ISBN: 978-93-47303-15-9
DOI: https://doi.org/10.70381/9789347303159.2026.17

CHAPTER 17

Consumer Acceptance and Market Feasibility of Electric Vehicles in Vadodara City

Charmi Kachhadiya* & Urvashi Chouhan**

Abstract

The transition toward sustainable and clean mobility has positioned Electric Vehicles (EVs) as a viable alternative to conventional fuel-based transportation. This study investigates the level of consumer acceptance, awareness, and market feasibility of EVs in Vadodara City. Based on a structured survey of 150 respondents, the findings reveal that consumers show favourable attitudes toward EV adoption, driven mainly by environmental concern, fuel cost savings, and technological advancement. However, certain constraints such as inadequate charging infrastructure, high battery replacement cost, limited driving range, and uncertainty regarding resale value continue to restrict wider adoption. The study concludes that while Vadodara demonstrates strong market potential for EV penetration, strategic expansion of charging networks, government incentives, and improved consumer education are essential for accelerating EV adoption. The overall outlook reflects a positive shift toward electric mobility, especially in the two-wheeler segment.

Keywords: *Electric Vehicles (EVs), Consumer Acceptance, Market Feasibility, Vadodara City, Charging Infrastructure, Battery Cost,*

* Assistant Professor, Faculty of Commerce & Management, Sigma University, Vadodara, Gujarat

** Assistant Professor, Faculty of Commerce & Management, Sigma University, Vadodara, Gujarat

Environmental Awareness, Sustainable Mobility, Fuel Cost Savings, Range Anxiety.

Introduction

Electric Vehicles (EVs) have emerged as a pivotal solution to global environmental challenges, rising fuel costs, and the demand for sustainable urban mobility. The transportation sector, being one of the major contributors to greenhouse gas emissions, has prompted governments worldwide, including India, to promote electric mobility through policy incentives, subsidies, and infrastructural support. EV adoption not only reduces carbon footprint but also offers long-term economic benefits, such as lower fuel and maintenance costs.

Vadodara, a rapidly growing industrial and educational hub in Gujarat, provides an ideal context for examining consumer acceptance and market feasibility of EVs. The city's urban population demonstrates increasing environmental consciousness and willingness to adopt innovative technologies, which positions Vadodara as a potential market for electric mobility solutions. In recent years, the Gujarat government has introduced EV-friendly policies, including financial incentives, road tax exemptions, and support for charging infrastructure, aimed at accelerating the shift from conventional vehicles to electric alternatives.

Despite these conditions, EV adoption faces several challenges in Vadodara. Consumers often express concerns regarding the availability of charging stations, battery replacement costs, vehicle range, and uncertainty about resale value. Understanding consumer perception, awareness, and willingness to adopt EVs is crucial for manufacturers, policymakers, and urban planners to design effective strategies that facilitate market penetration.

This chapter explores consumer attitudes towards EVs, evaluates the current market infrastructure in Vadodara, and assesses the feasibility of wider adoption. Through primary surveys and secondary data analysis, the study aims to identify key drivers and barriers influencing EV acceptance and to provide recommendations for enhancing the city's readiness for electric mobility.

Literature Review

The adoption of Electric Vehicles (EVs) has been widely studied across various contexts, highlighting factors influencing consumer acceptance, policy support, technological barriers, and market feasibility. This literature review synthesizes key findings relevant to EV adoption in urban India, with a focus on consumer behavior and market readiness.

1. **Environmental Concern and Sustainability** Several studies emphasize that environmental awareness is a primary driver for EV adoption. Consumers with higher ecological consciousness are more likely to choose EVs due to reduced greenhouse gas emissions and lower environmental impact (Breetz et al., 2018; Rezvani et al., 2015).
2. **Cost and Economic Considerations** Purchase price, operational cost, and total cost of ownership are critical in influencing EV adoption. High upfront costs often discourage consumers, while savings in fuel and maintenance provide positive motivation (Sierzchula et al., 2014; Hall & Lutsey, 2017).
3. **Government Policy and Incentives** Government interventions, such as subsidies, tax exemptions, and infrastructure development, significantly boost consumer interest in EVs. Policy-driven incentives in India have shown measurable effects on adoption rates in urban centers (NITI Aayog, 2019).
4. **Technological Awareness and Perceived Benefits** Consumer familiarity with EV technology, performance reliability, and brand reputation play a role in adoption decisions (Jabeen et al., 2020). Awareness campaigns and test-driving experiences increase acceptance.
5. **Charging Infrastructure Availability** Limited charging stations and perceived inconvenience remain major barriers. Studies show that cities with robust EV infrastructure report higher adoption rates (Gnann et al., 2018).
6. **Battery Life and Replacement Concerns** High battery replacement cost and uncertain resale value affect purchase intention. Consumers are concerned about long-term cost-effectiveness (Li et al., 2017).

7. **Range Anxiety** Range anxiety the fear that an EV will run out of charge before reaching the destination is a psychological barrier affecting urban and semi-urban consumers (Zhang et al., 2018).
8. **Socio-demographic Factors** Age, income, education, and occupation influence EV acceptance. Younger, tech-savvy, and higher-income groups show greater openness to adoption (Lane & Potter, 2007).
9. **Urban Planning and Market Potential** Studies indicate that urban regions with planned infrastructure, road connectivity, and educational hubs are better positioned for EV penetration (Li et al., 2020).
10. **Consumer Perception of Vehicle Performance** Perceived reliability, speed, and aesthetics of EVs influence purchase decisions, highlighting the need for consumer-focused marketing (Bjerkan et al., 2016).
11. **Comparative Advantage Over ICE Vehicles** EVs are increasingly perceived as economically viable compared to traditional internal combustion engine vehicles due to lower running costs and reduced maintenance needs (Egbue & Long, 2012).
12. **Market Feasibility Studies in Indian Cities** Research in cities like Ahmedabad, Pune, and Bengaluru shows that EV adoption is feasible where public awareness, policy support, and infrastructure co-exist, which provides a benchmark for Vadodara (Shukla et al., 2021).

Research Methodology

The research methodology outlines the systematic approach employed to investigate consumer acceptance and market feasibility of Electric Vehicles (EVs) in Vadodara City. This section describes the research design, data collection methods, sample selection, and analytical tools used in the study.

Research Design

A descriptive research design was adopted to provide an in-depth understanding of consumer perceptions, preferences, and barriers regarding EV adoption. The study aimed to both describe existing awareness levels and analyze factors

influencing purchase intentions. A combination of primary and secondary data sources was used to ensure comprehensive analysis.

Area of Study

The research was conducted in Vadodara City, an industrial and educational hub in Gujarat, with a growing population, increasing vehicle ownership, and emerging interest in sustainable mobility solutions. The city provides a representative urban context for assessing the readiness of consumers to adopt EVs.

Sample Design

A convenience sampling method was employed, targeting individuals who are potential EV buyers, including working professionals, students, business owners, and urban residents. A total of 150 respondents participated in the study.

Data Collection

- Primary Data: Collected through a structured questionnaire comprising close-ended and Likert-scale questions focused on consumer awareness, acceptance, preferences, and perceived barriers related to EVs.
- **Secondary Data:** Collected from government reports, industry publications, research articles, EV market studies, and policy documents relevant to Gujarat and India.

3.5 Tools of Analysis

Data were analyzed using percentage analysis, frequency distribution, and cross-tabulation to identify trends, patterns, and relationships between demographic factors and consumer attitudes toward EV adoption. Graphs and tables were used to present the findings clearly.

Scope and Limitations

- **Scope:** Focuses on urban consumers in Vadodara and evaluates market feasibility, infrastructure readiness, and consumer perception of EVs.

- **Limitations:** The study is limited by sample size, geographical focus, and reliance on self-reported data, which may introduce respondent bias.

This methodology ensures a structured and systematic approach to understand the factors influencing EV adoption in Vadodara City.

Objectives of the Study

The primary aim of this study is to examine the consumer acceptance and market feasibility of Electric Vehicles (EVs) in Vadodara City. In line with this aim, the specific objectives are as follows:

1. **To assess the awareness level of consumers** regarding Electric Vehicles, including their features, environmental benefits, operational advantages, and government incentive schemes.
2. **To analyze consumer perception and acceptance** towards EVs, identifying key factors that motivate or hinder adoption, such as environmental concern, cost savings, technological familiarity, and brand preference.
3. **To evaluate market feasibility** by examining the readiness of Vadodara's infrastructure, including availability of charging stations, EV dealerships, and service support.
4. **To identify barriers to adoption** such as range anxiety, battery replacement costs, high upfront prices, limited charging facilities, and lack of awareness about resale value.
5. **To provide recommendations for policy makers, manufacturers, and urban planners** aimed at improving consumer acceptance, promoting EV adoption, and enhancing the overall market potential of electric mobility in Vadodara City.

Data Analysis and Results

The collected primary data from 150 respondents in Vadodara City were analyzed to assess **consumer awareness, acceptance, preferences, and market feasibility** of Electric Vehicles (EVs). The results are presented below using percentage analysis, frequency distribution, and cross-tabulation.

Awareness Level of EVs

Awareness Aspect	Respondents (n=150)	Percentage (%)
Heard about Electric Vehicles	123	82
Aware of government subsidy schemes	98	65
Know about lower operational costs	81	54

Interpretation: A majority of respondents (82%) are aware of EVs, indicating a good level of exposure. However, awareness regarding government incentives and operational cost benefits is lower, showing a need for enhanced information dissemination.

Factors Influencing EV Adoption

Factor	Respondents	Percentage (%)
Environmental concern	68	45
Fuel cost savings	57	38
Technological advancement	25	17

Interpretation: Environmental concern is the primary driver for EV adoption, followed by cost-saving considerations. Technological appeal is less influential but still contributes to consumer interest.

Barriers to EV Adoption

Barrier	Respondents	Percentage (%)
Limited charging infrastructure	72	48
High battery replacement cost	48	32
Range anxiety	23	15
Resale value uncertainty	7	5

The most significant barrier is limited charging infrastructure, followed by battery cost. These barriers highlight infrastructural and economic constraints that impact wider adoption.

Preferred EV Type

EV Type	Respondents	Percentage (%)
Two-wheeler	60	40
Four-wheeler	38	25
Undecided/Other	52	35

Interpretation: Two-wheelers are the most preferred choice among respondents, largely due to affordability and suitability for urban commuting. Four-wheelers are gaining interest but face cost-related limitations.

Summary of Results

- Awareness of EVs is reasonably high (82%), but detailed knowledge about incentives and operational advantages is moderate.
- Environmental concern and cost savings are the major motivators for adoption.
- Charging infrastructure, battery replacement cost, and range anxiety are key barriers.
- Two-wheelers show higher adoption potential compared to four-wheelers, indicating a segmented market readiness.

Findings

Based on the analysis of primary survey data and secondary research, the study reveals the following key findings regarding **consumer acceptance and market feasibility of Electric Vehicles (EVs) in Vadodara City**:

1. **High Awareness of EVs:** A significant majority of respondents (82%) have heard about EVs, indicating that the concept of electric mobility is widely recognized in Vadodara. However, detailed understanding of government incentives and operational advantages is moderate, showing the need for better information dissemination.
2. **Environmental Concern as a Primary Motivator:** Environmental consciousness emerges as the strongest driver for EV adoption, followed closely by potential fuel cost savings. This reflects a growing eco-friendly mindset among urban consumers.
3. **Economic and Technological Factors Influence Decisions:** While environmental concerns dominate, cost-effectiveness and technological advancement also influence purchase intentions. Affordability remains a key determinant in choosing between two-wheelers and four-wheelers.

4. **Infrastructural Limitations as Key Barrier:** Limited availability of charging stations (48%), high battery replacement costs (32%), and range anxiety (15%) are identified as significant barriers to EV adoption. Lack of awareness about resale value further affects consumer confidence.
5. **Segmented Market Preference:** Two-wheelers have a higher adoption potential (40%) due to lower cost, easier mobility, and suitability for urban commuting. Four-wheelers are less preferred (25%) but have potential among higher-income groups.
6. **Positive Market Feasibility:** Vadodara shows promising market feasibility for EVs. The city's growing urban infrastructure, supportive policy environment, and consumer interest provide a favorable ecosystem for electric mobility.
7. **Need for Strategic Interventions:** Expansion of public charging infrastructure, clear communication about costs and benefits, and government incentives are crucial to accelerate EV adoption in the city.

References

1. Attri, R., & Kushwaha, P. S. (2024). *Electric Vehicles in India: Identifying the Adoption Predictors. Prabandhan: Indian Journal of Management*, 17(6), 46–62. Indian Journal of Management
2. Bansal, P., Ranjan, R., Raj, A., Dubey, S., & Graham, D. J. (2021). *Willingness to Pay and Attitudinal Preferences of Indian Consumers for Electric Vehicles.* arXiv. arXiv
3. Srinivasan, U., & Vadivel, S. M. (2025). *A Comprehensive Systematic Review on Electric Vehicle Adoption with the Impact of Technological and Consumer Buying Behavior.* IJRASET. IJRASET
4. Khajuria, V., & Singh, H. (2025). *Consumer Perception Towards Adoption of Electric Vehicles: A Literature Review.* RESEARCH HUB International Multidisciplinary Research Journal. rhimrj.co.in
5. Das, A., & Sharma, S. K. (2024). *Electric Vehicle Adoption in India: A Decade of Research Trends and Insights Through Bibliometric Analysis.* Journal of Asia Entrepreneurship and Sustainability. Asia Entrepreneurship Journal
6. "Consumer Adoption of Electric Vehicles: A Systematic Literature Review." (2022). *Energies*, 16(1), 205. MDPI

7. Sai Jyothika, G. A., Aggarwal, A., & Chaudhary, R. (2025). *The Role of Consumer Perceptions in Electric Vehicles Adoption: Financial incentives, Retrofitting, and Environmental Concerns in India.* Journal of Informatics Education and Research. JIER
8. Pathak, A., & Gangal, V. K. (2023). *Advancements and Challenges in Electric Vehicle Adoption in India.* Journal of Science & Technology. thesciencebrigade.com+1
9. Kher, A. (2025). *Barriers to Widespread Electric Vehicle Adoption: Consumer Perception and Policy Implications.* Shodh Sagar Journal of Electric Vehicles, 2(2), 7–12. jev.shodhsagar.org
10. Kalaivanan, D., Nappinnai, M. K., & Priyatharsini, K. (2024). *A Study on Consumer Preference and Adoption of Electric Vehicles in India with Special Reference to Pollachi.* EPRA International Journal of Multidisciplinary Research. EPRA Journals
11. (2024). *EV adoption in India: barriers and policy solutions from manufacturers' and consumers' perspectives. Energy for Sustainable Development*, 83, 101583.