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Consumer Attitudes Towards Electrical Vehicles in India

Er. Sumit Pandey

(MBA), Regional Manager, Sales, IME MOTORS PVT. LTD

ABSTRACT

This report explores **consumer attitudes toward electric vehicles (EVs)** in India, focusing on understanding the factors influencing their adoption, challenges faced by consumers, and their preferences. With the growing need for sustainable solutions to combat air pollution and reduce greenhouse gas emissions, EVs are emerging as an important alternative to traditional fuel vehicles. The report analyzes the Indian EV market, its growth trends, government initiatives, consumer behavior, and challenges to EV adoption, and provides recommendations to overcome these barriers.

The study highlights that while India has made significant progress in promoting EVs, the overall adoption rate remains low, accounting for only 7% of total vehicle sales in FY 2023–24. Two-wheelers and three-wheelers dominate the market due to their affordability and suitability for short-distance travel, while four-wheelers and buses face slower adoption because of high upfront costs and limited charging infrastructure. The **Faster Adoption and Manufacturing of Electric Vehicles (FAME) scheme** has played a vital role in accelerating EV adoption by offering subsidies and incentives. However, the scheme has achieved only 76% of its revised targets, with several gaps in fund utilization and infrastructure development.

Key findings show that consumer attitudes toward EVs are shaped by factors like environmental awareness, affordability, charging infrastructure, and trust in established brands. Urban consumers are more likely to adopt EVs due to better infrastructure and higher awareness levels, while rural areas lag behind due to accessibility challenges and lack of consumer education. The study also identifies that concerns about range anxiety, battery reliability, and long-term maintenance costs remain major deterrents.

The report concludes that a combined effort from the government, manufacturers, and private players is essential to overcome the existing challenges. Expanding charging infrastructure, particularly in rural and semi-urban areas, is critical to addressing range anxiety. Introducing affordable EV models in the two- and three-wheeler segments and providing better financing options, such as low-interest loans and longer repayment periods, can make EVs more accessible. Promoting local manufacturing of EV components and batteries under the "Make in India" initiative can further reduce costs and strengthen the EV ecosystem.

The recommendations emphasize the need to improve awareness about EV benefits and available government incentives. Targeted awareness campaigns, collaborative efforts to build charging stations, and reliable after-sales support are key strategies for boosting consumer confidence. The report also highlights the importance of encouraging adoption in untapped rural markets through innovative solutions like mobile charging stations and rural-specific EV models.

In conclusion, this study provides actionable insights into the Indian EV market, highlighting the importance of addressing consumer concerns and strengthening the ecosystem to drive EV adoption. By

implementing the proposed recommendations, India can accelerate its transition toward sustainable mobility, reduce its carbon footprint, and achieve its environmental and economic goals. This transition will not only benefit the environment but also create opportunities for economic growth and improve the quality of life for millions of people across the country.

Keywords:- Electric Vehicles, Buying Behaviour, EV adoption, Sustainability awareness, Environmental concern, EV affordability

CHAPTER – 1
INTRODUCTION TO THE TOPIC
Introduction

Electric vehicles (EVs) are transforming the way people think about transportation. These vehicles are powered by electricity rather than traditional fuels like petrol or diesel. EVs include battery electric vehicles (BEVs), plug-in hybrid electric vehicles (PHEVs), and hybrid electric vehicles (HEVs). They offer many benefits, such as lower running costs, reduced greenhouse gas emissions, and less dependence on fossil fuels. This shift towards cleaner energy is especially important in a country like India, which faces high pollution levels in many cities.

Understanding consumer attitudes toward electric vehicles is crucial for promoting their adoption. Consumer attitude refers to how people feel, think, and behave toward a particular product or concept. For EVs, this includes how people perceive their benefits, costs, and any challenges associated with their use. Many factors influence consumer attitudes, such as price, range, charging infrastructure, and awareness about environmental benefits. To encourage more people to switch to EVs, it is essential to address these concerns and build trust in the technology.

The theoretical background of this study includes concepts like the Theory of Planned Behavior (TPB), which explains how attitudes, social influences, and perceived control affect decision-making. For EVs, this means understanding how people's opinions, peer influence, and ease of charging or using the vehicle shape their willingness to buy one. Another relevant concept is innovation diffusion theory, which explains how new technologies spread in society. EVs, being relatively new in India, are currently in the early stages of this process, moving from early adopters to wider acceptance.

In the last five years, India has made significant progress in the EV sector. According to the Society of Manufacturers of Electric Vehicles (SMEV), EV sales in India have grown from 69,012 units in 2018–19 to nearly 11,52,021 units in 2022–23. This remarkable growth reflects increasing consumer interest and

supportive government policies like subsidies, tax benefits, and initiatives such as the Faster Adoption and Manufacturing of Hybrid and Electric Vehicles (FAME) scheme. Despite this, EVs still account for only about 2–3% of total vehicle sales in India, showing that there is significant room for growth.

Several types of electric vehicles have been introduced in India to meet the diverse needs of consumers. BEVs like the Tata Nexon EV and Mahindra XUV400 run entirely on electricity, while PHEVs like the Toyota Prius offer a mix of electric and fuel-powered driving. HEVs like the Honda City Hybrid use both electricity and fuel simultaneously to increase efficiency. Additionally, electric two-wheelers like Ola S1 and Ather 450X are becoming increasingly popular due to their affordability and practicality for short distances.

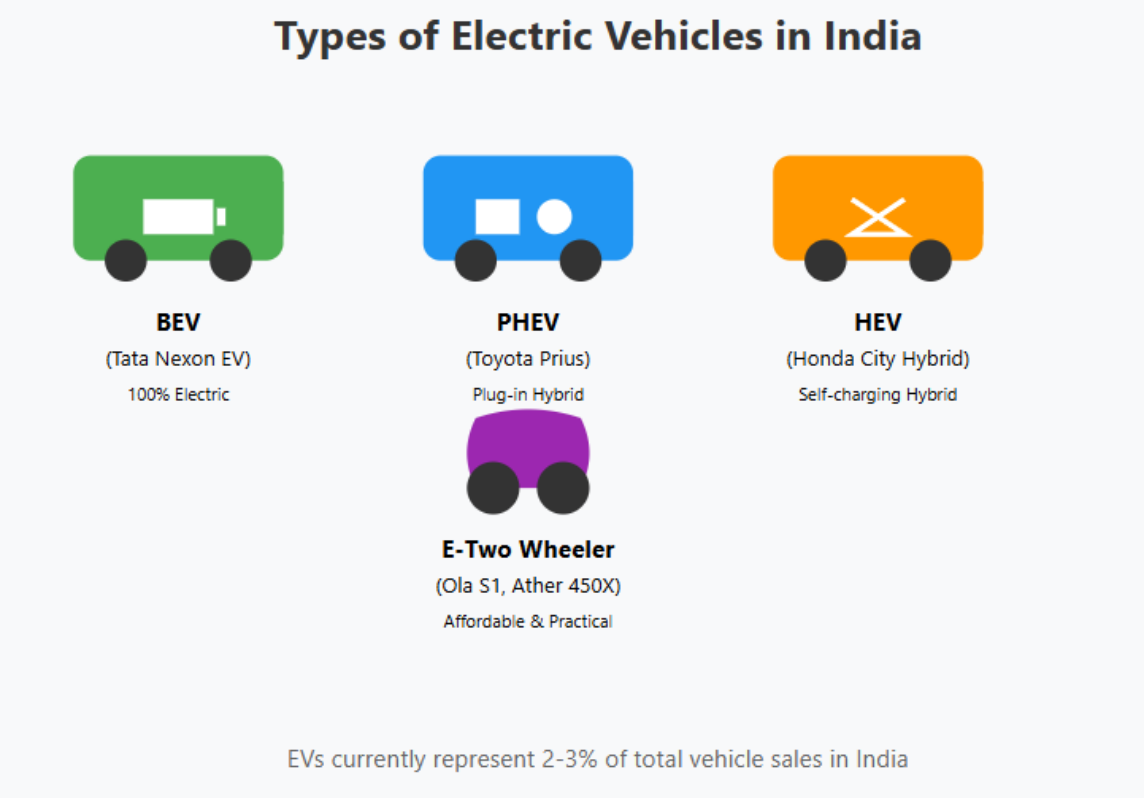


Figure 1: Types of EV in India

Hence, this study aims to explore how Indian consumers perceive EVs, their preferences, and the barriers they face in adopting this technology. It will also look into how EV manufacturers and the government can work together to improve awareness and acceptance. By analyzing recent trends and consumer behavior, this study can provide insights into the future growth of the EV market in India. Understanding these factors is essential for creating strategies to make EVs more appealing to the Indian population and achieve the country's sustainability goals.

OBJECTIVES OF THE STUDY

1. To identify the factors influencing consumer attitudes towards EVs in India.
2. To assess the level of awareness about EV benefits among Indian consumers.
3. To analyze the challenges faced by consumers in adopting EVs.

4. To evaluate the impact of pricing on consumer decisions.
5. To understand the effectiveness of government policies and incentives in promoting EVs.
6. To study consumer preferences for different types of EVs.
7. To explore the importance of charging infrastructure and range in consumer decision-making.

SCOPE OF THE PROJECT

The study focuses on understanding consumer attitudes towards electric vehicles (EVs) in India, including factors influencing their adoption, challenges faced, and preferences. It covers different types of EVs, analyzes the impact of pricing and government policies, and explores the role of awareness, charging infrastructure, and vehicle range in shaping consumer decisions.

CONTRIBUTION OF THE PROJECT

The study is expected to provide insights into consumer attitudes towards electric vehicles in India, highlighting key factors influencing their adoption. It aims to identify challenges such as cost, infrastructure, and awareness levels while understanding preferences for different EV types. The research will help evaluate the effectiveness of government policies and incentives in promoting EV usage. By addressing these aspects, the study seeks to offer recommendations for manufacturers, policymakers, and stakeholders to enhance EV acceptance and market growth. Ultimately, it will contribute to strategies for improving sustainability, reducing emissions, and supporting India's transition to cleaner transportation solutions.

CHAPTER – 2
REVIEW OF LITERTURE

Related Studies

A study by Bhalla et al. (2022) analyzed factors influencing EV adoption in India, focusing on affordability, government incentives, and environmental awareness. The research highlighted that high initial costs and limited charging infrastructure deter consumers, while subsidies and tax benefits positively influence decisions.

Mittal and Sharma (2021) explored the role of environmental consciousness in EV adoption. They found that individuals with higher awareness of climate change and air pollution are more likely to purchase EVs. However, the study also revealed that awareness alone does not translate into purchase decisions unless accompanied by affordability and convenience.

Research by Gupta and Bansal (2020) focused on the economic viability of EVs for Indian consumers. The study concluded that operational savings from EVs, such as lower fuel and maintenance costs, appeal to buyers. However, the high upfront cost remains a major barrier, particularly for middle-income groups.

A study by Sharma et al. (2021) investigated the impact of charging infrastructure on EV adoption in urban areas. The results indicated that insufficient charging stations significantly reduce consumer confidence. The study emphasized the need for a robust and accessible network of charging facilities to boost EV adoption.

According to Prakash et al. (2021), government policies like the Faster Adoption and Manufacturing of Hybrid and Electric Vehicles (FAME) scheme have positively impacted EV sales. The research recommended further expansion of subsidies, tax benefits, and infrastructure development for long-term growth.

A study by Singh et al. (2020) examined consumer perceptions of EV performance, including battery life, range, and speed. It found that concerns over range anxiety and battery reliability significantly affect purchasing decisions. However, newer models with improved technology have begun to address these issues.

Chaturvedi and Rao (2019) evaluated the impact of awareness campaigns on consumer knowledge and attitudes toward EVs. Their findings suggested that well-designed campaigns significantly improve understanding of EV benefits, especially in urban areas. The study highlighted the importance of such initiatives to educate potential buyers.

Mishra and Das (2021) compared EV adoption patterns in rural and urban India. The study found that urban consumers are more inclined toward EVs due to better infrastructure and awareness, while rural areas face challenges like poor accessibility to charging stations and lack of awareness.

Kumar et al. (2020) reviewed advancements in EV technology and their impact on consumer adoption. The study highlighted innovations like fast-charging batteries and affordable electric two-wheelers as game-changers for the Indian market. These advancements are gradually overcoming barriers like range anxiety and high costs.

A study by Banerjee and Ghosh (2022) analyzed the influence of socio-demographic factors like age, income, and education on EV adoption. It found that younger, educated, and higher-income individuals are more likely to purchase EVs. The research suggested targeted marketing to these groups to increase sales.

CHAPTER – 3
RESEARCH METHODOLOGY

Research Design

The study uses a descriptive research design to analyze consumer attitudes toward electric vehicles in India. It relies solely on secondary data collected from credible sources like research papers, government reports, industry publications, and online databases.

Figure 2: Research Methodology

Data collection Methods

Secondary Data: Data is gathered from published sources, including:

- Government reports such as FAME India Scheme updates.
- Industry reports from organizations like the Society of Manufacturers of Electric Vehicles (SMEV).
- Research articles from academic journals.
- News articles and market analysis from credible business portals.
- Publicly available EV sales data and trends.

Data Analysis and Presentation Method

This includes identifying common themes, trends, and patterns regarding consumer attitudes, challenges, and market growth.

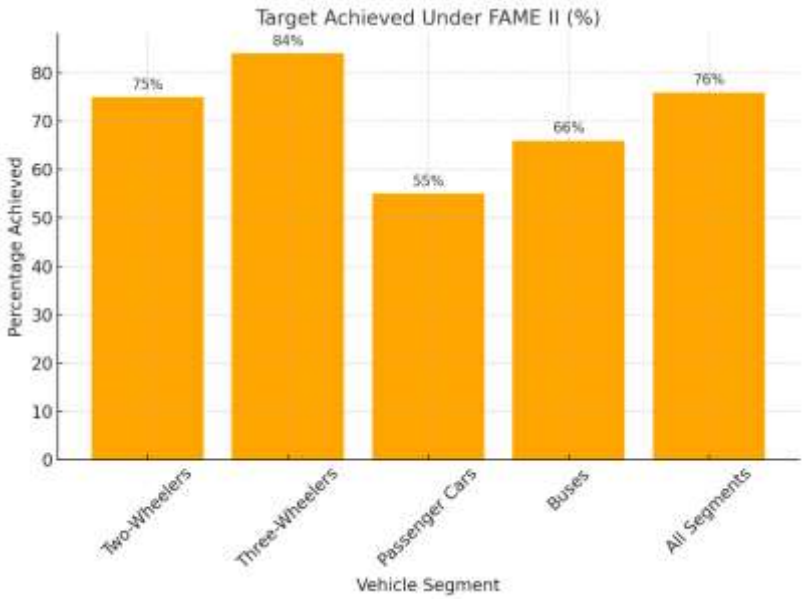
CHAPTER – 4
FINDINGS AND INTERPRETATION

India's electric vehicle (EV) ecosystem has grown substantially under the FAME II scheme, but significant challenges remain. Below are the major findings supported by tables and graphs.

Table 1: Target Achieved and Market Share in FY 2023-24

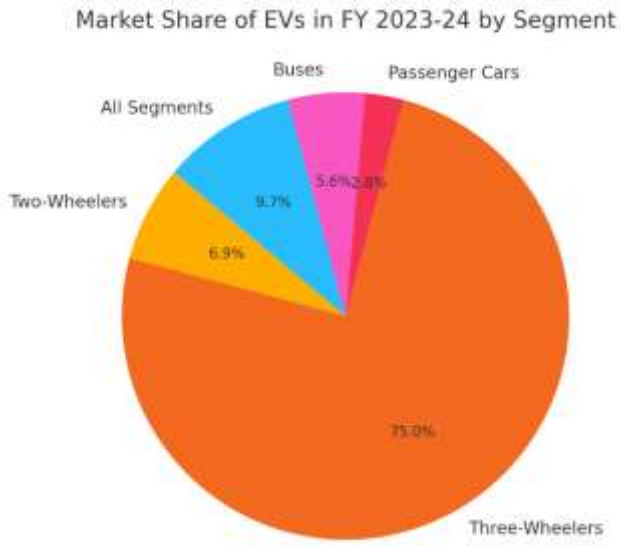
Segment	Target Achieved	Market Share in FY 2023-24
Two-Wheelers	75%	5%
Three-Wheelers	84%	54%
Passenger Cars	55%	2%
Buses	66%	4%
All Segments	**76%**	**7%**

Graph 1: Target Achieved Under FAME II (%)



Source: Ministry of Heavy Industries, Government of India (2024) - Data on FAME II targets and achievements.

Graph 2: Market Share in FY 2023-24



Source: Society of Manufacturers of Electric Vehicles (SMEV): https://smev.in.

India has made significant strides in promoting electric vehicles (EVs), with a strong focus on decarbonizing its transport sector. The Faster Adoption and Manufacturing of Electric Vehicles (FAME) schemes have been instrumental in this effort. Below are the key findings from the analysis of secondary data:

Achievement of FAME II Targets

- The FAME II scheme achieved 76% of its revised overall target for incentivizing EVs.
- **Two-Wheelers** had a 75% target achievement, the largest segment supported under the scheme, reflecting strong adoption due to affordability and widespread use.
- **Three-Wheelers** achieved 84% of their target, showing substantial uptake in passenger movers (e-rickshaws) and goods vehicles.
- **Passenger Cars** and **Buses** had lower target achievements at 55% and 66%, respectively, indicating challenges in these segments, such as high costs and limited charging infrastructure.

Market Share of EVs in FY 2023-24

- EVs accounted for 7% of total vehicle sales in FY 2023-24.
- Three-wheelers dominated the market with 54% share within their category, highlighting their popularity in urban and semi-urban areas.
- Two-wheelers, although supported significantly, captured only 5% of the market, indicating affordability and range concerns.
- Passenger cars and buses represented smaller shares at 2% and 4%, respectively, suggesting room for improvement in adoption strategies for these segments.

Utilization of FAME II Funds

- Out of ₹11,500 crore allocated, ₹7,940 crore (69%) was utilized. This indicates underutilization of

funds, pointing to administrative or implementation challenges.

Challenges Hindering EV Adoption

- High upfront costs, limited charging infrastructure, and financing barriers remain major challenges for EV adoption in India.
- Range anxiety and concerns over battery life significantly impact consumer confidence, especially in the passenger car segment.

Segment-Specific Trends

- The FAME II scheme prioritized two-wheelers and three-wheelers, which accounted for 98% of vehicles targeted for incentives.
- Buses and passenger cars lagged due to higher costs and operational challenges, including insufficient charging infrastructure for long-distance travel.

Key Findings on Consumer Behavior Towards Electric Vehicles in India

1. Indian consumers are increasingly aware of the environmental benefits of EVs, such as reduced air pollution and lower carbon emissions. This awareness is driving interest in sustainable transportation, particularly among urban and younger populations. Many consumers now see EVs as a way to contribute to a cleaner environment.
2. The high upfront cost of EVs remains a critical barrier, especially for passenger cars and buses. Consumers rely heavily on government subsidies and incentives under schemes like FAME II to make EVs affordable. Despite this, many are unaware of the full range of financial benefits, such as tax exemptions and interest-free loans, limiting their adoption potential.
3. Two-wheelers and three-wheelers dominate EV adoption due to their affordability and practicality for daily commutes. These segments are particularly popular in urban areas, where shorter travel distances make them a convenient choice. In contrast, four-wheelers and buses see slower adoption due to higher costs and limited charging infrastructure.
4. The lack of widespread charging infrastructure is a major deterrent for consumers, leading to concerns about running out of battery during long journeys. This "range anxiety" is more prominent among potential buyers of electric four-wheelers. The slow pace of infrastructure development in rural and semi-urban areas further hinders adoption.
5. Consumers prioritize EVs from established brands due to concerns over battery life, after-sales service, and long-term reliability. Known manufacturers such as Tata Motors and Mahindra benefit from this trust, while newer players face challenges in gaining consumer confidence.
6. EVs are increasingly viewed as a status symbol for sustainability and technological advancement, particularly among urban, tech-savvy consumers. Features like fast charging, smart connectivity, and superior performance further enhance their appeal, making EVs a desirable choice for modern lifestyles.

CHAPTER – 5
RECOMMENDATIONS AND CONCLUSION

Recommendations

1. Many consumers are not fully aware of the financial benefits and long-term savings associated with

EVs. The government and manufacturers should launch awareness campaigns to educate people about subsidies, tax exemptions, and lower running costs. These campaigns can also highlight the environmental benefits of EVs, encouraging consumers to switch from traditional fuel vehicles.

2. Limited charging infrastructure is a major barrier to EV adoption. The government and private companies should work together to establish more public charging stations, especially in rural and semi-urban areas. Fast-charging stations along highways and in urban centers can reduce range anxiety and make EVs more practical for long-distance and daily use.
3. Since affordability is a key concern for most Indian consumers, manufacturers should introduce more budget-friendly EV models, especially in the two- and three-wheeler segments. Government subsidies should continue to focus on these segments, as they have the highest adoption potential. Affordable financing options, such as low-interest loans, can also make EVs accessible to a broader audience.
4. High dependence on imported EV components increases costs. The government should promote local manufacturing of EVs and batteries under initiatives like "Make in India." This can reduce production costs, improve supply chain efficiency, and boost the availability of EVs at lower prices. Incentives for domestic battery recycling and reuse should also be encouraged to support sustainability.
5. Consumers often struggle to afford EVs due to their high upfront costs. Financial institutions should provide low-interest loans, longer repayment periods, and special credit schemes to make EV purchases more manageable. The government could partner with banks to develop tailored financing options for EV buyers.
6. Rural areas remain untapped for EV adoption. Targeted initiatives like rural-specific subsidies and mobile charging solutions can make EVs accessible to rural consumers. Manufacturers can also design EVs that cater to the specific needs of rural areas, such as durable vehicles for agricultural use.
7. Collaboration between the government, manufacturers, and private companies is essential for accelerating EV adoption. Joint efforts in building charging infrastructure, launching awareness programs, and offering financing solutions can create a more consumer-friendly EV ecosystem.
8. Reliable after-sales service is crucial for building consumer trust. Manufacturers should offer extended warranties on batteries, easy access to repair services, and guarantees on vehicle performance. This can alleviate consumer concerns about long-term maintenance and reliability.

By implementing these recommendations, India can overcome the existing challenges in its EV ecosystem. A combined focus on affordability, infrastructure, and consumer awareness can significantly boost EV adoption and support the country's sustainability goals.

Conclusion

This study highlights the growing interest in electric vehicles (EVs) in India, driven by environmental concerns, rising fuel costs, and government initiatives like the FAME II scheme. However, the adoption of EVs is still limited due to several challenges, including high upfront costs, lack of charging infrastructure, range anxiety, and limited awareness about available incentives. While two- and three-wheelers dominate the EV market due to their affordability and practicality, four-wheelers and buses are lagging behind due to higher costs and infrastructure issues.

Consumers are gradually recognizing the benefits of EVs, such as lower running costs and reduced emissions, but concerns about battery life, reliability, and after-sales service continue to affect their confidence. Urban areas are witnessing faster adoption due to better infrastructure and greater environmental awareness, while rural areas face slower progress due to accessibility challenges.

The study concludes that a combined effort from the government, manufacturers, and private players is essential to overcome these barriers. Expanding charging infrastructure, introducing affordable EV models, increasing consumer awareness, and providing better financing options can significantly boost EV adoption. Promoting local manufacturing and recycling of EV components can further reduce costs and strengthen the market.

By addressing these challenges and implementing targeted strategies, India can accelerate the transition to electric mobility, reduce its carbon footprint, and achieve its sustainability goals. This would not only benefit the environment but also create economic opportunities and improve the quality of life for millions of people.

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