

A Study on Consumer Satisfaction Towards Electric Vehicle Usage in Chennai City

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Abstract-- The rapid transition towards sustainable transportation has increased the relevance of electric vehicles (EVs) in urban mobility. Electric vehicles are increasingly being considered as an alternative to conventional petrol and diesel vehicles because of their potential economic, technological and environmental benefits. However, the decision to adopt an EV does not end with purchase; the actual ownership experience plays an important role in determining whether consumers remain satisfied, recommend the vehicle to others and continue using electric mobility.

This study examines consumer satisfaction towards electric vehicle usage in Chennai City. The study focuses on major dimensions of the ownership experience, including charging convenience, battery range, charging time, operating cost, maintenance cost, vehicle performance, safety, availability of charging infrastructure, after-sales service, environmental benefits and overall value for money. The study proposes a descriptive research design based on primary data collected from electric vehicle users in Chennai through a structured questionnaire. Secondary information is obtained from government policy documents and existing academic literature relating to electric vehicle adoption and consumer satisfaction.

The study is designed to identify the major factors influencing satisfaction among EV users and to examine whether demographic and usage characteristics are associated with differences in satisfaction. Attention is given to the practical concerns of Chennai consumers, including traffic conditions, daily commuting requirements, charging accessibility and range anxiety. Existing research indicates that technology-related perceptions, maintenance knowledge, infrastructure and government support can influence EV attitudes and satisfaction. Tamil Nadu's EV policy also identifies charging infrastructure as an important driver of EV adoption.

The study is expected to provide useful insights for EV manufacturers, dealers, charging-service providers and policymakers. Understanding consumer satisfaction from the user's perspective can help improve charging infrastructure, service quality, product reliability and the overall EV ownership experience in Chennai.

Keywords-- Electric Vehicles, Consumer Satisfaction, EV Usage, Charging Infrastructure, Range Anxiety, Chennai City, Sustainable Transportation, Consumer Behaviour.

I. INTRODUCTION

Transportation is an essential component of modern urban life. In rapidly developing cities, increasing mobility requirements have been accompanied by concerns relating to fuel expenditure, air pollution, traffic congestion and environmental sustainability. The transition from conventional internal-combustion vehicles towards electric mobility has therefore become an important area of interest for governments, automobile manufacturers and consumers.

Electric vehicles operate using electric power rather than relying primarily on petrol or diesel. Depending on the vehicle type and technology, EVs can offer lower running and maintenance requirements, quieter operation and reduced tailpipe emissions. At the same time, consumers may face challenges related to purchase price, battery performance, charging time, availability of charging facilities, driving range and uncertainty regarding long-term battery replacement.

The growth of electric mobility has created a new dimension of consumer behaviour. Earlier studies often concentrated on the intention to purchase an EV, but satisfaction after purchase is equally important. A consumer who purchases an EV but experiences difficulty in charging, inadequate range, poor service or unexpected maintenance problems may develop negative perceptions despite initially being attracted by economic or environmental benefits.

Recent research on EV satisfaction in an Indian metropolitan context found that anxiety management, technology, self-image and government support can play important roles in shaping EV satisfaction. Research on Indian consumers has also identified price, maintenance and safety as frequently discussed EV attributes.

Chennai provides an interesting setting for studying EV satisfaction because it combines dense urban travel, daily commuting, significant two-wheeler usage and increasing interest in electric mobility. Tamil Nadu's Electric Vehicle Policy 2023 identifies charging infrastructure as a key factor supporting EV adoption and provides measures intended to encourage public and private charging infrastructure.

The Tamil Nadu EV ecosystem has also continued to develop. The state's current EV platform provides resources including EV registration, charging-station information and policy documents, while recent government updates include measures concerning EV charging infrastructure and battery-operated vehicles.

Therefore, studying satisfaction among actual EV users rather than only potential buyers can provide a more realistic understanding of the strengths and limitations of electric mobility in Chennai.

II. BACKGROUND OF THE STUDY

Electric vehicle adoption involves more than replacing a petrol or diesel engine with an electric powertrain. It represents a change in the consumer's everyday mobility routine.

For a conventional vehicle, consumers are accustomed to refuelling within a relatively short period at widely available fuel stations. EV users may instead depend on home charging, workplace charging or public charging infrastructure. Consequently, charging availability and charging time become part of the ownership experience.

Similarly, the concept of driving range has a different psychological significance for EV users. Range anxiety refers to concern that the vehicle may not have sufficient remaining battery capacity to reach the desired destination or a charging facility. Research focusing on India has identified driving range, battery cost and lack of charging infrastructure as important challenges associated with EV adoption and range anxiety.

Maintenance is another important consideration. EVs have different maintenance requirements from conventional vehicles, and consumer understanding of these requirements may influence their confidence in EV ownership. Research in the Indian context found that perceived technology and maintenance knowledge can influence attitudes and purchase intention towards battery electric vehicles.

Consumer satisfaction therefore represents a combination of expectations and actual experience.

A simplified relationship can be represented as:

Consumer Expectations → Actual EV Experience →
Perceived Performance → Satisfaction →
Recommendation/Continued Usage

When actual performance meets or exceeds expectations, satisfaction is likely to increase. When actual experience falls below expectations, dissatisfaction may occur.

III. STATEMENT OF THE PROBLEM

Electric vehicles are increasingly visible on Chennai's roads. However, the growth of EV usage alone does not indicate whether consumers are satisfied with their ownership experience.

A consumer may purchase an EV because of lower running costs, environmental concerns, technological interest or government incentives. After purchase, however, the consumer may encounter issues such as:

- Limited availability of convenient charging stations
- Long charging time
- Concerns regarding real-world battery range
- Battery degradation concerns
- High initial purchase price
- Availability and quality of after-sales service
- Difficulty obtaining spare parts
- Uncertainty regarding battery replacement costs
- Safety concerns
- Differences between advertised and actual range
- Dependence on home charging
- Lack of awareness about EV maintenance

These factors may influence the consumer's overall satisfaction.

Although several studies have examined EV adoption and purchase intention in Chennai, relatively greater attention is required towards the post-purchase satisfaction experience of existing users. Recent Chennai-focused research has examined pre-purchase behaviour and post-purchase behaviour, demonstrating that EV consumer behaviour is an active area of research.

Hence, the present study focuses specifically on consumer satisfaction towards EV usage in Chennai City.

IV. RESEARCH GAP

Existing research on electric vehicles has frequently concentrated on:

- Purchase intention
- Consumer awareness
- Environmental attitudes
- Factors influencing EV adoption
- Pre-purchase behaviour
- Government incentives
- Charging infrastructure

However, there is a need to understand the actual experience after purchasing and using an EV.

A Chennai-specific study of consumer satisfaction can contribute by bringing together multiple post-purchase factors such as:

- Charging convenience
- Actual driving range
- Charging duration
- Running cost
- Maintenance cost
- Vehicle performance
- Safety
- Service quality
- Infrastructure
- Environmental satisfaction
- Value for money
- Recommendation intention

Recent Chennai studies have examined pre-purchase and post-purchase behaviour, while a 2026 Bengaluru study specifically examined determinants of EV satisfaction among owners.

The present study therefore seeks to focus specifically on consumer satisfaction among EV users in Chennai City and the factors that contribute to that satisfaction.

V. OBJECTIVES OF THE STUDY

Primary objective:

To study the level of consumer satisfaction towards electric vehicle usage in Chennai City.

Secondary Objectives:

1. To understand the demographic profile of EV users in Chennai.
2. To identify the major reasons for using electric vehicles.
3. To examine consumer satisfaction with EV performance.
4. To analyse satisfaction towards charging infrastructure.
5. To study consumer perceptions regarding battery range and charging time.
6. To examine satisfaction towards operating and maintenance costs.
7. To study consumer satisfaction with after-sales service.
8. To understand consumers' perceptions of EV safety and reliability.
9. To examine the relationship between selected demographic characteristics and overall satisfaction.
10. To identify the major problems faced by EV users.

11. To assess consumers' willingness to recommend EVs to others.

12. To provide suggestions for improving the EV ownership experience in Chennai

VI. RESEARCH METHODOLOGY

Research Design:

The study adopts a descriptive research design to examine consumer satisfaction towards electric vehicle usage in Chennai City. The descriptive approach is used to understand the experiences, perceptions and satisfaction levels of existing electric vehicle users.

Source of Data:

The study uses both primary and secondary sources of data. Primary data are collected from electric vehicle users in Chennai City through a structured questionnaire. Secondary data are collected from government policy documents, research articles, journals and other relevant published sources relating to electric vehicles, consumer satisfaction and charging infrastructure.

Data Collection Instrument:

A structured questionnaire is used as the primary instrument for collecting information from EV users. The questionnaire covers demographic characteristics, reasons for EV usage and major dimensions of the ownership experience, including charging convenience, battery range, charging time, operating cost, maintenance cost, vehicle performance, safety, charging infrastructure, after-sales service, environmental benefits and value for money.

Study Area:

The study is focused on Chennai City, Tamil Nadu, with particular attention to the experiences of consumers who currently use electric vehicles.

Sampling:

The respondents for the study are selected from EV users in Chennai City. The study focuses specifically on existing users so that their responses reflect actual ownership and usage experience rather than only purchase intention.

Data Analysis:

The collected responses are intended to be analysed using appropriate descriptive techniques to understand consumer perceptions and satisfaction towards different aspects of EV usage. The analysis also considers the association between selected demographic characteristics and overall consumer satisfaction.

Scope of the Methodology:

The methodology focuses on understanding the post-purchase experience of EV users, particularly charging accessibility, range, charging time, cost, performance, safety, service quality and overall satisfaction.

VII. CONCEPTUAL FRAMEWORK

The study considers overall consumer satisfaction as the dependent variable.

- Independent Variables
- Charging convenience
- Battery range
- Charging time
- Operating cost
- Maintenance cost
- Vehicle performance
- Safety
- After-sales service
- Charging infrastructure
- Environmental benefits
- Value for money
- Dependent Variable
- Overall Consumer Satisfaction
- Behavioural Outcome
- Willingness to Recommend / Continue Using EV

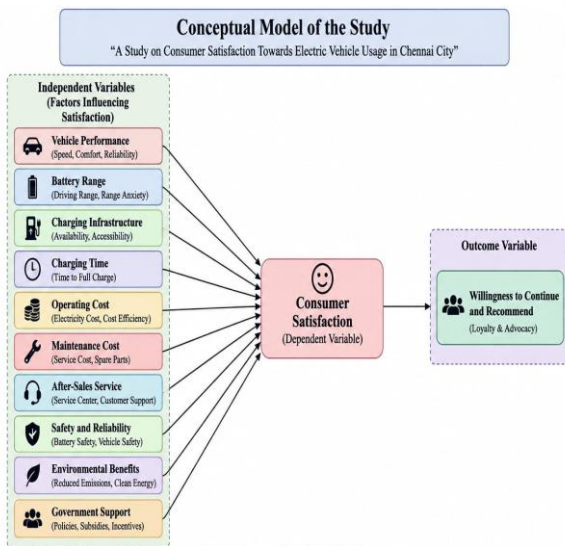


Figure 1: Conceptual Model of the Study

Fig.1. Conceptual Framework of Consumer Satisfaction

VIII. REVIEW OF LITERATURE

Consumer Sentiment Towards Evs:

Research on Indian consumers has examined public sentiment towards electric vehicles using large-scale data analysis. Price, maintenance and safety were among the commonly discussed EV attributes, demonstrating that consumers evaluate EVs from both economic and practical perspectives.

Technology And Maintenance Knowledge:

Research on battery electric vehicles in India has shown that consumer attitude is an important predictor of purchase intention. Perceived technology and knowledge of maintenance also influence consumer attitudes and intentions. This suggests that understanding EV technology can affect how consumers perceive ownership.

Range Anxiety:

Range anxiety remains an important concern in EV adoption. Research in India has identified driving range, battery cost and charging infrastructure among the important challenges affecting EV customers.

Charging Infrastructure:

Charging infrastructure directly influences the convenience of EV ownership. Research on charging-infrastructure satisfaction has examined how consumer satisfaction changes with improvements in infrastructure and charging-related experiences.

Tamil Nadu's EV policy similarly recognises charging infrastructure as an important driver of EV adoption and outlines measures to support public and private charging infrastructure.

Ev Satisfaction In Indian Metropolitan Cities:

A 2026 study of EV owners in Bengaluru examined satisfaction through factors including anxiety, economic considerations, environmental factors, infrastructure, government support, self-image and technology. The study reported that experiential, social and policy-related factors can play important roles in EV satisfaction.

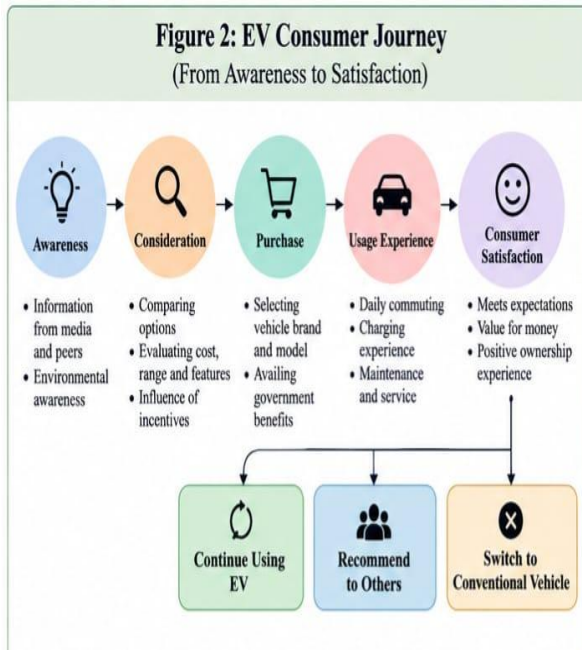


Fig.2. EV Consumer Journey

IX. CHENNAI-SPECIFIC RESEARCH

Recent research has examined EV consumer behaviour in Chennai. One study examined pre- and post-purchase behaviour among 405 respondents, while another examined factor influencing post-purchase behaviour among EV users in Chennai.

Another Chennai-focused study examined pre-purchase factors among 243 respondents and considered environmental awareness, financial considerations, infrastructure and perceived performance.

The present study builds on this body of work by concentrating specifically on consumer satisfaction during actual EV usage.

X. PROBLEMS FACED BY EV USERS

Based on the literature and questionnaire design, the study can examine the following potential problems:

Charging Infrastructure:

The availability and accessibility of charging facilities remain important to EV users. Tamil Nadu's EV policy recognises charging infrastructure as a key factor in reducing range-related concerns and supporting EV adoption.

Charging Time

Compared with conventional refuelling, EV charging may require more time depending on the charger, vehicle and battery condition. This makes charging time an important component of consumer satisfaction.

Range Anxiety

Users may experience concern regarding whether sufficient battery charge is available for an unexpected journey. This becomes particularly relevant for consumers travelling longer distances.

Battery Concerns

Consumers may be concerned about battery degradation, warranty conditions, replacement cost and long-term performance.

Service Availability

The availability of trained technicians and specialised EV service facilities can influence confidence in long-term ownership.

Initial Purchase Price

Although operating expenses may be attractive, the initial cost of some EVs can remain an important consideration for consumers.

Resale Value

Consumers may also consider the future resale value of the vehicle and battery condition.

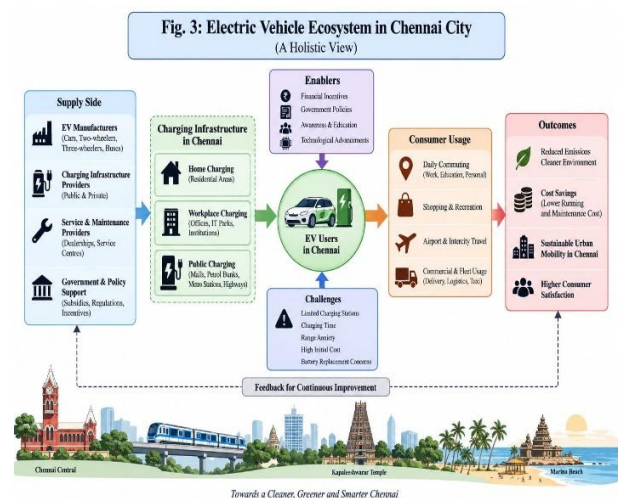


Fig.3. Electric Vehicle Ecosystem in Chennai City

XI. SUGGESTIONS

Improve Charging Infrastructure

Charging stations should be expanded strategically across residential areas, commercial zones, major roads, workplaces and parking facilities.

Increase Fast-Charging Availability

Fast-charging facilities can reduce waiting time and improve consumer confidence, particularly for users who travel longer distances.

Improve Real-World Range Information

Manufacturers should communicate realistic range expectations under different traffic, speed, weather and driving conditions instead of relying only on laboratory or ideal-condition figures.

Strengthen After-Sales Service

Manufacturers should establish easily accessible service centres with trained EV technicians.

Increase Battery Transparency

Consumers should receive clear information regarding:

- Battery warranty
- Expected battery life
- Degradation
- Replacement cost
- Warranty conditions
- Charging practices

Improve Consumer Education

Manufacturers and government agencies can conduct awareness programmes explaining EV technology, charging methods, maintenance requirements and safety.

Develop User-Friendly Charging Applications

Charging applications should provide accurate information about station location, availability, charger type, charging speed and payment options.

Encourage Home And Workplace Charging

Residential and workplace charging can reduce dependence on public infrastructure and improve everyday convenience.

Focus On Customer Feedback

Manufacturers should regularly collect customer feedback after purchase and use the information to improve vehicle software, service, battery management and customer support.

Strengthen Policy Support

Government initiatives should continue supporting reliable charging infrastructure and a consumer-friendly EV ecosystem. Tamil Nadu's EV policy already places emphasis on developing public and private charging infrastructure.

XII. LIMITATIONS OF THE STUDY

1. The study is geographically restricted to Chennai City.
2. The findings depend on the responses provided by selected respondents.
3. Consumer perceptions may change as EV technology develops.
4. Different EV categories may have different ownership experiences.
5. The study focuses primarily on consumer satisfaction rather than the complete environmental lifecycle of EVs.
6. Charging infrastructure can change rapidly, which may affect future findings.
7. Some respondents may have limited experience with long-distance EV travel.
8. The study is cross-sectional and therefore captures consumer perceptions at a particular point in time.

XIII. SCOPE FOR FUTURE RESEARCH:

- Future research can extend this study in several directions.
- A comparative study can be conducted between Chennai, Bengaluru, Hyderabad and other metropolitan cities.
- Future research can compare electric two-wheeler and electric four-wheeler satisfaction.
- Longitudinal research can examine satisfaction before purchase and after several years of ownership.
- Future studies can investigate battery degradation and its influence on satisfaction.
- Researchers can examine the relationship between charging infrastructure density and consumer satisfaction.
- Future studies can analyse EV resale value perceptions.
- Advanced statistical techniques such as Structural Equation Modelling can be used to identify direct and indirect relationships between satisfaction factors.

- Future research can examine the influence of government policies and incentives on long-term EV usage.
- A comparative study between EV users and petrol/diesel vehicle users can provide insights into perceived economic and service differences.
- Future research can incorporate actual vehicle usage data, charging records and maintenance records alongside questionnaire responses.

XIV. CONCLUSION

Electric vehicles represent an important transformation in urban transportation. However, the success of electric mobility cannot be measured only by the number of vehicles sold. The long-term success of EV adoption depends on whether consumers are satisfied with the vehicles after purchase and whether their everyday ownership experience meets their expectations.

This study focuses on consumer satisfaction towards electric vehicle usage in Chennai City by examining the practical, economic, technological and service-related dimensions of EV ownership. Factors such as charging convenience, battery range, charging time, operating cost, maintenance, performance, safety, after-sales service and value for money are particularly relevant to the consumer experience.

The literature indicates that EV satisfaction is multidimensional. Technology perceptions, anxiety management, infrastructure, maintenance knowledge and policy support can influence the way consumers evaluate electric mobility.

For Chennai, the availability of reliable charging infrastructure is especially important. Tamil Nadu's EV policy recognises charging infrastructure as a key component of EV adoption, while the state's current EV ecosystem continues to develop charging-related resources and initiatives.

Ultimately, the transition to electric mobility should not be viewed simply as a change in the type of vehicle. It is a change in the consumer's transportation experience. An EV that is affordable but difficult to charge, technologically advanced but poorly supported, or environmentally attractive but inconvenient to use may fail to generate lasting consumer satisfaction.

Therefore, the future of EV adoption in Chennai depends not only on increasing sales but also on creating an ownership ecosystem in which charging is convenient, range is reliable, service is accessible, costs are transparent and consumers feel confident in their choice.

A satisfied EV consumer can become more than a vehicle owner—they can become an advocate for sustainable mobility. Thus, improving consumer satisfaction should be treated as an essential component of Chennai's transition towards a more sustainable transportation system.

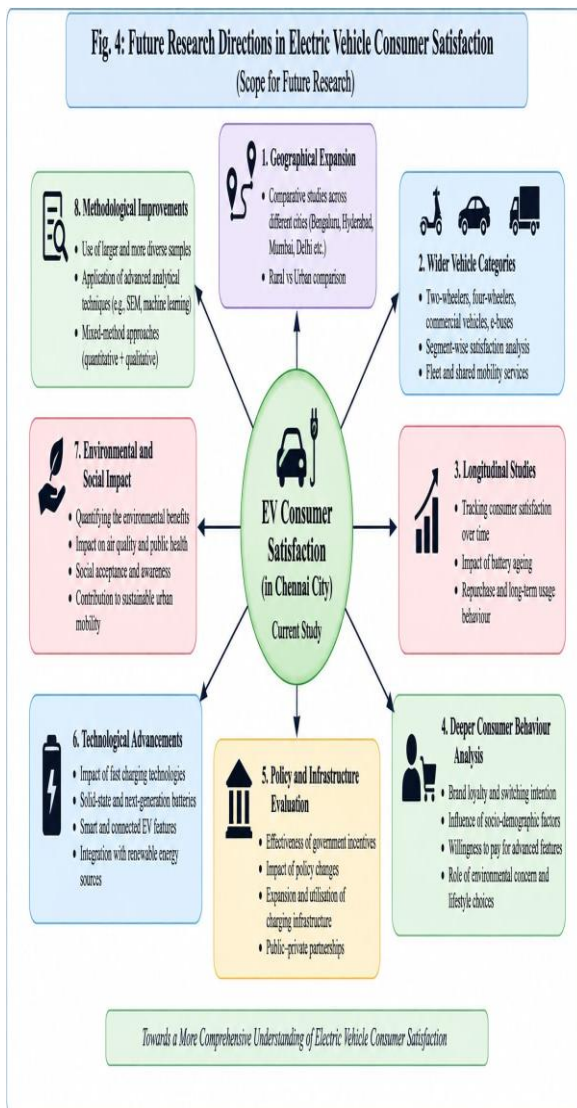


Fig.4. Future Research in EV Consumer Satisfaction:



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