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# A Study on Consumer Performance and Purchase Intention Towards Electric Vehicles in Delhi

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#### : Introduction

The global auto-mobile industry is undergoing a revolutionary shift towards sustainability and eco-friendliness. Electric vehicles (EVs) are considered a crucial component of this transformation. In India, particularly in metropolitan cities like Delhi, the adoption of EVs has gained significant attention due to alarming levels of air pollution and increasing fuel costs. This study explores how consumers in Delhi perceive electric vehicles, their satisfaction with current EVs, and what motivates or hinders their purchase decisions.

Electric vehicles (EVs) have emerged as a cornerstone of sustainable transportation, offering a cleaner and more energy-efficient alternative to traditional internal combustion engine (ICE) vehicles. As the world grapples with escalating environmental challenges, including climate change, air pollution, and the depletion of fossil fuel reserves, the automotive industry is undergoing a rapid transformation. EVs are positioned as a key solution to reduce greenhouse gas emissions and lower dependency on non-renewable energy sources.

Delhi, the capital city of India, is one of the most polluted urban centres globally, facing critical issues related to air quality and vehicular emissions. In response, the Government of Delhi and the central government have launched several initiatives aimed at promoting the adoption of electric vehicles. Policies such as subsidies on EV purchases, exemption from road taxes, and the development of EV charging infrastructure are designed to stimulate demand and build consumer confidence. Despite these efforts, EV adoption remains at a nascent stage in Delhi, hindered by several economic, technological, and perceptual barriers.

This study focuses on understanding consumer behavior and performance expectations related to electric vehicles in the context of Delhi. It investigates the primary drivers of EV adoption, such as environmental awareness, cost-effectiveness, and government support, as well as the barriers that dissuade consumers from purchasing EVs. By analyzing consumer perceptions, the research aims to provide insights that can aid policymakers and manufacturers in tailoring strategies to enhance EV penetration in urban India.

The objective is to evaluate the extent to which consumers are prepared to transition to electric vehicles, what influences their purchasing intentions, and how various external factors— including infrastructure availability, pricing, and regulatory incentives—impact their decisions. In doing so, the study contributes to the broader discourse on sustainable urban mobility and offers actionable recommendations to promote electric vehicle adoption in Delhi and beyond.

#### : Background of the Study

Delhi is one of the most polluted cities in the world, with vehicular emissions being a major contributor. The Government of Delhi has introduced several policies to promote electric vehicles, such as subsidies, free registration, and road tax exemptions. Despite these measures, EV penetration remains relatively low. This research aims to fill the gap by understanding the behavioral aspects of consumers regarding EVs in Delhi, including performance evaluation and purchase intention.

#### : Research Objectives

The specific objectives of this study are:

- 1. To assess the level of awareness among Delhi consumers regarding electric vehicles.
- 2. To evaluate consumer satisfaction with existing EVs (performance, maintenance, driving experience).
- 3. To identify key factors influencing the intention to purchase EVs.

- 4. To analyze the impact of demographic factors such as age, income, and education on EV adoption.
- 5. To suggest recommendations to improve EV adoption based on consumer feedback.

#### : Review of Literature

Multiple studies have investigated the shift towards electric mobility. According to Singh and Sharma (2023), Indian consumers show a positive attitude towards EVs when provided with adequate information and incentives. The Deloitte Global Automotive Consumer Study (2023) highlights that EV performance, cost of ownership, and environmental concern are primary factors driving EV purchases. However, perceived barriers like high upfront costs, limited charging stations, and batteryrelated concerns continue to restrict adoption.

#### : Theoretical Framework

The study is based on the Theory of Planned Behavior (TPB), which suggests that behavioral intention is influenced by attitude, subjective norms, and perceived behavioral control. In the context of EVs:

- Attitude includes perception of benefits (eco-friendliness, fuel savings).
- Subjective norms relate to peer influence and social trends.
- Perceived behavioral control is shaped by infrastructure and ease of use.

#### : Research Methodology

This research employs a descriptive methodology to understand consumer opinions and behaviors.

- Population: Vehicle owners and potential buyers in Delhi.
- Sample Size: 150 respondents.
- Sampling Method: Random sampling across age, gender, and occupation groups.
- Data Collection Tool: Structured questionnaire with both openended and Likert scale questions.
- Data Analysis: Performed using SPSS and Microsoft Excel for graphical interpretation.

#### : Demographic Profile of Respondents

- Age Groups: 18-25 (30%), 26-40 (40%), 41-60 (20%), above 60 (10%)
- Gender: Male (60%), Female (40%)
- Education: Graduate (45%), Postgraduate (35%), Others (20%)
- Income Levels: Below 5L (25%), 5L–10L (50%), Above 10L (25%)
- Profession: Students, working professionals, business owners, and retirees

#### : Consumer Awareness and Perception

Most respondents (65%) were aware of electric vehicles and their benefits. Commonly cited advantages included:

- Environmental friendliness (reduction in carbon emissions)
- Low running and maintenance costs
- Government subsidies and incentives

However, many consumers were unclear about battery life, resale value, and safety features, indicating the need for more awareness campaigns.

#### : Consumer Performance Evaluation of EVs

The respondents who had used EVs rated the following parameters:

- Driving Experience: Smooth and quiet (80% satisfied)
- Maintenance Cost: Lower than petrol/diesel vehicles (70% satisfied)
- Battery Performance: Average; issues in extreme weather (55% satisfied)
- Charging Infrastructure: Insufficient and inconvenient (only 30% satisfied)

• Service Availability: Limited in many areas (40% satisfied) These results highlight satisfaction in some areas and significant gaps in infrastructure and support.

#### : Factors Influencing Purchase Intention

The key motivators for considering EVs include:

- Rising fuel prices
- Environmental awareness
- Availability of government subsidies
- Technological advancements (e.g., smart dashboards) The barriers include:
- High initial cost of purchase
- Range anxiety (limited battery range)
- Lack of charging stations
- Uncertain resale value

#### : Role of Government Policies

The Delhi EV Policy (2020) offers incentives such as:

- Purchase subsidy up to Rs. 30,000 for two-wheelers and Rs. 1.5 lakh for four-wheelers
- Waiver on road tax and registration
- Support for setting up charging stations

Despite these efforts, ground-level implementation needs improvement. Consumers feel policies are not uniformly applied or promoted.

#### : Comparative Analysis with Other Cities

When compared with Mumbai, Bengaluru, and Hyderabad, Delhi lags in charging infrastructure but has stronger incentives. Bengaluru leads in terms of EV startups and public charging points. Consumers in Delhi are more price-sensitive and expect greater value-for-money propositions.

#### : Recommendations

Based on the findings, the following recommendations are made:

- Enhance charging infrastructure in residential areas, malls, and workplaces.
- Provide clear and updated information on subsidies and EV models.
- Encourage private-public partnerships for faster EV ecosystem development.
- Introduce low-interest EV loans for middle-income consumers.
- Offer trade-in benefits for old petrol/diesel vehicles.

#### : Impact of Infrastructure on EV Adoption

Infrastructure, particularly the availability and accessibility of charging stations, plays a pivotal role in the successful adoption of electric vehicles. In Delhi, although government initiatives have led to the establishment of charging points in public spaces, their distribution and number remain inadequate to meet the growing demand. Lack of fast chargers, long charging times, and unreliable service at some stations discourage potential buyers.

Urban planning and infrastructure development must align with the EV vision.

There is a growing need for public-private partnerships to expand the EV ecosystem, including residential charging solutions, workplace chargers, and highway fastcharging corridors. The implementation of smart grid technologies and solar-powered charging stations can further support sustainable energy use.

Moreover, integrating real-time charging station data into navigation apps would significantly ease user experience and reduce range anxiety. Addressing these infrastructural concerns is crucial for converting positive consumer intentions into actual EV purchases.

: Role of Automotive Companies in Shaping Consumer Attitudes

Automobile manufacturers and EV startups have a significant impact on consumer perception and confidence in EVs. Companies like Tata Motors, MG Motors, Hyundai, and Mahindra have introduced various electric models in India, including compact cars, SUVs, and two-wheelers. These models cater to different consumer segments in terms of pricing, performance, and features.

The role of auto companies extends beyond product offerings. Through effective marketing campaigns, awareness programs, and after-sales support, they can influence consumer behavior. Test drive campaigns, experiential centers, and promotional schemes help build trust and reduce misconceptions about EVs.

Moreover, innovation in battery technology, safety features, and vehicle design has improved the attractiveness of EVs.

Collaborations with fintech companies for easy financing, and tieups with power distribution companies for charging infrastructure, further enhance the consumer experience.

#### : Socio-Cultural and Psychological Factors

Consumer behavior is not solely driven by economics or technology but also influenced by social and psychological factors. In Delhi, owning a vehicle is often associated with social status. Early adopters of EVs may perceive themselves as environmentally conscious, progressive, and tech-savvy.

However, widespread adoption requires a cultural shift. Concerns about reliability, social acceptance, and fear of the unknown continue to hinder mass uptake. Peer influence, word-of-mouth experiences, and media narratives play crucial roles in shaping opinions.

Educational institutions and community-level outreach programs can help create positive perceptions. Incentivizing first-time users and enabling community demonstration projects may boost confidence. Understanding these factors helps design targeted awareness campaigns that resonate with different consumer groups.

#### :Global Trends and Lessons for Delhi

Globally, cities like Oslo, Amsterdam, and San Francisco have achieved substantial EV penetration through a mix of strong incentives, dense charging infrastructure, and public awareness. In Norway, over 70% of new car sales are electric, supported by free parking, toll exemptions, and a nationwide charging network.

Delhi can draw lessons from such models. Key takeaways include:

- Prioritizing EV infrastructure development ahead of demand.
- Setting clear EV targets and timelines.
- Encouraging domestic EV production and innovation.
- Leveraging renewable energy for charging stations.

By contextualizing global best practices to local realities, Delhi can leapfrog many challenges and position itself as a leader in India's clean mobility revolution.

Summary of Key Findings and Strategic Roadmap

This extended study has identified several critical insights:

- High awareness but moderate conversion to actual EV purchases.
- Positive consumer sentiment towards environmental benefits.
- Challenges include cost, charging availability, and technical concerns.
- Influence of government policy, auto companies, and social factors.
- Importance of infrastructure, innovation, and cultural acceptance.

A strategic roadmap for Delhi should include:

- Strengthening EV infrastructure across the city.
- Enhancing policy execution and transparency.
- Supporting R&D for affordable and durable EVs.
- Encouraging inclusive EV financing and ownership models.
- Promoting community engagement and education on clean mobility.

With coordinated efforts from all stakeholders—government, industry, and consumers—Delhi can pave the way for a cleaner, smarter, and more sustainable transportation future.

#### : Conclusion

Delhi has strong potential for electric vehicle adoption. While consumer interest is evident, there are tangible barriers related to cost, infrastructure, and awareness. With the right mix of incentives, awareness programs, and infrastructure development.0020

Delhi can emerge as a leader in India's electric mobility revolution. Understanding consumer performance feedback is essential to refine future EV offerings and policy support.

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