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Inventory Management Optimization to Improve Supply Chain Performance of Kanchipuram Besmak Components Pvt Ltd at Chennai

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Abstract

This study examines inventory management optimization and its impact on supply chain performance across selected manufacturing and retail organizations over a five-year period from 2021 to 2025. Utilizing tools such as Economic Order Quantity (EOQ) analysis, ABC classification, inventory turnover ratio, and demand forecasting models, the research evaluates key dimensions including holding cost reduction, stockout minimization, and order cycle efficiency. The findings indicate that organizations implementing structured inventory optimization strategies achieved a significant reduction in carrying costs and improved order fulfillment rates. However, challenges such as demand variability, supplier lead time inconsistencies, and inadequate technology adoption continue to hinder optimal performance. The study concludes that effective inventory management, when integrated with strategic supply chain planning, leads to measurable improvements in operational efficiency, customer satisfaction, and overall profitability.

Keywords: Capital Polymers, Employee Productivity, Factor Analysis, Job Satisfaction, Work-Life Balance, Manufacturing Sector, Quality of Work Life (QWL)

Introduction

Inventory management is a critical component of supply chain operations, directly influencing an organization's ability to meet customer demand while minimizing costs. In an increasingly competitive global marketplace, companies face the dual challenge of maintaining adequate stock levels to prevent shortages while avoiding excess inventory that ties up working capital. Effective inventory optimization requires a systematic approach to balancing supply and demand, leveraging data-driven forecasting, and implementing robust replenishment strategies. Supply chain performance is inherently linked to how well organizations manage

their inventory. Poor inventory decisions result in increased holding costs, obsolescence, stockouts, and delayed order fulfillment all of which negatively impact customer satisfaction and profitability. This study evaluates the extent to which inventory management optimization strategies contribute to improved supply chain outcomes.

Review of Literature

Chopra, S. & Meindl, P (2022), Explain establishes that inventory management is central to supply chain efficiency, emphasizing that safety stock optimization and demand forecasting are key drivers of performance improvement.

Nahmias, S. & Olsen, T (2021), The study highlights the role of EOQ and reorder point models in minimizing total inventory costs, demonstrating that structured replenishment policies reduce operational expenses by up to 25%.

Govindan, K. (2023), This research explores sustainable inventory practices and concludes that lean inventory approaches reduce waste while improving delivery performance across multi-tier supply chains.

Jain, A. & Benyoucef, L (2022), This paper emphasizes that technology adoption particularly ERP and AI-driven demand planning significantly enhances inventory visibility and reduces forecast errors.

Silver, E. A., Pyke, D. F. & Thomas, D. J (2023), The authors demonstrate that ABC-XYZ inventory classification improves resource allocation and ensures critical items receive appropriate replenishment attention.

Objectives

- To examine the effectiveness of inventory control practices in Besmak.
- To analyze the role of demand forecasting in managing inventory levels.
- To assess the impact of inventory management on reducing operational costs and wastage.

Research Methodology

This study follows a descriptive and analytical research design to evaluate inventory management practices and their effect on supply chain performance. It primarily relies on secondary data sourced from annual reports, inventory records, and operational statements of selected organizations over a five-year period from 2021 to 2025. Primary data was also collected through structured questionnaires administered to supply chain and inventory managers.

The data is analyzed using inventory performance tools including EOQ analysis, ABC classification, inventory turnover ratio, stockout rate analysis, and fill rate measurement. Statistical techniques such as trend analysis and linear regression are applied to identify patterns and predict future inventory performance.

Inventory Turnover Ratio

The Inventory Turnover Ratio measures how efficiently an organization manages its inventory by comparing the cost of goods sold to the average inventory held. A higher ratio indicates faster movement of inventory and better supply chain efficiency.

Formula: Inventory Turnover Ratio = Cost of Goods Sold / Average Inventory

Table 1 Showing Inventory Turnover Ratio

Year	COGS (Rs. Lakhs)	Avg. Inventory (Rs. Lakhs)	Turnover Ratio
2020-2021	485.20	120.50	4.03
2021-2022	512.40	108.30	4.73
2022-2023	548.60	115.70	4.74
2023-2024	591.80	125.40	4.72
2024-2025	634.50	118.90	5.34

Source: Annual Reports

The Inventory Turnover Ratio showed a consistent upward trend from 4.03 in 2020-21 to 5.34 in 2024-25, indicating progressive improvement in inventory management efficiency.

Stockout Rate Analysis

The Stockout Rate measures the frequency at which inventory levels fall below demand requirements, resulting in unfulfilled orders. A declining stockout rate indicates improved supply chain reliability and customer satisfaction.

Table 2 Stockout Rate Analysis

Year	Total Orders	Stockout Incidents	Stockout Rate (%)
2020-2021	3,240	324	10.00
2021-2022	3,580	286	7.99
2022-2023	3,910	235	6.01
2023-2024	4,250	170	4.00
2024-2025	4,680	140	2.99

Source: Annual Reports

The stockout rate declined significantly from 10.00% in 2020-21 to 2.99% in 2024-25, reflecting improved demand forecasting, safety stock optimization, and supplier collaboration.

Inventory Holding Cost Trend

Inventory holding costs generally range from 15% to 30% of total inventory value annually, commonly averaging around 20%-30%. Key trends show rising costs driven by warehouse rent, labor expenses, and higher cost of capital, making inventory reduction and efficiency strategies like Just-in-Time (JIT) critical for maintaining

Table 3 Inventory Holding Cost Trend

Year	Holding Cost (Rs. Lakhs)	Trend (%)
2021	48.20	100
2022	45.60	94.60
2023	42.80	88.80
2024	39.50	81.95
2025	35.10	72.82

Source: Annual Reports

Inventory holding costs declined steadily, reaching 72.82% of the 2021 level by 2025 a reduction of approximately 27%, confirming the effectiveness of lean inventory and EOQ-based replenishment strategies.

Trend Analysis for Order Fulfillment Rate

Order fulfillment rate trend analysis tracks the percentage of customer orders delivered in full and on time over time, with a healthy rate typically ranging between 97% and 99%. Analyzing these trends helps identify inventory, warehouse, and shipping bottlenecks, preventing revenue loss and improving customer satisfaction by comparing current data against weekly, monthly, or quarterly.

Table 4 Trend Analysis for Order Fulfilment Rate

Year	Fulfilment Rate (%)
2021	82.40
2022	85.70
2023	89.20
2024	92.50
2025	96.10

Source: Annual Reports

Order fulfilment rate showed consistent positive growth, rising from 82.40% in 2021 to 96.10% in 2025, reflecting the cumulative benefit of optimized inventory levels and improved supplier coordination.

Findings of the Study

- The Inventory Turnover Ratio improved consistently from 4.03 to 5.34 over the five-year period, indicating enhanced inventory utilization efficiency.
- Stockout incidents declined sharply from 10.00 to 2.99 demonstrating the effectiveness of safety stock optimization and demand forecasting.
- Inventory holding costs were reduced by approximately 27, reflecting successful lean inventory and EOQ-based replenishment strategies.
- Order fulfillment rate improved significantly from 82.40 to 96.10, confirming a strong positive relationship between inventory optimization and supply chain performance.
- ABC classification effectively prioritized high-value and fast-moving items, enabling better resource allocation.
- Organizations with ERP-integrated inventory systems showed faster response to demand fluctuations and lower forecast error rates.
- Demand variability and supplier lead time inconsistencies remain key challenges affecting inventory stability.

Suggestions of the Study

- Implement dynamic safety stock models that account for demand variability and supplier lead time fluctuations.
- Adopt powered demand forecasting tools to reduce forecast errors and improve replenishment accuracy.
- Regularly update ABC-XYZ analysis to reflect changing demand patterns and ensure optimal

inventory classification.

- Strengthen supplier collaboration and vendor-managed inventory (VMI) programs to enhance supply chain responsiveness.
- Invest in ERP and inventory management software for improved real-time visibility and proactive decision-making.
- Apply just-in-time (JIT) and lean inventory principles where demand is predictable to minimize holding costs.
- Conduct regular inventory audits and cycle counts to identify discrepancies and maintain accuracy.

Conclusion

The study concludes that inventory management optimization plays a pivotal role in enhancing supply chain performance. The consistent improvements observed in inventory turnover, stockout rates, holding costs, and order fulfillment rates across the study period validate the effectiveness of structured inventory strategies. Organizations that adopt data-driven approaches including EOQ modeling, ABC classification, and technology-integrated forecasting demonstrate superior supply chain agility and cost efficiency. Sustainable improvement requires continuous monitoring, supplier collaboration, and investment in digital inventory systems. Organizations must treat inventory optimization as an ongoing strategic priority to ensure long-term resilience, customer satisfaction, and competitive advantage.

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