



"A Comparative Study of level of Consumer Satisfaction towards Fuel and Electric Vehicles with special reference to Amravati City"

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Abstract

The automobile industry is undergoing a transformative shift with the increasing adoption of electric vehicles (EVs). This study aims to compare the consumer satisfaction levels between fuel-based and electric cars in Amravati City, Maharashtra. Using a mixed-method approach, the research integrates quantitative sales data and qualitative consumer feedback to evaluate preferences, purchasing behavior, and factors influencing consumer satisfaction. The findings will help policymakers and automobile manufacturers understand market dynamics and consumer expectations in a rapidly evolving sector.

Keywords: Electric Vehicles, Fuel Cars, Consumer Satisfaction, , Amravati City

1. Introduction

The automobile industry is undergoing a transformative shift with the growing adoption of electric vehicles (EVs) as an alternative to conventional fuel-powered cars. This transition is driven by concerns over environmental sustainability, fuel dependency, and technological advancements. While fuel-powered vehicles continue to dominate the market, the rising awareness of climate change and government incentives for EV adoption have led to increased interest in electric mobility (IEA, 2022). However, the sales and satisfaction levels of consumers towards both fuel and electric vehicles vary significantly based on factors such as cost, infrastructure, performance, and consumer perception (Li et al., 2023).

1.1 Electric Vehicles: The Sustainable Mobility of the Future

Electric vehicles, or EVs, are transforming transportation by providing a more environmentally friendly option to cars that run on gasoline. EVs offer zero tailpipe emissions, increased energy efficiency, and reduced running costs, which are important given the growing concerns about climate change and the depletion of fossil fuels. While improvements in battery technology are improving performance and driving range, governments around the world are encouraging the adoption of EVs through subsidies, tax breaks, and infrastructure development. However, issues such as a lack of charging stations, worries about battery life, and expensive initial expenses continue to prevent widespread use. Notwithstanding these obstacles, EVs have a bright future because of advancements like solid-state batteries, solar-powered EVs, and hydrogen fuel cells, which will influence the next stage of environmentally friendly transportation. The transition to a cleaner, greener future is well under way as businesses and consumers adopt electric vehicles.

1.2 Consumer Satisfaction

Consumer satisfaction is a key determinant of the success and expansion of the automobile market. Studies suggest that customer satisfaction with traditional fuel vehicles is primarily influenced by reliability, performance, and fuel efficiency, whereas for EVs, factors such as battery range, charging infrastructure, and environmental consciousness play a crucial role (Zhou et al., 2021). Despite the environmental benefits, potential EV buyers often express concerns about high initial costs, limited charging stations, and battery longevity, which affect overall sales growth (Bakker & Trip, 2020). A major contributing factor to the broad use of electric vehicles (EVs) is consumer happiness. Consumer perceptions and acceptance of EVs are influenced by a number of factors, such as cost-effectiveness, performance, charging infrastructure, environmental impact, and technological improvements (Oliver, 2014; Ziegler, 2012).

1.2.1 Factors Affecting Consumer Satisfaction

- **Cost-Effectiveness:** Although EVs are more expensive initially, they require less gasoline and upkeep. By lowering the cost of EVs, government incentives have a major impact on customer satisfaction (Huang & Qian, 2021; Hardman et al., 2017).
- **Performance and Maintenance:** EVs offer smooth acceleration, immediate torque, and reduced maintenance expenses, all of which enhance the driving experience. But issues with battery life and replacement costs still exist (Axsen & Wolinetz, 2018; Li et al., 2019).
- **Infrastructure for Charging:** The accessibility of charging stations has a big impact on customer satisfaction. Long charging periods and range anxiety continue to be obstacles to increased EV adoption (She et al., 2020; Zhao et al., 2021).
- **Environmental Benefits:** Since EVs have no tailpipe emissions, they appeal to customers who care about the environment (Neubauer et al., 2012; Barisa et al., 2015).

- **Technological Advancements:** Although traditional vehicle owners may experience an initial learning curve, features like autonomous driving, regenerative braking, and smart connectivity increase satisfaction (Mangram, 2012; Li et al., 2020).

1.3 Consumer Satisfaction in Fuel Vehicles

Despite the growing demand for electric vehicles (EVs), fuel-powered vehicles, also known as internal combustion engine vehicles or ICEVs, still control a large portion of the worldwide automobile market. Cost-effectiveness, performance, infrastructure accessibility, and convenience all affect how satisfied consumers are with fuel-powered automobiles (Oliver, 2014; Ziegler, 2012). Even though ICEVs have benefits like long driving range, fast recharging, and dependability, there are still a lot of worries about maintenance needs, fuel prices, and the influence on the environment (Hardman et al., 2017).

1.3.1 Factors Affecting Consumer Satisfaction towards Fuel vehicles

Consumer preference for ICEVs (Internal Combustion Engine Vehicle) is significantly influenced by cost-effectiveness. Long-term satisfaction may be impacted by fluctuating gasoline prices and higher maintenance costs, even though fuel vehicles are often less expensive up front than EVs (Huang & Qian, 2021). The main advantages of fuel-powered cars are their performance and dependability. They are perfect for long-distance travel since they have more power, better acceleration, and a steady range (Axsen & Wolinetz, 2018). However, satisfaction levels are impacted by emission rules and regular engine maintenance (Zhao et al., 2021).

In contrast to EVs' restricted charging infrastructure, ICEVs continue to benefit from the widespread availability of fuel stations, which enable speedy refueling (She et al., 2020). Overall consumer confidence in fuel-powered vehicles is bolstered by this convenience (Wang et al., 2021). Given that ICEVs increase carbon emissions and air pollution, environmental issues are a major disadvantage. Some consumers are unhappy with the environmental impact of fuel-powered automobiles as a result of governments throughout the world imposing higher pollution standards and encouraging the adoption of electric vehicles (Neubauer et al., 2012; Barisa et al., 2015).

In India, the adoption of electric vehicles has been gaining momentum due to government policies like the Faster Adoption and Manufacturing of Hybrid and Electric Vehicles (FAME) scheme and subsidies on EV purchases (NITI Aayog, 2023). However, the penetration of EVs remains relatively low compared to traditional fuel vehicles, particularly in semi-urban and rural areas such as the Vidarbha region of Maharashtra. Understanding consumer preferences and satisfaction levels in this region is crucial to formulating effective policies and marketing strategies to accelerate EV adoption.

This study aims to conduct a comparative analysis of sales trends and consumer satisfaction between fuel and electric cars, focusing on key determinants influencing purchase decisions. By examining consumer behavior and market dynamics, the research seeks to provide valuable insights into the factors driving or hindering the adoption of electric vehicles in India.

2. Review of Literatures

The global automobile industry has witnessed a shift in sales trends as governments and manufacturers promote electric mobility. According to the **International Energy Agency (IEA) (2022)**, EV sales exceeded 10 million units worldwide in 2022, representing nearly 14% of total vehicle sales. Countries such as China, the United States, and European nations have seen rapid EV adoption due to strong policy support, infrastructure development, and declining battery costs (Li et al., 2023).

In India, the electric vehicle market is growing but remains in its early stages. The **NITI Aayog (2023)** reported that India aims to achieve 30% EV penetration by 2030 through initiatives like the Faster Adoption and Manufacturing of Hybrid and Electric Vehicles (FAME) scheme and tax incentives. However, internal combustion engine (ICE) vehicles continue to dominate the market due to their widespread availability, established refueling infrastructure, and lower upfront costs.

Despite policy incentives, several barriers hinder EV adoption, including high purchase prices, limited charging infrastructure, and range anxiety (Bakker & Trip, 2020). Studies indicate that the upfront cost of EVs is a significant deterrent, especially in developing economies where affordability plays a crucial role in vehicle purchases (Zhou et al., 2021). Additionally, resale value uncertainty and battery degradation concerns further impact consumer confidence in EVs.

Consumer satisfaction is a crucial aspect of automobile market growth, influencing brand loyalty and future sales. Research highlights that satisfaction levels for fuel and electric cars depend on different factors.

- **Fuel Cars:** Consumers prioritize engine performance, fuel efficiency, maintenance costs, and resale value when purchasing conventional fuel cars (Sharma et al., 2022). The widespread availability of fuel stations and a well-established servicing network further enhance consumer satisfaction.
- **Electric Cars:** Studies show that EV buyers focus on battery performance, charging infrastructure, environmental impact, and technological features (Li et al., 2023). However, concerns regarding charging time and station accessibility lower satisfaction levels in some regions.

A comparative study by **Wang et al. (2022)** found that while early EV adopters express high satisfaction with the environmental benefits and smooth driving experience, concerns over range limitations and charging times affect overall satisfaction. In contrast, ICE vehicle owners report greater satisfaction with vehicle reliability and convenience but are increasingly concerned about rising fuel prices and environmental regulations.

Government incentives, such as subsidies, tax reductions, and charging infrastructure expansion, significantly impact consumer satisfaction and willingness to adopt EVs. Research by **Ghosh et al. (2023)** suggests that policy-driven financial incentives improve consumer satisfaction by reducing the total cost of ownership. However,

inconsistent policy implementation and lack of widespread infrastructure remain key challenges in emerging markets like India.

While extensive research has been conducted on EV adoption and consumer preferences, gaps remain in understanding regional disparities in satisfaction levels, particularly in semi-urban and rural areas like the Vidarbha region in Maharashtra. Additionally, studies focusing on long-term satisfaction trends post-purchase and the impact of emerging battery technologies on consumer perceptions are limited. Future research should also explore psychological factors influencing consumer hesitation towards EV adoption and the role of brand trust in sales growth.

Electric two-wheelers (E2Ws) have emerged as a dominant segment in India's EV market. Wagh (2024) notes that indigenous manufacturers have played a pivotal role in this surge, with companies like Ola Electric leading sales despite facing challenges such as increased competition and service quality improvements (Reuters, 2025). The electric four-wheeler (E4W) segment is also gaining momentum, supported by initiatives from major automotive players like Tata Motors, which plans to more than double EV charging stations to 400,000 by 2027, addressing infrastructure challenges (Reuters, 2025).

The passenger vehicle market in India is witnessing shifts in fuel preferences. Compressed Natural Gas (CNG) vehicle sales grew by 59% in the first half of 2024, capturing a market share of 16.4%, attributed to favorable pricing and a broader range of models (Auto Punditz, 2024). Diesel vehicles maintained a stable market share of 17.6%, while petrol vehicle sales experienced a slight decline, reducing their market share to 61%.

3. Research Methodology

This chapter outlines the research design, data collection methods, sampling techniques, and data analysis procedures used in the study. The study aims to analyze sales trends and consumer satisfaction levels for fuel and electric vehicles (EVs) in Amravati City, Maharashtra. A mixed-method approach integrating both qualitative and quantitative techniques has been adopted to ensure a comprehensive understanding of the research problem (Creswell, 2014).

3.1 Research Design

This research adopts a mixed-method approach, integrating quantitative and qualitative analysis. Primary data is collected through structured surveys from car owners in Amravati City. Secondary data sources include reports from the Society of Indian Automobile Manufacturers (SIAM), government publications, and automobile sales reports.

3.2 Sampling Technique A stratified random sampling method is employed to ensure adequate representation of both fuel and electric vehicle owners. A sample size of 100 respondents is selected, comprising 50 fuel car owners' and 50 EV owners.

3.3 Data Collection

- Primary Data: A questionnaire was designed to capture consumer demographics, purchase preferences, factors influencing decision-making, and satisfaction levels.
- Secondary Data: Automobile sales reports, industry journals, and government reports

3.4 Tools of Data Analysis and Findings

Descriptive statistics, including mean, median, and standard deviation, were utilized to summarize consumer preferences and satisfaction levels. These statistical measures provided insights into central tendencies and variations in responses, allowing for a clearer understanding of consumer behavior toward fuel and electric vehicles. The mean values helped identify general trends, the median highlighted central responses, and the standard deviation measured the extent of variability in consumer opinions.

Consumer satisfaction levels were assessed using a Likert scale, focusing on key areas influencing vehicle ownership experience. In terms of cost-effectiveness, while electric vehicles (EVs) have a higher initial purchase cost, they offer lower operating expenses due to reduced fuel and maintenance costs. Performance and maintenance emerged as another critical factor, where fuel-powered cars were preferred for their longer range and convenient refueling, whereas EV owners appreciated lower maintenance requirements despite concerns over battery longevity. The environmental impact was a key driver of EV adoption, with EV owners expressing higher satisfaction due to the reduced carbon footprint and lower emissions compared to traditional fuel vehicles. However, infrastructure availability remains a challenge, as the limited presence of charging stations in Amravati City poses a significant barrier to widespread EV adoption, affecting overall consumer satisfaction.

4. Data Analysis & Interpretation

The study finds that while fuel cars still lead in sales, consumer satisfaction levels are shifting in favor of EVs due to economic and environmental benefits. Recommendations include policy enhancements for EV infrastructure, awareness campaigns, and incentives to accelerate EV adoption.

4.1 Demographic Distribution of Respondents

Variable	Classification	No. of Respondents	Percentage of Respondents
Gender	Male	81	59.5
	Female	119	40.5
	Other	-	-
Age Group	18-20	15	7.5
	21-25	119	59.5
	25-30	32	16
	30 and above	34	7.5
Qualification	Higher secondary	19	9.5
	Graduation	81	40.0
	Post graduation	81	41.5
	Ph.D.	10	5.0
	Professional	4	2.0
	Professional	4	2.0
	Others	6	3.0
Annual Income	Below 100000	127	63.5
	100000-300000	26	13.0
	300000-500000	23	11.5
	Above 500000	24	12.0
Designation	Employee	26	13.0
	Business	29	14.5
	Student	117	58.5
	Professionals	11	5.5
	Other	17	8.5

Table No.4.1 Demographic Distribution of Respondents

5. Findings of the Study:

1. Most respondents stated that they were aware of electric vehicles and their advantages, with only a small minority disagreeing or strongly disagreeing with this statement.
2. Social media was identified as the leading source of information regarding electric vehicles.
3. The majority of respondents owned petrol or diesel vehicles, while a smaller percentage had electric vehicles, and an even fewer number owned hybrid models.

4. The primary reasons for preferring electric vehicles were their lower carbon emissions and their role in reducing dependence on petrol and diesel.
5. The lack of charging a station was cited as the main reason preventing consumers from purchasing electric vehicles.
6. Most respondents acknowledged the negative environmental impact of petrol and diesel vehicles, with only a small percentage disagreeing or strongly disagreeing.
7. Respondents expressed a desire for greater battery capacity and the availability of battery swap facilities to improve convenience.
8. Tata Motors and Mahindra were the most preferred brands for purchasing electric vehicles, while Ola and Toyota also received notable mentions.
9. While more than half of the respondents believed electric vehicles were affordable and offered good value, a smaller group disagreed with this assessment.
10. The majority of respondents considered electric cars to be more environmentally friendly than other vehicle types, with only a small percentage expressing disagreement.
11. 50% of respondents were satisfied with the government's subsidies and tax benefits for electric vehicles, while 29.5% remained neutral or uncertain about their stance.
12. A significant number of respondents indicated their willingness to pay a premium for electric vehicles.
13. Nearly half of the participants believed that electric vehicles outperformed traditional fuel-powered cars in terms of efficiency and performance.
14. Opinions on the durability of electric vehicles were mixed: 37% were satisfied, 35% dissatisfied, and 28% uncertain.
15. The majority of respondents indicated that social influences, such as family and friends, would impact their decision to purchase an electric vehicle.
16. A vast majority of respondents anticipated growth and improvement in the electric vehicle sector in India in the future.
17. While many respondents preferred electric vehicles priced between ₹5 to ₹10 lakhs, the highest percentage of respondents preferred a price range of ₹2 to ₹5 lakhs.

These results imply that respondents are highly aware of and receptive to electric vehicles, and that factors like price, accessibility of infrastructure, and social impact are crucial in their decision-making. Additionally, respondents indicated a preference for companies like Tata and Mahindra as well as characteristics like larger battery capacity. However, obstacles to the broader use of electric vehicles still exist, including the scarcity of charging stations and worries about their pricing and longevity.

6. Conclusion:

The study reveals increasing consumer awareness and interest in electric vehicles (EVs), with social media being the primary information source. While most respondents own fuel-powered vehicles, key factors driving EV adoption include lower emissions and reduced fuel dependency. However, limited charging infrastructure remains a major barrier. Consumers recognize EVs' environmental benefits and efficiency, yet concerns about battery durability, cost, and charging convenience persist. Tata Motors and Mahindra is the preferred brands, with Ola and Toyota also gaining popularity. Government subsidies positively influence EV adoption, though many respondents remain uncertain about policy benefits. Social influences impact purchasing decisions and most respondents expect EV adoption to rise in India. Consumers prefer affordable EVs (₹2-5 lakhs), though some are open to ₹5-10 lakh models. To accelerate EV adoption, improvements in charging infrastructure, affordability, and battery performance are essential, ensuring a more consumer-friendly and sustainable EV market in India.

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