

Contemporary Determinants of Consumer Behavior Towards Electric Vehicles in India: Integrating Awareness, Value Perceptions, and Barriers

Mr. Bharath T. S.¹, Dr. U. Bhojanna²

¹ Research Scholar, Department of MBA & Research Centre, RNS Institute of Technology, Channasandra, Bengaluru – 560098, Karnataka, India; Assistant Professor, SJBIT, Bengaluru, Karnataka, India.

² Professor and Dean, Department of MBA & Research Centre, RNS Institute of Technology, Channasandra, Bengaluru – 560098, Karnataka, India.

Corresponding Author

Mr. Bharath T. S.

Email: Not provided...

ABSTRACT

Electric vehicles (EVs) are viewed as key enablers of sustainable transportation in emerging economies. Despite technological advances and policy incentives, EV adoption in India remains below expectations. This research analyzes consumer behavior towards EVs, focusing on the roles of awareness, perceived value, and adoption barriers. A structured survey of 312 urban automobile consumers was analyzed using Partial Least Squares Structural Equation Modeling (PLS-SEM). Findings indicate that awareness and perceived value strongly predict purchase intention, while infrastructural and financial barriers persist as major deterrents. Implications for policymakers, marketers, and manufacturers are discussed, along with recommendations for future research....

Keywords: Electric vehicles, consumer behavior, India, perceived value, adoption barriers, PLS-SEM...

INTRODUCTION

India's pursuit of electrifying its transport sector is central to national goals for reducing emissions, improving air quality, and fulfilling global climate commitments. While government policies, technological innovation, and increased urbanization have driven some progress, electric vehicle (EV) adoption rates remain modest compared to policy ambitions and international benchmarks (Mehta & Rao, 2024). Understanding the factors influencing consumer decisions is now critical for bridging this gap.

Recent studies highlight that consumer awareness, perceived value—including both economic and environmental benefits—and persistent adoption barriers are all pivotal in shaping EV market growth (Gupta & Shah, 2023; Saxena & Banerjee, 2024). Additionally, the rise of digital media and social networks has transformed both the spread of information and the formation of social norms related to EVs, making the landscape more dynamic and complex (Banerjee et al., 2024). This research seeks to provide a nuanced, evidence-based understanding of these drivers and barriers in the context of urban India, integrating the most recent literature and empirical methods.

Literature Review

Recent research (2022–2024) has deepened understanding of the following core drivers of EV adoption:

Awareness: Digital campaigns, social networks, and influencer marketing have increased EV awareness,

though knowledge gaps and misinformation persist (Singh & Patel, 2024).

Perceived Value: Consumers increasingly weigh long-term savings, environmental benefits, and the prestige of eco-friendly ownership against higher purchase costs (Müller & Li, 2022; Saxena & Banerjee, 2022).

Adoption Barriers: Infrastructure scarcity, range anxiety, upfront costs, policy fluctuations, and after-sales service concerns remain deterrents (Mehta & Rao, 2024; Banerjee et al., 2024; Ghosh & Huang, 2023).

Integrative Perspectives: New frameworks emphasize the need to address both motivators and barriers, and the interplay of digital influence, peer effects, and policy environments (Thomas et al., 2023;).

Research Objectives

To assess the impact of consumer awareness on EV purchase intention in India.

To evaluate the role of perceived value in shaping consumer decisions.

To identify and rank the most influential barriers to EV adoption.

Hypotheses

H1: Higher consumer awareness positively influences EV purchase intention.

H2: Greater perceived value increases EV adoption likelihood.

H3: Adoption barriers negatively affect purchase intention.

Methodology

5.1 Research Design and Rationale

This study employed a quantitative, cross-sectional design to systematically investigate the factors influencing consumer intentions to adopt electric vehicles in urban India. The approach was selected for its ability to capture patterns and associations among variables across a diverse sample of potential EV buyers.

5.2 Sampling Procedure

The target population comprised urban automobile consumers residing in five major Indian cities (Delhi, Mumbai, Bengaluru, Hyderabad, and Chennai). Stratified random sampling was used to ensure representation across age groups, gender, and car ownership status. The sampling frame was constructed from recent automobile purchase databases, and participants were invited via email and social media platforms.

A total of 389 responses were collected during January–February 2025. After screening for completeness and eligibility (must be age 18+, reside in an urban area, and currently own or intend to buy a vehicle), 312 valid responses were retained for analysis.

5.3 Instrument Development

The structured questionnaire was developed based on an extensive review of both classic and recent (2022–2024) literature. The survey included:

Awareness: Items measured knowledge of EV features, policies, and environmental impact (e.g., “I am well informed about the benefits of electric vehicles”).

Perceived Value: Items captured perceptions of cost savings, environmental benefits, and social prestige.

Adoption Barriers: Respondents rated challenges such as insufficient charging stations, range concerns, high upfront costs, and trust in new technology.

Purchase Intention: Participants indicated their likelihood of purchasing an EV within the next two years.

All items were rated on a five-point Likert scale (1 = strongly disagree, 5 = strongly agree). The questionnaire was piloted with 20 respondents, and minor revisions were made for clarity.

5.4 Data Collection and Ethics

All respondents provided informed consent, and the study adhered to ethical standards for social science research (confidentiality, voluntary participation, and data security). No personally identifiable data were collected.

5.5 Data Analysis

Reliability and Validity: Internal consistency was assessed using Cronbach’s alpha (all > .80), and convergent validity was confirmed by composite reliability (> .85) and average variance extracted (AVE > .65) for all constructs.

Statistical Techniques: Partial Least Squares Structural Equation Modeling (PLS-SEM) was conducted using

SmartPLS 4. The model tested direct paths from awareness, perceived value, and barriers to purchase intention. Model fit was evaluated via R² and SRMR indices. Bootstrapping (5,000 samples) was used to estimate path significance and confidence intervals.

Robustness Checks: Subgroup analysis (by age, gender, and prior EV trial) and Harman’s single-factor test for common method bias were also performed.

6. Data Analysis & Results

Sample Profile: 54% male, 46% female; 39% aged 25–34; 62% undergraduate; 71% currently own a vehicle.

Measurement Model:

Construct	Cronbach’s Alpha	Composite Reliability	AVE
Awareness	.862	.903	.698
Perceived Value	.875	.912	.704
Adoption Barriers	.838	.889	.681
Purchase Intention	.893	.924	.752

6.1 Structural Model:

Awareness → Purchase Intention: $\beta = .33$, $t = 5.14$, $p < .01$

Perceived Value → Purchase Intention: $\beta = .41$, $t = 6.27$, $p < .01$

Barriers → Purchase Intention: $\beta = -.29$, $t = 4.72$, $p < .01$
Model R² = .52

6.2 Key Barriers:

Charging infrastructure (mean = 4.2/5)

Range anxiety (mean = 4.0/5)

Upfront cost (mean = 3.9/5)

7. Discussion

The results reaffirm recent findings that awareness—especially as shaped by digital information sources and peer influence—is a significant positive driver for EV adoption (Thomas et al., 2023). Perceived value, particularly when related to total cost of ownership and eco-status, is also instrumental in shaping intent (Müller & Li, 2022). However, classic barriers—most notably infrastructure, range, and cost—remain formidable. These insights echo and extend the conclusions of recent work on Indian and Asian EV markets (Mehta & Rao, 2024; Banerjee et al., 2024).

8. Practical Implications

Policymakers: Focus on visible public charging, stable incentives, and consumer education to reduce infrastructure and trust barriers.

Marketers: Use influencer marketing and transparent cost-benefit messaging to build awareness and value perceptions.

Manufacturers: Innovate around range, battery life, and flexible ownership models to address top barriers.

9.Limitations & Future Research

The study's urban, cross-sectional sample may limit rural generalizability and causal inference. Future research should include rural and semi-urban populations, use longitudinal designs, and further explore the role of AI-driven marketing and peer influence in the evolving EV landscape.

10.Conclusion

This research provides robust empirical evidence that consumer awareness and perceived value are pivotal in driving the intention to adopt electric vehicles in Indian cities. Yet, persistent barriers—especially around infrastructure, range, and cost—continue to impede the transition to electric mobility. Notably, digital media, government policy, and social influence are reshaping both motivators and deterrents in real time.

To mainstream EV adoption, stakeholders must deploy integrative strategies that go beyond technology and incentives, focusing equally on consumer education, behavioral nudges, and visible improvements in infrastructure. As the Indian market matures and digital influence grows, it is crucial for future research and practice to stay attuned to shifting consumer perceptions, evolving policy landscapes, and the broader context of sustainable mobility.

By systematically increasing awareness, enhancing value perceptions, and removing practical and psychological barriers, India can accelerate its transition toward cleaner, more sustainable urban transportation—benefiting industry, consumers, and the environment alike.

REFERENCES

1. Banerjee, S., Mehta, R., & Singh, P. (2024). The evolving barriers to electric vehicle adoption: Insights from Indian cities. *Energy Policy*, 182, 115–127.
2. Egbue, O., & Long, S. (2012). Barriers to widespread adoption of electric vehicles: An analysis of consumer attitudes and perceptions. *Energy Policy*, 48, 717–729.
3. Ghosh, A., & Huang, Z. (2023). Policy uncertainty and consumer trust in electric vehicle markets. *Sustainable Transportation Research*, 11, 48–59.
4. Helveston, J. P., et al. (2015). Will subsidies drive electric vehicle adoption? *Measuring*

consumer preferences in the US and China. *Transportation Research Part A*, 73, 96–112.

5. Jansson, J., et al. (2017). Exploring consumer adoption of a high involvement eco-innovation using value-belief-norm theory. *Journal of Consumer Behaviour*, 16(6), 442–453.
6. Li, J., et al. (2017). The adoption of electric vehicles: The role of government and environmental factors. *Energy Policy*, 107, 233–243.
7. Mehta, D., & Rao, V. (2024). Charging ahead: Infrastructure, range anxiety, and the Indian electric vehicle market. *International Journal of Automotive Technology and Management*, 24(2), 180–198.
8. Oliver, J. D., & Rosen, M. A. (2010). Evaluating the sustainability of electric vehicles. *Energy*, 35(12), 4913–4921.
9. Rezvani, Z., Jansson, J., & Bodin, J. (2015). Advances in consumer electric vehicle adoption research: A review and research agenda. *Transportation Research Part D*, 34, 122–136.
10. Rogers, E. M. (2003). *Diffusion of innovations* (5th ed.). Free Press.
11. Sheth, J. N., Newman, B. I., & Gross, B. L. (1991). Why we buy what we buy: A theory of consumption values. *Journal of Business Research*, 22(2), 159–170.
12. Sierczula, W., et al. (2014). The influence of financial incentives and other socio-economic factors on electric vehicle adoption. *Energy Policy*, 68, 183–194.
13. Singh, A., & Patel, K. (2024). Misinformation, digital literacy, and EV adoption: A study of urban Indian consumers. *Indian Journal of Marketing*, 54(3), 65–78.
14. Thomas, P., Narayanan, S., & Agarwal, R. (2023). Integrative models for EV adoption: Digital and policy perspectives in India. *Journal of Sustainable Transportation Management*, 18(3), 201–219.
15. Wolske, K. S., et al. (2018). Public support for policies to advance electric vehicle adoption: Insights from surveys in Canada and the U.S. *Transportation Research Part D*, 64, 163–177.
16. Zhang, X., et al. (2022). Consumer adoption of electric vehicles in China: The role of awareness, perceived value, and barriers. *Transportation Research Part A*, 155, 411–428
- ...
- .