



AN ANALYTICAL STUDY ON INVENTORY MANAGEMENT AND DEMAND FORECASTING PRACTICES AT SUPREME INDUSTRIES LTD

Ritesh Sanjay Chaudhari (ADT24MGTM0164)

MBA (Finance Technology)– MIT ADT University College of Management & Computer Applications, Pune, India

ABSTRACT

This research paper examines the inventory management and demand forecasting practices of Supreme Industries Ltd., one of India's largest plastic product manufacturers. Using five years of secondary data (FY2020–FY2025) sourced from company reports, ERP dashboards, industry publications, and government databases, the study evaluates demand patterns, inventory efficiency, profitability trends, and division-wise performance – focusing on Plastic Piping Systems and Consumer Products. Analytical tools such as Excel, Power BI, ratio analysis, trend analysis, benchmarking, and SPSS (correlation, regression, ANOVA) were applied. Results indicate seasonality-driven demand fluctuations, declining inventory turnover in Consumer Products, overstocking patterns, and profit margin compression. The study suggests strengthening forecasting models, applying ABC analysis, optimizing safety stock, and integrating macroeconomic indicators like IIP into forecasting. The findings highlight the strategic role of analytics-driven inventory optimization in improving operational performance and competitiveness.

1. INTRODUCTION

The plastics manufacturing sector in India forms a vital part of the industrial ecosystem, supplying critical components for agriculture, housing infrastructure, automobiles, and consumer goods. In such a dynamic environment, efficient inventory management and accurate demand forecasting are essential for operational stability and profitability.

Supreme Industries Ltd., established in 1942, has grown into a market leader with four major divisions: Plastic Piping Systems, Consumer Products, Packaging Products, and Industrial Products. Among these, Piping Systems contribute nearly 60% of revenue, while Consumer Products play a smaller but strategically important role. The company's operations are heavily influenced by seasonal factors, raw material fluctuations, and macroeconomic cycles.

This study evaluates how Supreme manages inventory levels, interprets demand trends, and aligns forecasting models with real market conditions. The goal is to derive actionable insights to strengthen efficiency and help bridge theoretical supply-chain models with real-world manufacturing practices.

2. REVIEW OF LITERATURE

Inventory management and demand forecasting are critical for manufacturing efficiency and profitability. Previous research highlights several approaches and models relevant to this study:

1. Classical Inventory Models

Economic Order Quantity (EOQ), ABC Analysis, Safety Stock, and Reorder Point models form the foundation of inventory planning and manufacturing stability. These models ensure optimal stock levels, minimize carrying costs, and maintain uninterrupted production.

2. Contemporary Inventory Approaches

Lean inventory systems, responsiveness strategies, and bullwhip-effect reduction techniques improve supply chain efficiency. They focus on reducing waste, increasing agility, and aligning production with actual market demand.

3. Forecasting Models

Quantitative, qualitative, causal, and hybrid forecasting models enhance demand prediction accuracy. Combining different forecasting methods allows firms to respond effectively to both historical trends and market uncertainties.

4. Industry Gap

Limited research exists on forecasting and inventory trends in the Indian plastics industry. This study addresses this gap by analyzing inventory management practices, forecasting approaches, and operational efficiency in the context of Supreme Industries.

3. OBJECTIVES OF THE STUDY

To analyze the demand patterns of Plastic Piping Products at Supreme Industries Ltd. over the past five financial years.

To evaluate inventory efficiency in the Consumer Products division using ratio analysis and performance indicators.

To assess profitability trends across major business divisions of Supreme Industries.

To compare the company's performance with industry benchmarks and validate findings through statistical analysis using SPSS.

4. SCOPE OF THE STUDY

The study focuses on the Plastic Piping Systems and Consumer Products divisions of Supreme Industries Ltd. and includes five years of secondary data, company reports, trend analysis, and



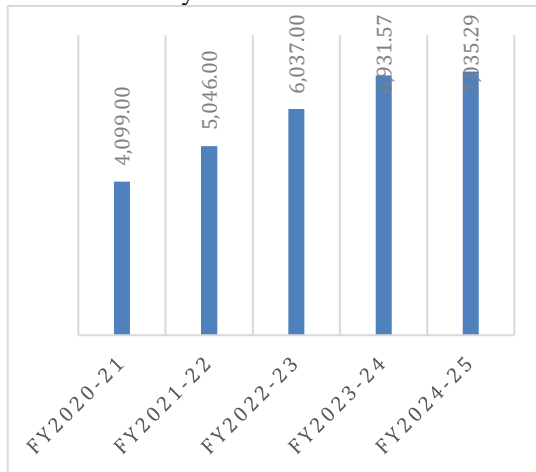
forecasting assessment. The scope excludes financial audits and proprietary internal production data.

5. RESEARCH METHODOLOGY

- Research Design: Descriptive and analytical.
- Data Sources: Secondary data from annual reports, ERP systems, CRISIL, MOSPI, IIP, and industry databases.
- Tools Used: Excel, Power BI, ratio analysis, CAGR, regression, correlation, ANOVA.
- Sample Technique: Purposive sampling of two divisions.
- Time Frame: FY2020–FY2025.

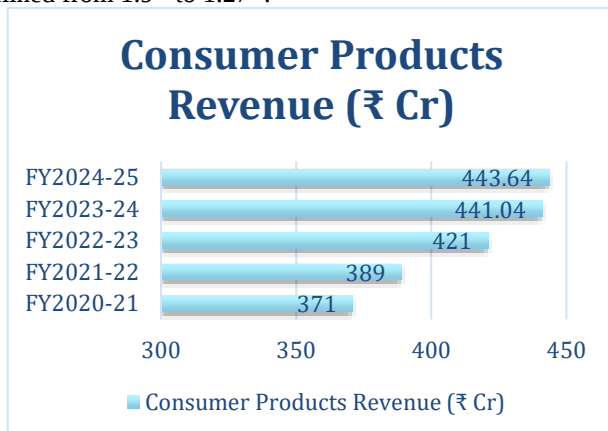
6. DATA ANALYSIS & DISCUSSION

- Demand Pattern Analysis: Plastic Piping shows long-term growth but short-term cyclical slowdown.



Plastic Piping Products continue to form the core of Supreme Industries, and strong long-term growth is fueled by construction, agriculture, and government infrastructure programs. Yet demand is policy-sensitive and cyclical in nature, and the company must closely follow seasonal and macroeconomic trends in inventory to ensure efficiency.

- Inventory Efficiency: Inventory turnover in Consumer Products declined from 1.9× to 1.27×.



Despite Consumer Products' sustained revenue growth over five years, the decelerating growth rate (to 0.6% in FY2024-25) poses questions about inventory effectiveness. Lacking firmer demand forecasting and inventory optimization, the division can be at risk of higher stockholding costs and lower turnover efficiency.

- Benchmarking: Supreme leads in piping market share but lags in consumer products.

Parameter	Supreme Industries (Plastic Piping)	Industry Benchmark	Interpretation
CAGR (5 years)	~14%	10–12%	Above average growth
FY25 Revenue (₹ Cr)	7,035	–	Among top 3 players
Profit Trend	Declining margin FY24–FY25	Similar decline	In line with industry pressures
Consumer Products CAGR	~4.5%	5–7%	Below industry average

- Supreme's Plastic Piping Products division is performing better than industry benchmarks, maintaining leadership and strong growth despite raw material challenges.
- The Consumer Products division, however, is lagging behind industry averages, indicating room for improvement in marketing, product mix, and demand forecasting.
- Overall, Supreme remains a market leader in piping, but needs strategic focus on consumer plastics to improve competitiveness.
- Regression Analysis: Inventory turnover has a significant positive impact on profit margin ($B = 11.42$).



	Column 1	Column 2
Column 1	1	
Column 2	0.901471369	1

SUMMARY OUTPUT

Regression Statistics	
Multiple R	0.901471369
R Square	0.812650629
Adjusted R Square	0.750200839
Standard Error	1.614668339
Observations	5

ANOVA					
	df	SS	MS	F	Significance F
Regression	1	33.90653846	33.90653846	13.01206401	0.036572329
Residual	3	7.821461538	2.607153846		
Total	4	41.748			

	Coefficients	Standard Error	t Stat	P-value	Lower 95%	Upper 95%	Lower 95.0%	Upper 95.0%
Intercept	-3.656923077	5.117799199	-0.71454993	0.526469989	-19.94404423	12.63019807	-19.944	12.6302
Inventory Turnover	11.43307692	3.166635142	3.607334752	0.036572329	1.345461438	21.50069141	1.34546	21.5007

RESIDUAL OUTPUT

Observation	ed Profit Margin Pipi	Residuals
1	18.04692308	-1.846923077
2	16.90461538	1.495384615
3	14.62	1.28
4	12.33538462	-0.235384615
5	11.19307692	-0.689076923

7. FINDINGS

Supreme Industries demonstrates strong leadership in the Plastic Piping segment, leveraging robust production capabilities and market presence. However, the Consumer Products segment faces operational challenges, primarily due to inefficient inventory management and fluctuating demand, resulting in lower profit margins and higher carrying costs.

Key insights from the analysis include:

1. Seasonal and cyclical factors significantly affect demand in Plastic Piping Systems.
2. Inventory turnover is notably low in the Consumer Products segment.
3. Profit margins are declining due to inventory inefficiency.
4. Benchmarking highlights the company's competitive strengths and areas requiring improvement.
5. Forecasting accuracy is impacted by market volatility and overstocking issues.

Addressing these challenges through advanced demand forecasting, optimized safety stock levels, and alignment of production with seasonal demand will improve operational efficiency, reduce costs, and enhance overall profitability. By focusing on inventory optimization and strategic planning,

Supreme Industries can sustain growth across all business segments while strengthening its competitive position.

8. CONCLUSION

Supreme Industries demonstrates strong leadership in the Plastic Piping segment, leveraging its robust production capabilities, established market presence, and consistent demand. However, the Consumer Products segment faces operational challenges due to inefficient inventory management, fluctuating demand patterns, and excess stock levels. These issues lead to higher carrying costs and reduced profitability.

To address these challenges, the company should adopt advanced demand forecasting tools, optimize safety stock levels, and align production schedules with seasonal demand variations. Reducing excess inventory and implementing data-driven supply chain strategies will enhance operational efficiency and strengthen the company's competitive position. Overall, by focusing on inventory optimization and strategic planning, Supreme Industries can sustain growth across all business segments while improving profitability and customer satisfaction.

9. FUTURE SCOPE

To enhance operational efficiency and strengthen Supreme Industries' market position, the following measures are recommended:

- Adoption of AI-based forecasting: Implement advanced AI and machine learning models to improve demand prediction accuracy and reduce overstocking.
- Comparative studies across all divisions: Conduct regular benchmarking and performance analysis to identify best practices and address operational weaknesses.
- IoT-driven real-time stock monitoring: Utilize IoT-enabled sensors and systems to monitor inventory levels in real time, enabling faster response to demand fluctuations.
- Broader macroeconomic-indicator integration: Incorporate macroeconomic and industry trends into forecasting models to improve planning and align production with market conditions.

Implementing these strategies will help Supreme Industries optimize inventory, reduce costs, improve forecasting accuracy, and maintain sustainable growth across all business segments.

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