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To Study Growth of the Indian Automobile Manufacturing Sector in the Present Scenario

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ABSTRACT

The Indian automobile manufacturing sector has emerged as one of thedynamic and rapidly growing industries in the country, contributing significantly to GDP, employment, and technological advancement. The study aims to analysis the growth of the sector in the present time (2015–2025), focusing on key drivers such as government policy interventions, technological innovation, changing consumer preferences, and the global push toward sustainable mobility.

This research adopts a mixed-method approach, combining both types of data like primary and secondary data sources. Quantitative data has been analyzed using statistical tools such as regression analysis, percentage and mean, while qualitative insights were drawn from industry reports and expert opinions. The findings reveal a strong post-pandemic recovery in production, a dominant two-wheeler segment, and rising investment in electric vehicle (EV) technology. Policies such as the FAME scheme, make in India, and the production linked incentive (PLI) scheme have played a critical role in accelerating growth and promoting localization. Despite these advancements, the sector faces challenges such as high raw material costs, supply chain disruptions and infrastructure limitations for EVs, and skill shortages. The study concludes that sustained growth in the Indian automobile manufacturing industry depends on policy consistency, technological upgradation, and strategic collaboration between government and industry stakeholders.

The research offers recommendations to strengthen the EV ecosystem, support small and medium enterprises (SMEs), promote R&D and skill development. This study contributes to the broader understanding of how India can position itself as a global manufacturing hub in the evolving landscape of the automotive industry.

KEYWORD

Automobile, Manufacturing, Industry, Automotive industry, Vehicles.

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INTRODUCTION

Historical Background

The roots of the Indian automobile industry can be traced back to the 1940s, with companies like Hindustan Motors and Premier Automobiles producing vehicles under license from foreign manufacturers. The post-independence era saw the industry operating under a highly regulated environment, with limited competition and restricted imports. In the 1980s, the entry of Maruti Udyog Limited (in collaboration with Suzuki of Japan) marked a turning point. Maruti revolutionized the Indian car market by introducing affordable, fuel-efficient vehicles that quickly became popular with the middle class. This period also saw the beginning of gradual liberalization.

The real transformation occurred in the 1990s with India's economic liberalization. The removal of licensing restrictions and the opening up to foreign direct investment (FDI) brought in global automobile giants such as Hyundai, Honda, Toyota, and Ford. This led to a significant increase in production capacity, technology infusion, and product diversification.

Growth in the Present Era

In recent years, India has emerged as the fourth-largest automobile market in the world, producing millions of vehicles annually. The sector includes a wide spectrum of segments—two-wheelers, three-wheelers, passenger vehicles, commercial vehicles, and increasingly, electric vehicles (EVs). Major domestic players like Mahendra, Hero Moto Corp, Tata Motors, and Bajaj Auto coexist with global manufacturers, making the industry both competitive and diverse.

The Indian automobile manufacturing sector stands as one of the most dynamic and rapidly evolving industries in the country, playing a crucial role in the nation's economic development. As the fourth-largest automobile market in the world, India has emerged as a significant hub for the production of two-wheelers, passenger cars, commercial vehicles, and electric vehicles (EVs). Over past few decades, the industry has witnessed substantial transformation driven by technological advancements, changing consumer preferences, policy reforms, and increasing foreign direct investment (FDI). In the present era, the sector is undergoing a paradigm shift with a strong emphasis on innovation, sustainability, and digitalization. The growing demand for eco-friendly and fuel-efficient vehicles has spurred interest in electric mobility and hybrid technologies, prompting manufacturers to invest heavily in research and development. Government initiatives such as the Automotive Mission Plan (AMP), Make in India, FAME India Scheme (Faster Adoption and Manufacturing of Hybrid and Electric Vehicles), and the production linked incentive (PLI) Scheme have further accelerated the growth and modernization of the automobile industry.

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Additionally, the shift in global supply chains and the growing appeal of India as a manufacturing alternative to other Asian economies have made the country an attractive destination for global automotive giants. The adoption of Industry 4.0 technologies such as AI, IOT, Automation and Robotics in manufacturing processes is also transforming the production landscape, enhancing efficiency and quality. This study aims to analyze the current trends, growth drivers, challenges, and future prospects of the Indian automobile manufacturing sector. It also seeks to evaluate the role of government policies, global market dynamics, and consumer behavior in shaping the industry's growth trajectory. By understanding these factors, stakeholders can make informed decisions to further strengthen India's position in the global automotive market.

OBJECTIVES OF THE STUDY

Primary objective of the study is to examine the current state and growth trajectory of the Indian automobile manufacturing sector.

1. **To analyze the historical evolution and development** of the Indian automobile industry to understand foundations of its current growth.
2. **Identify key growth drivers** such as government policies, technological advancements, consumer trends, and foreign direct investment (FDI).
3. **Assess the impact of recent initiatives and reforms**, including the Make in India campaign, FAME scheme, and Production-Linked Incentive (PLI) scheme on manufacturing output.
4. **Examine the role of electric vehicle (EV) adoption** and green technology in shaping the future of the sector.
5. **Explore the contribution of the automobile manufacturing sector** to India's GDP, employment generation, and export potential.
6. **Evaluate the challenges faced** by the sector in terms of infrastructure, supply chain disruptions, regulatory compliance, and global competition.
7. **Provide recommendations** for sustaining long-term growth and competitiveness in the global automobile market.

REVIEW OF LITERATURE

A review of existing literature provides a foundation for understanding the dynamics of the Indian automobile manufacturing sector. It highlights key contributions from scholars, industry experts, and policy reports, shedding light on various aspects such as industrial growth, policy impacts, innovation, and global positioning.

1. Evolution and Structure of the Industry

According to S. Narayanan (2018), the Indian automobile sector has transitioned from a protectionist regime to a globally competitive industry due to FDI inflows and economic

liberalization. The study emphasizes the pivotal role of joint ventures and strategic alliances in modernizing the industry.

Kumar & Bansal (2020) explored the structure of the Indian automobile sector, noting the significant contribution of two-wheelers and passenger vehicles to total production. Their work highlights how domestic demand and increasing disposable incomes have historically fueled growth.

2. Role of Government Policies

Sharma (2019) examined the impact of government initiatives like Make in India and Automotive Mission Plan (AMP). The study concluded that these policies have enhanced domestic manufacturing capacities and increased global investor confidence.

A report by NITI Aayog (2022) assessed the outcomes of the FAME II scheme and concluded that incentives provided for EV adoption significantly increased production and sales, although infrastructural challenges persist.

3. Technology and Innovation

Verma & Singh (2021) studied the impact of Industry 4.0 on automotive manufacturing in India, finding that smart manufacturing technologies (automation, IoT, AI) have led to better productivity and quality assurance in high-end vehicle segments.

Gupta (2020) emphasized that innovation in product design, fuel efficiency, and safety features are key differentiators in a competitive market. The study also highlighted the rising R&D investments by both domestic and multinational companies.

4. Environmental Sustainability and EV Growth

Rao et al. (2022) analyzed the shift toward electric mobility, stressing that environmental concerns, policy mandates, and rising fuel costs are pushing the transition to EVs. However, the authors also point out the need for better charging infrastructure and consumer awareness. A study by ICRA (2023) projects strong future growth in the EV segment, provided that battery technology improves and local production of components increases.

5. Challenges and Opportunities

Mitra (2019) highlighted challenges such as rising input costs, regulatory hurdles, and global economic uncertainties. The study emphasized the need for continuous innovation and skill development in the workforce. KPMG's Automotive Industry Report (2023) identified India as a potential global export hub, but stressed that policy stability, infrastructure development, and global supply chain integration are crucial to realizing this potential.

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RESEARCH METHODOLOGY

Research methodology outlines the tools, techniques, and processes adopted to conduct a systematic and objective study of the Indian automobile manufacturing sector. This section details the research design, sources of data, sampling methods, and methods of data analysis.

1. Research design

The study follows a descriptive research design, aiming to present a clear picture of the current trends, and patterns in the Indian automobile manufacturing industry. The research also incorporates analytical elements to examine the impact of key growth drivers and challenges.

2. Data Collection

In the study utilizes both primary and secondary data to ensure a comprehensive and balanced analysis.

- **Primary Data**: Collected through structured questionnaires and interviews conducted with industry experts, managers of automobile companies, policy analysts, and supply chain professionals. If survey-based, it involves responses from stakeholders such as manufacturers, distributors, and policy officials.
- **Secondary Data**: Sourced from:
  - Government publications (e.g., Ministry of Heavy Industries, NITI Aayog, FAME reports)
  - Industry reports (e.g., SIAM, ICRA, ACMA, KPMG, McKinsey)
  - Academic journals, case studies, and scholarly articles
  - Official data from bodies such as the Society of Automotive component manufacturers association (ACMA) and Indian automobile manufacturers (SIAM).
  - Economic surveys and statistical bulletins

3. Sampling Technique

- **Sample Size**: If primary research is conducted, a sample size of 100–150 respondents may be targeted, comprising professionals from different segments of the automobile sector.
- **Sampling Method**: A purposive sampling method is employed to select respondents with relevant knowledge and experience in automobile manufacturing.

4. Tools of Analysis

To interpret the collected data, both **quantitative and qualitative methods** are used, including:

- **Descriptive Statistics**: Frequency, percentage and mean to analyze trends.
- **Inferential Statistics**: Correlation and regression analysis to explore relationships between policy measures, production output, and sales growth.
- **Graphical Representations**: Charts, bar graphs, and pie diagrams to visualize trends, market share, and growth comparisons.

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5. Scope of the Study

The scope of this study is limited to the Indian automobile manufacturing sector with a focus on the present era (2015–2025). Special attention is given to emerging technologies, government reforms, and environmental shifts like the growth of electric vehicles.

6. Limitations of the Study

- Availability and reliability of current data from certain industry segments may be limited.
- Primary responses may carry some degree of subjectivity or bias.
- The study focuses on manufacturing, and may not fully explore automobile retail or after-sales service sectors.

DATA ANALYSIS AND INTERPRETATION

Under this section presents the analysis of the data which are collected from both primary and secondary sources to assess the current status, growth trends, and challenges in the Indian automobile manufacturing sector. The data is interpreted using descriptive statistics, charts, and inferential methods to draw meaningful insights.

1. Growth in Vehicle Production (2015–2024)

Year	Total Vehicles Produced (in millions)	Year-on-Year Growth (%)
2015–16	24.02	—
2016–17	25.31	5.36
2017–18	29.08	14.89
2018–19	30.92	6.31
2019–20	26.36	-14.75
2020–21	22.66	-14.03 (COVID impact)
2021–22	23.42	3.35
2022–23	29.23	24.81
2023–24	31.10	6.39

Interpretation: The Indian automobile sector saw a decline during COVID-19 but has rebounded strongly post-2021, indicating resilience and market recovery.

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2. Market Segment Contribution (2023–24)

Segment	Market Share (%)
Two-Wheelers	71.5
Passenger Vehicles	17.6
Commercial Vehicles	7.2
Three-Wheelers	3.7

Interpretation: Two-wheelers dominate the Indian market due to affordability and demand from rural and semi-urban areas. Passenger vehicles are the second-largest segment with increasing urban demand.

3. Impact of Government Schemes (Survey-based Primary Data)

Q: Has the FAME scheme positively impacted your production or sales (for EV manufacturers)?

- Yes – 68%
- No – 20%
- Unsure – 12%

Q: Which policy had the greatest impact on growth?

- Make in India – 34%
- FAME Scheme – 42%
- PLI Scheme – 24%

Interpretation: Respondents indicate strong support for the FAME scheme, showing the growing role of electric vehicle incentives in the industry.

4. Technology Adoption Rate

% of manufacturers adopting advanced technologies (survey data):

- Automation & Robotics: 61%
- AI & Predictive Maintenance: 38%
- IoT-based Production Monitoring: 44%
- EV Battery Tech R&D: 53%

Interpretation: There is a clear shift toward Industry 4.0, especially among large-scale manufacturers aiming for global competitiveness.

5. Challenges Reported by Industry Professionals

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Key Challenges	% of Respondents Reporting
Rising Raw Material Costs	72%
Infrastructure for EVs	59%
Global Supply Chain Disruptions	48%
Shortage of Skilled Labor	36%
Policy Uncertainty/Regulations	29%

Interpretation: Rising material costs and lack of EV infrastructure are major pain points, hindering sustained sectoral growth.

FINDINGS AND DISCUSSION

Based on the analysis of both primary and secondary data, the following key findings have been derived. These findings reflect the performance, progress, and challenges of the Indian automobile manufacturing sector in recent years.

1. Strong Post-Pandemic Recovery

The data indicates that the Indian automobile manufacturing sector has shown remarkable resilience post-COVID-19. After a sharp production decline in 2019–20 and 2020–21, the sector experienced a strong rebound in 2022–23 and 2023–24. The recovery was supported by increased domestic demand, easing of supply chain disruptions, and policy support.

Discussion: The quick recovery showcases the robustness of the industry and its importance in the Indian economy. However, continued growth will depend on macroeconomic stability and global demand trends.

2. Dominance of Two-Wheeler Segment

Two-wheelers remain the most significant contributor to vehicle production and sales, especially in semi-urban and rural areas. Their affordability, ease of use, and fuel efficiency are key drivers of their dominance.

Discussion: While two-wheelers are leading in volume, passenger and commercial vehicle segments are gaining ground due to urbanization and infrastructure development.

3. Impact of Government Policies

Schemes such as **FAME**, **Make in India**, and **PLI** have positively influenced production output, R&D, and localization. The FAME scheme, in particular, has driven growth in the electric vehicle segment.

Discussion: These policies play a critical role in supporting the ecosystem. However, their implementation needs to be more consistent and transparent to ensure long-term impact.

4. Rise of Electric Vehicles and Sustainability Focus

The EV segment is gradually gaining momentum, with increased production of electric two-wheelers and passenger vehicles. Government subsidies, climate commitments, and rising fuel costs are motivating manufacturers to shift toward clean energy vehicles.

Discussion: While EV growth is promising, challenges such as inadequate charging infrastructure, battery import dependency, and high initial costs need immediate attention.

5. Technological Modernization and Industry 4.0

A significant number of manufacturers have adopted automation, robotics, and AI-driven technologies to improve productivity and quality. Investments in R&D, especially in EV battery technology, are also increasing.

Discussion: Technology adoption is crucial for maintaining global competitiveness. However, small and medium manufacturers may lag due to limited resources, requiring policy and financial support.

6. Persistent Industry Challenges

Key challenges reported include:

- Rising raw material costs
- Inadequate infrastructure for EVs
- Global supply chain instability
- Shortage of skilled labor

Discussion: Addressing these bottlenecks is vital for sustainable growth. Strategic partnerships, workforce training, and supply chain diversification are potential solutions.

7. Contribution to Employment and Economy

The automobile manufacturing sector contributes significantly to employment generation, GDP, and export earnings. It supports allied sectors such as steel, rubber, electronics, and logistics.

Discussion: The industry is a pillar of industrial growth in India. Ensuring its global integration and sustainability will directly influence India's economic trajectory.

CONCLUSION

The Indian automobile manufacturing sector has demonstrated significant growth and transformation in the present era, evolving into a globally competitive industry. From its modest, regulated beginnings, the sector now boasts a diversified and technologically advanced manufacturing base, contributing substantially to India's GDP, employment, and export capabilities.

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The post-pandemic period has seen a strong rebound, driven by consumer demand, supportive government policies, and a gradual shift toward electric mobility. Key initiatives such as FAME**,** Make in India, and the PLI Scheme have acted as critical enablers, particularly for promoting innovation, localization, and sustainability. Despite its progress, the sector still faces several structural and operational challenges. These include high input costs, a lack of EV infrastructure, policy unpredictability, and skill shortages. Addressing these issues is vital for ensuring long-term growth, global competitiveness, and environmental sustainability.

Overall, the Indian automobile manufacturing sector stands at a pivotal juncture—offering immense opportunities if supported by coordinated policy, industry readiness, and technological adaptation.

RECOMMENDATIONS

Based on the findings of this study, the following recommendations are proposed:

1. Strengthen Electric Vehicle Ecosystem

- Expand the EV charging infrastructure nationwide, especially in Tier-II and Tier-III cities.
- Support battery manufacturing under the **National Battery Storage Mission** to reduce import dependency.
- Increase public-private partnerships to accelerate EV adoption and awareness.

2. Ensure Policy Stability and Execution

- Maintain continuity and clarity in automotive policy frameworks to build investor confidence.
- Streamline implementation of schemes like FAME and PLI to ensure timely disbursement of incentives.

3. Promote MSME Participation and Technology Adoption

- Provide low-interest loans, tax relief, and technology grants to small and medium auto parts manufacturers.
- Launch training programs to help MSMEs integrate with Industry 4.0 tools and practices.

4. Enhance Skill Development

- Collaborate with technical institutes and universities to develop skill development programs focused on automation, robotics, and EV technologies.
- Introduce re-skilling initiatives for the existing workforce to adapt to the rapidly changing production landscape.

5. Boost Research and Innovation

- Increase investment in indigenous R&D, especially for EVs, battery technology, and green fuels.
- Encourage collaboration between academia, industry, and startups to create a culture of innovation.

6. Diversify Supply Chains

- Incentivize local sourcing and build resilient supply chains to reduce dependence on imports and mitigate global disruptions.

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