95	40.77

SOURCE: SECONDARY DATA

INTERPRETATION:

The Inventory to Current Asset Ratio steadily declined from 53.95% in 2020 to 40.77% in 2024, showing that inventory now makes up a smaller portion of current assets. This indicates improved liquidity, better working-capital management, and reduced overstocking. The trend is positive overall, though inventory levels should still be monitored to avoid shortages.

4.6-TABLE SHOWING INVENTORY TO WORKING CAPITAL

Years	Inventory	Working Capital	Inventory To Working Capital Ratio
2019-2020	8824.54	2351.88	3.75
2020-2021	10466.29	2430.60	4.31
2021-2022	9096.98	4907.13	1.85
2022-2023	9738.29	6139.26	1.59
2023-2024	10165.4	6322.21	1.61

SOURCE: SECONDARY DATA

INTERPRETATION:

The Inventory to Working Capital Ratio was very high in 2019–2020 (3.75) and 2020–2021 (4.31), showing heavy dependence on inventory and weaker liquidity. From 2021–2022 onward, the ratio fell sharply to 1.85, 1.59, and stabilized at 1.61 in 2023–2024. This declining trend indicates reduced excess stock, better liquidity, and more efficient working capital management.

4.7-TABLESHOWINGCAPACITY   ULTILIZATION RATIO

Year	Cane Crushed	Installed Capacity	CUR
2019-20	2.263	172	43.86
2020-21	3.146	172	60.97
2021-22	2.648	172	51.31
2022-23	3.787	172	73.39
2023-24	4.215	172	81.65

SOURCE:SECONDARY DATA

INTERPRETATION:

The capacity utilization ratio shows strong improvement over time. It increased from 43.86% in 2019–2020 to 60.97% in 2020–2021, dipped to 51.31% in 2021–2022, and then rose sharply to 73.39% in 2022–2023 and 81.65% in 2023–2024. Overall, the trend indicates rising operational efficiency and better use of installed capacity.

4.8- TABLESHOWINGTREND ANALYSIS OF SALES

Years	Sales	Trend
2019-2020	5531.67	100
2020-2021	8737.16	157.94
2021-2022	11395.46	206.06
2022-2023	13742.50	248.52
2023-2024	16540.50	299.14

SOURCE:SECONDARY DATA

INTERPRETATION:

Sales show a strong and consistent upward trend from ₹5,531.67 lakh in 2019–2020 to ₹16,540.50 lakh in 2023–2024. The trend index rose from 100 to 299.14, indicating that sales nearly tripled over the period. This steady growth reflects rising production, strong market demand, and effective management, showcasing the mill's expanding market presence.

4.9 TABLESHOWINGTREND ANALYSIS OF INVENTORY

Years	Inventory	Trend
2020	8824.54	100
2021	10466.29	118.60
2022	9096.98	103.09
2023	9738.29	110.35
2024	10165.4	115.19

SOURCE:SECONDARY DATA

INTERPRETATION:

The inventory trend shows overall growth from 2020 to 2024. The index increased from 100 to 118.60 in 2021, dipped to 103.09 in 2022, and then rose again to 110.35 in 2023 and 115.19 in 2024. Despite a brief decline, the trend remains positive, indicating stable expansion of inventory to support operational needs.

4.10-TABLESHOWING CORRELATION ANALYSIS

YEARS	STR	CR	LR	ROA
2019-2020	0.62	1.17	0.54	-1.14
2020-2021	0.35	1.14	0.53	-1.86
2021-2022	0.38	1.33	0.72	-0.35
2022-2023	0.38	1.40	0.77	0.60
2023-2024	0.42	1.34	0.79	1.35

VARIABLES	STR	CR	LR	ROA
STR	1	-0.377	-0.404	-0.166
CR	-0.377	1	0.967	0.875
LR	-0.404	0.967	1	0.943
ROA	-0.166	0.875	0.943	1

SOURCE:SECONDARY DATA

INTERPRETATION:

The correlation analysis shows that the Stock Turnover Ratio has a weak negative link with the Current Ratio, Liquidity Ratio, and ROA, meaning it has little effect on liquidity or profitability. However, the Current Ratio and Liquidity Ratio are very strongly correlated (r = 0.967), and both have strong positive correlations with ROA (r = 0.875 and r = 0.943). This indicates that better liquidity significantly boosts profitability, while stock turnover has minimal impact.

V. FINDINGS

1. **Sales Growth:** The company experienced consistent sales growth over five years, reflecting strong market demand, customer acceptance, and stable operations.
2. **Inventory Levels and Turnover:** While inventory levels increased to meet rising production needs, the low inventory turnover indicates slow stock movement and tied-up capital.
3. **Profitability (ROA):** ROA improved from negative to positive values, showing better utilization of assets and a significant turnaround in financial performance.
4. **Inventory Efficiency:** Declines in inventory-to-sales, inventory-to-current assets, and inventory-to-working capital ratios suggest more efficient stock management, improved liquidity, and optimized resource use.
5. **Capacity Utilization:** Higher capacity utilization indicates enhanced operational efficiency, effective raw material management, and optimized production processes.
6. **ABC & Correlation Insights:** ABC analysis revealed that a small number of high-value items dominate inventory, requiring strict control, while correlation analysis showed a weak link between sales turnover and ROA, suggesting limited impact of sales on profitability.

VI. SUGGESTION

- **Improve Inventory Turnover:** Use JIT and EOQ to reduce holding costs, avoid overstocking, and increase stock movement.
- **Strengthen Control Over Category-A Items:** Apply strict monitoring and accurate forecasting for high-value items like sugar and process materials.
- **Enhance WIP & Production Efficiency:** Reduce bottlenecks, adopt lean practices, and ensure smooth flow to improve profitability and ROA.
- **Optimize Finished Goods & Reduce Obsolete Stock:** Maintain finished goods at market-demand levels and remove slow-moving or outdated inventory.
- **Increase Liquidity & Working Capital Efficiency:** Balance current assets like cash and receivables to reduce dependency on inventory-heavy working capital.
- **Ensure Stable Raw Material Supply & Better Storage:** Strengthen supplier relationships and improve warehouse facilities to avoid disruptions and reduce wastage.

VII. CONCLUSION

The study clearly shows that efficient inventory management plays a vital role in improving the overall financial performance of the Chengalrayan Co-operative Sugar Mills. Over the five-year period, the mill has been able to enhance its sales, reduce excess stock, and achieve a positive return on assets, indicating better utilization of resources. The decline in the inventory-to-sales ratio reflects improved efficiency in converting stock into revenue, while higher capacity utilization demonstrates stronger production stability. Among the various components, Work-in-Progress was found to have the most significant impact on profitability, highlighting the need for greater focus on production flow and process control. The application of ABC analysis further confirmed that a few high-value items dominate the inventory structure, making close monitoring essential. Overall, the findings suggest that through scientific techniques like EOQ, JIT, and ERP adoption, along with effective utilization of by products, the mill can strengthen its liquidity, reduce costs, and achieve sustainable growth in the competitive sugar industry.

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