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A Study on Inventory Management and Control at Swamy Automobiles - Maruti Suzuki Authorized Service Station

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ABSTRACT: Effective inventory management is essential to ensuring operational efficiency and financial sustainability, especially in the highly service-oriented automobile industry. This study investigates the inventory management practices at Swamy Automobiles, an authorized Maruti Suzuki service station located in Chennai. It aims to evaluate inventory levels, assess control techniques, and examine associated cost implications. Utilizing a mixed-methods research approach—comprising both qualitative interviews and quantitative data analysis—the study identifies key inefficiencies and bottlenecks in the current system.

Analytical tools such as Economic Order Quantity, ABC analysis, VED classification, and inventory turnover ratio are employed to evaluate the effectiveness of existing inventory controls. The research reveals critical challenges such as overstocking, under stocking, high inventory holding costs, and lack of real-time monitoring systems. These issues have direct implications for customer service quality, cash flow management, and overall profitability.

The study further emphasizes the strategic importance of aligning inventory practices with technological advancements like ERP systems and predictive analytics. Recommendations are offered to streamline procurement cycles, enhance forecasting accuracy, and reduce operational redundancies. Ultimately, this study contributes valuable insights for automobile service providers seeking to improve inventory efficiency, reduce costs, and achieve a more responsive and agile supply chain.

KEYWORDS: Inventory Management, EOQ, ABC Analysis, VED Analysis, Inventory Turnover Ratio, Just-In-Time , Automobile Service, Cost Control, Spare Parts Management, Demand Forecasting, Supply Chain Efficiency, Holding Costs, Stock Replenishment, Inventory Optimization, Service Operations, Warehouse Management, Operational Efficiency, Automotive After-Sales, Inventory Performance Metrics, ERP Systems.

I. INTRODUCTION

Inventory management plays a pivotal role in ensuring seamless and uninterrupted operations, particularly in the automotive service sector where timely customer service is a critical success factor. Swamy Automobiles, a Maruti Suzuki Authorized Service Station located in Nungambakkam, Chennai, maintains a broad inventory of spare parts, tools, and accessories to support the routine maintenance and repair of a large volume of vehicles. In such a high-demand environment, effective inventory control is not only about availability—it directly influences service turnaround time, customer satisfaction, cost efficiency, and business continuity.

Ensuring the right balance between stock availability and cost control is crucial. Excess inventory can tie up working capital, increase holding costs, and raise the risk of obsolescence, especially with fast-changing automotive technologies. On the other hand, stock outs can lead to service delays, customer dissatisfaction, and potential loss of business to competitors. These dual pressures make inventory planning a strategic priority for service centers like Swamy Automobiles.

In recent years, the automotive aftermarket has become increasingly competitive, driven by higher customer expectations, greater vehicle complexity, and the emergence of multi-brand service providers. This has intensified the need for data-driven inventory strategies, demand forecasting, and real-time inventory tracking. Unfortunately, many

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service centers continue to rely on outdated or manual systems, resulting in inefficiencies and decision-making blind spots.

At Swamy Automobiles, challenges such as overstocking, under stocking, poor demand forecasting, and the lack of real-time monitoring tools have emerged. These issues underscore the importance of evaluating the current inventory management systems and identifying opportunities for improvement. This study seeks to analyze the existing inventory control practices, assess the effectiveness of analytical tools like EOQ, ABC, and VED analysis, and provide actionable recommendations to enhance operational efficiency, minimize costs, and improve customer satisfaction.

II. OBJECTIVES OF THE STUDY

- To assess the adequacy of inventory levels in relation to operational demand.
- To evaluate the effectiveness of inventory control techniques EOQ, ABC, JIT.
- To analyze inventory-related costs including holding, ordering, and stock out costs.
- To identify areas for improving operational efficiency through better inventory practices.
- To suggest measures to minimize wastage and obsolescence.

III. SCOPE OF THE STUDY

This study focuses on analyzing the inventory management and control practices at Swamy Automobiles, a Maruti Suzuki Authorized Service Station located in Nungambakkam, Chennai. The research primarily investigates how spare parts, tools, lubricants, and accessories are procured, stored, tracked, and utilized to support vehicle maintenance and repair services.

The core focus is limited to internal inventory operations, including stock level management, reordering policies, storage practices, and the application of analytical tools such as
:

- Economic Order Quantity (EOQ)
- VED (Vital, Essential, Desirable) Analysis
- Just-In-Time (JIT) Replenishment
- Reorder Level and Safety Stock Calculations

These techniques are examined for their effectiveness in minimizing wastage, reducing holding and ordering costs, and ensuring timely availability of critical components.

In addition to quantitative analysis, the scope also covers the operational and strategic dimensions of inventory management. This includes assessing the role of human resource capabilities, workflow coordination among departments, and the impact of inventory decisions on customer service delivery, turnaround time, and customer retention.

The study period is restricted to February to April 2025, which provides a snapshot of inventory performance during a three-month window. While the findings offer valuable insights into operational efficiency during this period, seasonal demand fluctuations, long-term trends, macroeconomic conditions, and global supply chain factors are not included.

Furthermore, the research is organization-specific, and data is collected only from Swamy Automobiles. Therefore, the observations and recommendations, while insightful, are not universally generalize able but can serve as a benchmark for similar automobile service centers, especially those affiliated with OEM (Original Equipment Manufacturer) networks like Maruti Suzuki.

The study also excludes financial auditing, customer relationship management, and external supplier performance evaluation, except where directly linked to inventory control. Advanced technologies such as ERP, RFID, or AI-based inventory optimization are only considered if currently in use by the organization.

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IV. REVIEW OF LITERATURE

The literature consistently emphasizes that effective inventory management is a cornerstone of organizational profitability, operational efficiency, and customer satisfaction. Scholars and industry experts have long argued that optimizing inventory levels and adopting strategic control techniques can lead to reduced carrying costs, minimized stock outs, and improved cash flow—factors that are especially critical in competitive and service-intensive industries like automotive repair and maintenance.

Gaur et al. (2005) and **Capkun et al. (2009)** underscore the importance of inventory turnover as a performance metric, demonstrating its strong correlation with profitability and operating efficiency in retail and manufacturing environments. Their studies reveal that high inventory turnover is often linked to better utilization of resources and reduced inventory holding periods, which, in turn, enhance firm performance.

Piasecki (2001) highlights the value of the Economic Order Quantity (EOQ) model in optimizing order sizes to balance ordering and holding costs. He notes, however, that while EOQ is a widely accepted theoretical tool, its real-world applicability depends heavily on the accuracy of input data and the stability of demand patterns.

In the **Indian context**, **Singh (2006)** conducted a detailed analysis of inventory control practices in the fertilizer industry, observing that ineffective inventory planning can lead to excessive working capital requirements and declining liquidity. Similarly, **Panigrahi (2013)** focused on inventory conversion periods in Indian cement companies, concluding that longer inventory cycles adversely affect profitability and capital efficiency.

Across various sectors—particularly small and medium-sized enterprises (SMEs), engineering goods, and fast-moving consumer goods (FMCG)—a common theme emerges: inventory management is not just a cost center but a strategic function. Studies affirm that the adoption of techniques such as ABC analysis, VED analysis, Just-In-Time (JIT), and ERP-based inventory control systems can significantly enhance organizational agility, reduce wastage, and improve service delivery.

Collectively, the reviewed literature forms a robust foundation for the current study, affirming that well-managed inventory systems can drive both financial performance and customer-centric outcomes.

V. RESEARCH METHODOLOGY

This study adopts a descriptive research design to systematically examine the current inventory management practices at Swamy Automobiles, with the objective of identifying inefficiencies and recommending practical improvements. A descriptive approach is well-suited for this research as it enables the collection of detailed information regarding the processes, tools, and outcomes associated with inventory control in a real-world service environment.

To ensure the validity and depth of analysis, the research employs a mixed-methods approach**,** integrating both primary and secondary data sources**.**

Primary Data Collection

- Primary data was gathered directly from individuals involved in the inventory process through:
- Structured interviews with key personnel such as the service manager and senior technicians.
- Standardized questionnaires distributed to inventory clerks and spare parts handlers to collect both quantitative and qualitative data regarding stock levels, order frequency, replenishment cycles, and challenges faced.
- Direct observation of daily inventory operations, storage conditions, order processing, and parts tracking, allowing for real-time assessment of efficiency and procedural adherence.

This triangulated approach ensures the reliability and accuracy of findings by capturing both perceptions and practices.

Secondary Data Collection

Secondary data was obtained from the internal records of Swamy Automobiles, including:

- Inventory logs and stock reports
- Purchase and usage records
- Reorder level data
- Historical data on inventory turnover, holding costs, and service delivery timelines

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These documents provided a quantitative foundation to assess inventory turnover ratios, EOQ calculations, and cost metrics.

Sampling Method

The study uses a purposive sampling technique**,** selecting participants who have direct involvement and experience in inventory-related operations. A total of 15 respondents were chosen to ensure a comprehensive view from different functional roles:

This non-probability sampling method was deemed appropriate as it enables targeted insights from those most knowledgeable about the subject matter, rather than a random representation of the broader workforce.

This integrated data collection strategy supports a nuanced understanding of inventory management practices and provides a solid basis for meaningful analysis and interpretation.

Analytical Tools

- Economic Order Quantity
- ABC & VED Analysis
- Inventory Turnover Ratio
- Trend and Percentage Analysis

VI. DATA ANALYSIS AND INTERPRETATION

Inventory Turnover Ratio

The ratio fluctuated over five years, indicating inconsistent inventory movement:

- Highest: 30.01 (2021–22)
- Lowest: 10.99 (2023–24)
-

Inventory Holding Period

Increased significantly in 2023–24 (33.21 days), indicating slow inventory movement and potential overstocking.

Inventory Conversion Period

Rose from 9 to 17.09 days over five years, suggesting decreasing efficiency in converting inventory into sales.

Average Day to Sell Inventory

Varied between 3.33 and 9.09 days, with a spike in 2023, reflecting inefficiencies in sales or stock planning.

VII. FINDINGS OF THE STUDY

Based on the data analysis and interpretation, several important insights were drawn regarding the inventory management practices at Swamy Automobiles:

The analysis of inventory turnover ratios over the past five years indicates fluctuations in inventory movement efficiency. While certain years recorded acceptable turnover, recent data shows a noticeable decline, reflecting irregular inventory utilization and possible inefficiencies in stock management.

The inventory holding period and inventory conversion period have shown a rising trend, suggesting that goods are remaining in stock for longer durations before being utilized or sold. This points to an accumulation of excess inventory and slower movement of parts, which can hinder operational agility and tie up working capital.

Although inventory models such as Economic Order Quantity (EOQ) **and** ABC Analysis are recognized within the organization, they are not being consistently or effectively applied. The absence of systematic implementation results in missed opportunities for cost optimization and efficient reorder planning.

The organization is experiencing an increase in inventory holding costs, including storage expenses, insurance, and depreciation of parts. Obsolescence is becoming a concern, particularly for slow-moving items and outdated components, further contributing to financial strain.

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The current system lacks digital tools for real-time inventory tracking, leading to delays in procurement decisions and stock mismatches. Manual tracking methods are prone to errors, impacting the accuracy of stock data and forecasting.

Physical storage spaces are under strain due to overstocking, leading to inefficient use of warehouse capacity. Inadequate classification and arrangement of parts also hinder quick retrieval, affecting service turnaround times.
These findings highlight the critical need for improved planning, automation, and strategic use of inventory control techniques to enhance operational performance, reduce costs, and meet customer service expectations efficiently.

VIII. SUGGESTIONS

Based on the findings of the study, several strategic and operational improvements are recommended to enhance the efficiency of inventory management at Swamy Automobiles:

Implement Real-Time Inventory Monitoring through ERP Systems:
Introducing an integrated **Enterprise Resource Planning (ERP)** system can automate inventory tracking, improve data accuracy, and provide real-time insights into stock levels, movement patterns, and reorder needs. This would significantly reduce manual errors and improve decision-making.
Adopt EOQ and Just-In-Time (JIT) Models:
Utilizing the **Economic Order Quantity (EOQ)** model can help optimize order quantities by balancing ordering and holding costs. Simultaneously, adopting a **Just-In-Time (JIT)** approach where feasible can reduce excess inventory and minimize wastage by ordering parts closer to the time of actual need.

Train Inventory Personnel in Forecasting Techniques:
Conduct regular training for inventory clerks and procurement staff on **demand forecasting methods**, data interpretation, and modern inventory tools. This will enhance their ability to predict usage patterns more accurately and improve inventory planning.

Establish Reorder Level Alerts to Prevent Stockouts:
Setting up automated **reorder level thresholds** with alert mechanisms will ensure that critical items are replenished in a timely manner. This reduces the risk of service delays caused by stock unavailability and helps maintain optimal service delivery.

Periodically Reclassify Inventory using ABC/VED Analysis:
Regularly conducting **ABC (Always Better Control)** and **VED (Vital, Essential, Desirable)** classification allows for better prioritization of inventory items. It ensures that vital and high-value components receive tighter control while reducing overstocking of less essential items.

Optimize Storage and Space Utilization:
Revise layout and storage strategies within the warehouse to maximize space efficiency, ease of access, and minimize movement time during service operations.

Establish Supplier Coordination for Lean Inventory:
Build strong relationships with reliable suppliers for quicker lead times, better credit terms, and flexible delivery schedules. This supports lean inventory practices and reduces the need for large safety stocks.

Introduce Performance Metrics and Periodic Reviews:
Develop **Key Performance Indicators (KPIs)** such as inventory turnover ratio, fill rate, order cycle time, and carrying cost percentage. Review these periodically to ensure continuous improvement and accountability.

IX. CONCLUSION

Inventory management at Swamy Automobiles plays a pivotal role in ensuring timely service delivery, optimizing resource utilization, and maintaining financial discipline. As an authorized Maruti Suzuki service station, the company is expected to meet high standards of responsiveness, reliability, and customer satisfaction—objectives that are directly influenced by the efficiency of its inventory systems.

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While the organization has built a solid operational foundation, the study reveals notable inefficiencies in stock planning, inventory turnover, and demand forecasting. Rising holding costs, inconsistent application of inventory control models like EOQ and ABC, and limited use of real-time tracking mechanisms have adversely impacted performance in recent years.

To address these challenges, the company must embrace data-driven inventory strategies, invest in modern ERP systems**,** and enhance staff competencies in forecasting and inventory classification techniques. By doing so, Swamy Automobiles can significantly improve its inventory turnover, minimize wastage, reduce operational **costs**, and align its inventory management with evolving industry standards and customer expectations.

Ultimately, a more agile, transparent, and analytically driven inventory management framework will not only improve internal efficiency but also reinforce the company's market competitiveness and service quality**,** ensuring sustained growth in a dynamic automotive service environment.

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