

# A Study on Optimizing Inventory Management in the Automotive Aftermarket Logistics Sector Towards Rydon Industries PVT LTD, Coimbatore

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## ABSTRACT

This study focuses on optimizing inventory management in the automotive aftermarket logistics sector at Rydon Industries Pvt Ltd, Coimbatore. It examines key inventory practices such as stock control, demand forecasting, and warehouse management in improving operational efficiency. The study analyzes how effective inventory management reduces holding costs, minimizes stockouts, and enhances customer satisfaction. Data collected from employees highlights the importance of adopting modern inventory techniques and technology integration. The findings reveal that optimized inventory systems significantly contribute to better logistics performance and organizational productivity. The study concludes that efficient inventory management is essential for sustaining competitiveness in the automotive aftermarket sector.

**Keywords:** Inventory Management, Automotive Aftermarket, Logistics Efficiency, Stock Control

## INTRODUCTION

The automotive aftermarket logistics sector is a vital segment of the global supply chain, supporting vehicle maintenance, repair, and enhancement services well beyond the initial sale of automobiles. As the population of vehicles grows, so does the complexity of logistics involved in delivering timely, accurate inventories of spare parts, components, and accessories to service centers, dealerships, and retailers. In this fastevolving landscape, optimizing inventory management is essential for maintaining profitability, customer satisfaction, and operational efficiency.

Inventory management in the automotive aftermarket encompasses the planning, tracking, and distribution of thousands of stockkeeping units (SKUs) representing a wide range of products. Parts can include fastmoving items like filters and tires, as well as slowmoving, highvalue components such as turbochargers or specialized electronics. The unpredictability of demand, long lead times from suppliers, the risk of obsolescence, and the pressure to maintain high service levels all present significant challenges for logistics professionals. Maintaining optimal inventory levels is critical—overstocking ties up capital and risks obsolescence, while understocking may result in lost sales and dissatisfied customers.

Technological advancements are transforming inventory management in this sector. The use of data analytics, automated reorder points, inventory management software, and advanced forecasting techniques is improving visibility and control over complex stock assortments. Automated systems allow realtime tracking, facilitate smarter replenishment, and support exception based management, triggering alerts for deviations or lifecycle changes.

## STATEMENT OF THE PROBLEM

The automotive aftermarket logistics sector faces persistent challenges in balancing inventory availability with cost control. Unpredictable demand, long supplier lead times, and broad assortments make forecasting and replenishment difficult. Excess inventory locks up capital and increases the risk of obsolete stock, while shortages harm customer service and retention. Existing management systems may lack the sophistication needed for realtime visibility and decisionmaking. The rise of ecommerce and omnichannel sales further complicates inventory alignment. Fragmented supplier networks and limited data integration exacerbate inefficiencies. These factors collectively hinder sector

profitability and responsiveness. Optimizing inventory management is thus essential to address these operational and strategic constraints.

## OBJECTIVES OF THE STUDY

### PRIMARY OBJECTIVES

To analyze the current inventory management practices in the automotive aftermarket logistics sector and identify inefficiencies.

### SECONDARY OBJECTIVES

1. To identify the key factors influencing inventory performance, such as demand forecasting, lead time variability, and supplier reliability.
2. To develop optimized strategies for improving inventory turnover and reducing holding costs.
3. To evaluate the impact of warehouse layout and logistics integration on inventory handling and distribution.
4. To assess supplier lead times and demand variability and their impact on inventory planning.
5. To suggest strategic improvements based on industry best practices and data-driven insights for sustainable inventory optimization.

### SCOPE OF THE STUDY

This study investigates inventory management practices in the automotive aftermarket logistics sector, focusing on optimization strategies for diverse, complex assortments. It examines the application of technology, analytics, and automation in streamlining stocking, replenishment, and fulfillment processes. Case studies from dealerships, distributors, and service centers provide context for evaluating solutions and challenges. The research encompasses supply chain collaboration, segmentation, and demand forecasting techniques. The scope includes the impact of e-commerce and evolving customer expectations on parts logistics. Recommendations are tailored to enhance operational efficiency, minimize costs, and improve service reliability. The findings aim to guide stakeholders in adopting best practices for sustainable inventory management.

### LIMITATIONS OF THE STUDY

1. The study is limited to the automotive aftermarket logistics sector, excluding OEM manufacturing and primary sales channels.
2. Data availability may be restricted due to confidentiality concerns and uneven digital adoption among stakeholders.
3. Rapid technological changes may render some findings quickly outdated.
4. The study may not account for regional differences in supply chain infrastructure and regulations.
5. Sample size for case studies could limit generalizability across all types of aftermarket businesses.

### REVIEW OF LITERATURE

**Banerjee & Kapoor (2025)** examined the integration of blockchain technology in inventory management systems in the automotive logistics sector. The authors presented a model where realtime ledger updates allowed for transparent and tamperproof tracking of parts movement. In Chennai-based logistics hubs, pilot implementations of blockchain helped reduce reconciliation delays and disputes over delivery discrepancies. They argued that the decentralized nature of blockchain enhances trust across stakeholders—OEMs, dealers, and logistics providers. However, they also noted limitations in adoption due to infrastructure readiness and cost concerns.

**Shinde & Natarajan (2025)** analyzed how seasonal trends and macroeconomic fluctuations affect inventory decisions in the automotive aftermarket sector. The research noted that tire and battery segments showed cyclic demand patterns, which required agile inventory practices. Firms that incorporated AI-based forecasting tools adjusted safety stock levels

proactively and avoided overcapitalization. The study stressed the importance of continuous data monitoring and integration with supplier systems to remain resilient during market disruptions.

**Varun and Pillai (2025)** studied how customer demand forecasting influences inventory planning in aftermarket logistics. Their research highlighted that customer expectations for sameday or nextday delivery placed significant pressure on inventory accuracy and availability. The authors proposed that datadriven demand forecasting using historical trends, sales data, and external variables improved inventory planning precision. Additionally, demanddriven MRP (Material Requirements Planning) systems enabled realtime inventory adjustments in response to actual consumption patterns.

**Roy & Harish (2024)** studied the impact of sustainability initiatives on inventory strategies in the automotive aftermarket logistics sector. The study revealed that companies adopting green inventory practices—like recycling parts and reducing packaging waste—achieved both environmental and cost benefits. By optimizing order quantities and batch sizes, firms reduced overproduction and obsolescence. The authors also suggested that sustainability metrics should be included in inventory performance KPIs. Their conclusion emphasized that inventory optimization must now balance economic, servicelevel, and environmental goals simultaneously.

**Meenakshi & Arvind (2023)** conducted an empirical study on inventory turnover and its impact on profitability in auto parts distributors. The study spanned over 40 regional warehouses and found that higher inventory turnover correlated with improved return on assets and reduced obsolescence. They emphasized that aftermarket parts face shelflife issues, and proactive inventory audits are essential to minimize dead stock. The researchers proposed digital dashboards for monitoring key metrics like days sales of inventory (DSI), cycle time, and fill rate. They concluded that inventory optimization directly enhances customer satisfaction and competitive advantage.

**Banerjee and Thomas (2023)** analyzed the challenges of reverse logistics and inventory recovery in the automotive aftermarket. Their research found that returned products, such as remanufactured components and cores, were often mismanaged due to a lack of clear inventory categorization. Implementing inventory pooling techniques and dynamic categorization was shown to increase inventory accuracy. They proposed that reverse inventory be tracked using AIenabled tools to identify usability, shelf life, and restocking possibilities. This led to greater profitability and sustainability in inventory operations.

## RESEARCH METHODOLOGY

Research methodology outlines the systematic approach a researcher employs to conduct their study. It serves as a structured and logical plan designed to address research problems effectively. A well-defined methodology ensures that the research yields reliable and valid results, aligning with the study's objectives and aims.

### Approaches to Research: **Exploratory Research**

Exploratory research is a methodological approach used to investigate questions that have not been thoroughly explored before. It is often qualitative in nature, though large-scale studies conducted in an exploratory manner can also be quantitative. The primary goal of exploratory research is to generate hypotheses rather than test them. The data collected in such studies is typically qualitative and may involve brainstorming sessions, expert interviews, and short surveys posted on social networking platforms.

### **Population**

The target population for this study consists of employees of Rydon Industries Pvt Ltd at Coimbatore, who are directly or indirectly involved in the maintenance, production, and operations of industrial equipment. This includes maintenance engineers, technicians, supervisors, and managers responsible for ensuring the efficiency and reliability of machinery.

### Probability Sampling Explanation:

Probability sampling involves selecting a sample from the population where every member has a known and equal chance of being chosen through a random process. This ensures that the sample represents the entire population accurately, allowing unbiased insights into inventory management optimization at Rydon Industries Pvt Ltd at Coimbatore.

**Sample Size:** A total of 123 employees from various departments have been selected as respondents for this study. This sample size is considered adequate to provide statistically significant insights into the research problem.

**Sample Area:** The study is conducted at Rydon Industries Pvt Ltd at Coimbatore, focusing on employees working in the maintenance, production, and quality control departments

### Sampling Technique

The study employs a convenience sampling technique, where the population is divided into different strata based on job roles (e.g., technicians, engineers, supervisors, and managers). Convenience sampling is then applied within each stratum to ensure equal representation from different categories of employees. This technique minimizes bias and enhances the accuracy of the study findings.

### Data Collection Methods

Data collection is a critical component of research. For this study, data will be gathered directly from the company, making use of secondary data sources.

**Primary Data:** Primary data are collected through a structured questionnaire. A well-structured questionnaire has been prepared given to them by the researcher.

### Secondary Data

Secondary data refers to information that has already been collected for purposes other than the current research problem. It can be accessed quickly and cost-effectively. This type of research involves analysing existing data from case studies, literature, and online sources. Secondary data includes large-scale surveys and data gathered from previous personal research efforts, offering valuable insights into different research questions.

### TOOLS TO BE USED

In order to come out with the findings of the study the following statistical tools are used by the researcher

- Simple Percentage analysis
- Chi-Square test
- Correlation
- Anova

### DATA ANALYSIS AND INTERPRETATION

#### SUPPLY CHAIN RESPOND TO CHANGES IN AFTERMARKET DEMAND

SUPPLY CHAIN RESPOND TO CHANGES	RESPONDENTS	PERCENTAGE
Strongly agree	35	28.5%
Agree	31	25.2%
Neutral	20	16.3%
Disagree	24	19.5%
Strongly disagree	13	10.6%
<b>TOTAL</b>	<b>123</b>	<b>100.0%</b>

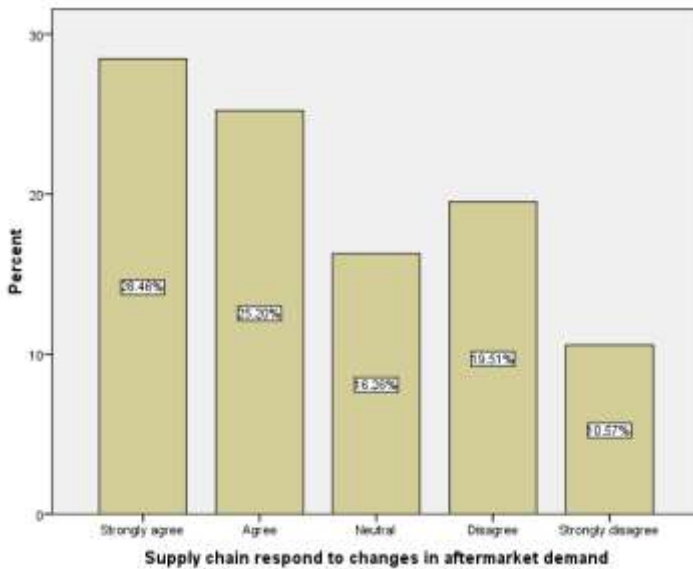
Source: Primary data

### INTERPRETATION

The above index shows that, 28.5% of them are belong to Strongly agree to changes in aftermarket demand, 25.2% of them are belong to agree to changes in aftermarket demand, 16.3% of them are belong to neutral to changes in aftermarket demand, 19.5% of them are belong to disagree to changes in aftermarket demand and remaining 10.6% of them are belong to Strongly disagree to changes in aftermarket demand.

Majority 28.5% of them are belong to Strongly agree for Supply chain respond to changes in aftermarket demand.

### CRITICAL PHASES OF PROJECT MANAGEMENT PROCESS



### INVENTORY COSTS CONTROLLED THROUGH OPTIMIZATION STRATEGIES

INVENTORY CONTROLLED	COSTS	RESPONDENTS	PERCENTAGE
Strongly agree		46	37.4%
Agree		27	22.0%
Neutral		36	29.3%
Disagree		9	7.3%
Strongly disagree		5	4.1%
<b>TOTAL</b>		<b>123</b>	<b>100.0%</b>

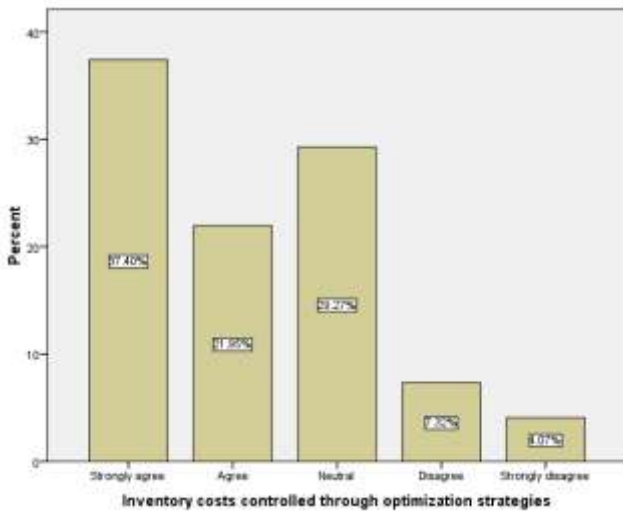
Source: Primary data

### INTERPRETATION

The above index shows that, 37.4% of them are feel Strongly agree through optimization strategies, 22.0% of them are feel agree through optimization strategies, 29.3% of them are feel neutral through optimization strategies, 7.3% of them are feel Disagree through optimization strategies and remaining 11.4% of them are feel strongly disagree through optimization strategies.

Majority 37.4% of them are feel strongly agree for Inventory costs controlled through optimization strategies.

## INVENTORY COSTS CONTROLLED THROUGH OPTIMIZATION STRATEGIES



## CORRELATION

The index shows that the relationship between Educational Qualification and Optimize inventory accuracy and turnover rates

### Correlations

	Educational Qualification	Optimize inventory accuracy and turnover rates
Educational Qualification	1	.814**
Pearson Correlation		
Sig. (2-tailed)		.000
N	123	123
Optimize inventory accuracy and turnover rates	.814**	1
Pearson Correlation		
Sig. (2-tailed)	.000	
N	123	123

\*\* . Correlation is significant at the 0.01 level (2-tailed).

**RESULT:** The index shows a strong positive correlation between "Educational Qualification" and "Optimize inventory accuracy and turnover rates" with a Pearson correlation coefficient of 0.814. This correlation is statistically significant ( $p < 0.01$ ), indicating that higher educational qualifications are associated with better performance in optimizing inventory. The sample size for this analysis is 123.

## ANOVA

**NULL HYPOTHESIS  $H_0$ :** There is no significance relationship between Years of Experience ion and Inventory costs controlled through optimization strategies

**ALTERNATIVE HYPOTHESIS  $H_1$ :** There is a significance relationship between Years of Experience ion and Inventory costs controlled through optimization strategies

**ANOVA**

Years of Experience								
			Sum of Squares	df	Mean Square	F	Sig.	
Between (Combined) Groups			145.130	3	48.377	234.697	.000	
Linear Term	Unweighted		132.468	1	132.468	642.662	.000	
		Weighted		138.950	1	138.950	674.112	.000
			Deviation	6.180	2	3.090	14.990	.000
Within Groups			24.529	119	.206			
Total			169.659	122				

**HOMOGENEOUS**

**Years of Experience**

	Inventory costs controlled through optimization strategies	N	Subset for alpha = 0.05			
			1	2	3	4
Student-Newman-Keuls <sup>a</sup>	Strongly agree	46	1.65			
	Agree	27		2.15		
	Neutral	36			3.47	
	Disagree	14				4.86
	Sig.		1.000	1.000	1.000	1.000
Tukey B <sup>a</sup>	Strongly agree	46	1.65			
	Agree	27		2.15		
	Neutral	36			3.47	
	Disagree	14				4.86

**RESULT:** Based on the provided ANOVA table, there is a statistically significant difference between the groups, as indicated by the 'Between Groups' p-value of 0.000, which is less than the typical alpha level of 0.05. The F-statistic is 234.697 with 3 degrees of freedom between groups.

**SUGGESTIONS**

1. Invest in advanced inventory management software and analytics tools to improve forecasting and reduce stockouts. This will enhance visibility, control, and adaptability in dynamic markets.
2. Segment inventories based on demand patterns and item criticality to optimize stocking policies. Such targeted strategies help balance service levels and minimize excess stock.
3. Establish periodic assortment reviews and automate alerts for lifecycle changes and declining demand. Timely action on slowmoving items reduces the risk of obsolescence and waste.
4. Foster stronger collaboration between suppliers, distributors, and service centers. Improved communication and shared information streamline replenishment and order fulfillment.
5. Adapt warehouse and storage practices to enable efficient tracking and retrieval, minimizing delays and reducing holding costs. Regular audits ensure alignment with operational goals.
6. Address the challenges posed by ecommerce and omnichannel sales with integrated inventory systems. This ensures consistent availability and meets customer expectations across channels.

## CONCLUSION

Optimizing inventory management in the automotive aftermarket logistics sector is essential for meeting evolving customer needs, maintaining profitability, and ensuring reliable service. Effective strategies—built on technology, analytics, and collaborative practices—empower organizations to overcome demand unpredictability, long lead times, and the risk of overstock or obsolescence. As digital transformation accelerates and market conditions shift, only businesses embracing innovation and adaptability will maintain a competitive edge.

The findings of this study underscore the importance of segmentation, periodic reviews, system integration, and strong supplier partnerships. Although challenges remain, the proactive application of best practices allows stakeholders to not only manage inventory efficiently but also enhance overall supply chain resilience. With commitment to continuous improvement and customer centric logistics strategies, the sector can thrive amid uncertainty and change.

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