

A Study on the Factors Influencing Purchase Intention of Battery Electric Vehicles (Bevs) in Uttar Pradesh

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Abstract:

This study examines the factors influencing the purchase intention of Battery Electric Vehicles (BEVs) in Uttar Pradesh, an emerging market for sustainable mobility. Drawing on both primary and secondary data, including a structured survey of 251 respondents across urban and rural areas, the research evaluates the impact of economic factors, environmental attitudes, product performance, charging infrastructure, marketing and government policies on consumer intent. Findings reveal that socio-demographic variables such as income and education significantly shape consumer attitudes, while subsidies, perceived cost savings and environmental awareness positively influence adoption. Product-related attributes, particularly vehicle performance and charging availability, are critical determinants of purchase intention. Although government incentives, marketing strategies and peer influence exert moderate effects, barriers such as high upfront costs, limited charging infrastructure and concerns over battery life hinder wider adoption, especially in rural areas. Urban consumers exhibit stronger adoption intent, driven by incentives, environmental concerns and fuel cost savings. The study highlights the need for supportive policies, infrastructure development and awareness initiatives to accelerate BEV adoption in India.

Keywords: Battery Electric Vehicles (BEVs), Purchase Intention, Consumer Behavior, Sustainable Transportation, Charging Infrastructure, Government Policy.

1. INTRODUCTION

1.1 Background of the Study

The early electric vehicles emerged in the late 19th century during the Second Industrial Revolution, with DC and AC electric motors being the preferred methods for motor vehicle propulsion. However, range anxiety due to limited energy storage offered by contemporary battery technologies hindered mass adoption of private electric vehicles throughout the 20th century. Electric vehicles (EVs) are now a central element in the global automotive industry, addressing environmental concerns such as air pollution, greenhouse gas emissions and non-renewable energy resource depletion. In India, the electric vehicle revolution is still in its nascent stages, but its potential for growth is immense, particularly in urban and semi-urban regions. Uttar Pradesh, India's most populous state, is uniquely positioned to both influence and benefit from the adoption of electric vehicles due to its demographic diversity, economic potential and evolving policy landscape. The Indian automotive market is transitioning from traditional vehicles to electric vehicles in response to the government's push for

environmental sustainability, energy conservation and reduced reliance on fossil fuels. However, EV adoption remains sluggish in India due to concerns regarding cost, infrastructure and consumer awareness. This Study i.e. “A study examining factors influencing the purchase intentions of battery electric vehicles in Uttar Pradesh” is critical to identify key drivers and obstacles to adoption, allowing stakeholders to tailor their strategies and policies accordingly. Understanding these factors is crucial to driving the successful integration of BEVs into the mainstream automotive market in Uttar Pradesh and India at large.

1.2 Electric Vehicle (EV)

An electric vehicle (EV) is a motor vehicle whose propulsion is powered fully or mostly by electricity. EVs encompass a wide range of transportation modes, including road and rail vehicles, electric boats and submersibles, electric aircraft and electric spacecraft. The primary types of EVs are **Battery Electric Vehicles (BEVs)**, which run solely on batteries; Plug-in Hybrid Electric Vehicles (PHEVs), which have both an electric motor and an internal combustion engine and can be plugged in; and Fuel Cell Electric Vehicles (FCEVs), which use a fuel cell to generate electricity.



Figure 1: Battery Electric Vehicle (BEVs)

1.3 Factors influencing Purchase Intention for BEVs

Consumer purchase intention for BEVs is influenced by a combination of economic, psychological, social, technological, policy-related and cultural factors. Each of these variables influences the consumers' decision-making process in the context of BEV adoption.

1. Economic Factors

- Price Sensitivity: High upfront cost vs. long-term savings on fuel and maintenance (Sharma & Verma, 2020).
- Government Incentives: Subsidies, tax rebates and road tax reductions (Dixit & Singh, 2020).
- Total Cost of Ownership (TCO): Includes charging, maintenance and battery life compared with conventional vehicles (Rao & Sharma, 2021).

2. Psychological & Social Factors

- Environmental Awareness: Growing concern for sustainability and reducing carbon footprint (Nayak & Choudhury, 2021).
- Social Influence: Peer pressure, trends, word-of-mouth and family recommendations (Singh & Mehta, 2021).
- Perceived Status: EV ownership symbolizes innovation, modernity and prestige, especially for higher-income groups (Mishra & Pradhan, 2021).

3. Technological Factors

- Battery Life & Performance: Range anxiety and charging speed remain critical (Bansal & Kumar, 2021).

- Charging Infrastructure: Accessibility of charging points strongly affects adoption (Gupta & Jain, 2022).
 - Technological Trust: Awareness about EV technology, battery durability and maintenance boosts confidence (Rao & Sharma, 2021).
- 4. Government Policies & Regulations**
- Subsidies & Incentives: Reduce financial burden and promote adoption (Dixit & Singh, 2020).
 - Regulations & Standards: Emission norms and incentives for EV manufacturing support market growth (Bansal & Kumar, 2021).
 - Awareness Campaigns: Clear communication about benefits and available subsidies improves consumer confidence (Rao & Sharma, 2021).
- 5. Cultural & Regional Factors**
- Regional Disparities: Urban centers (e.g., Lucknow, Noida) are more EV-friendly than rural areas due to income and infrastructure differences (Singh & Mehta, 2021).
 - Cultural Perceptions: Urban consumers embrace new technology faster, while rural populations show more traditional, cautious behavior (Nayak & Choudhury, 2021).

2. REVIEW OF LITERATURE

2.1 Economic Factors in EV Purchase Intention

High upfront cost is a major barrier to EV adoption in India (Pundir & Rathi, 2020). Despite fuel and maintenance savings, higher prices than conventional vehicles deter consumers. In a price-sensitive market, affordability is vital. Incentives such as subsidies, tax rebates and road tax exemptions help reduce this barrier (Gupta & Jain, 2022).

2.2 Consumer Awareness and Perceptions

Awareness and perceptions strongly affect EV purchase intentions. While knowledge of environmental benefits is growing, uncertainty about technology persists (Bansal & Kumar, 2021). Limited understanding of battery life, charging and long-term cost-effectiveness, especially in semi-urban and rural areas, hinders adoption (Mishra & Pradhan, 2021).

2.3 Charging Infrastructure and Range Anxiety

Limited charging facilities cause “range anxiety” among potential buyers (Nayak & Choudhury, 2021). Expanding accessible charging networks can reduce this fear and boost adoption. Improved infrastructure is essential for consumer confidence (Fang & Wang, 2020).

2.4 Government Policies and Subsidies

Policies and subsidies play a central role in promoting EV adoption. The FAME scheme provides financial support to consumers and manufacturers (Dixit & Singh, 2020). While subsidies and tax exemptions ease purchase costs, inconsistent implementation in rural and semi-urban areas weakens effectiveness.

2.5 Environmental and Social Motivations

Environmental concerns such as air pollution and climate change drive adoption, particularly in urban centers like Lucknow and Noida (Singh & Mehta, 2021). Social influence, including peer norms and visibility of EVs, encourages sustainable consumer behavior (Rao & Sharma, 2021).

2.6 Technological Innovations and Trust

Advances in batteries, charging speed and performance enhance consumer perceptions (Saluja & Yadav, 2020). However, doubts about reliability remain. Building trust through consumer education on EV technology and battery longevity is critical (Kumar & Singh, 2021; Fang & Wang, 2020).

3. RESEARCH METHODOLOGY

3.1 Research Objectives

- To assess the impact of economic factors on consumer purchase intentions for EVs.
- To examine how environmental awareness and sustainability attitudes shape BEV perceptions and intentions.
- To analyze the influence of product factors (performance, range, charging, technology) on BEV purchase decisions.
- To investigate the effect of government policies (tax benefits, subsidies, infrastructure) on BEV adoption.

3.2 Research Design

This study adopts a descriptive research design to analyze consumer purchase intentions toward BEVs and the relationship between economic, social, environmental and technological factors.

3.3 Sampling Technique

A stratified random sampling method was used to represent urban, semi-urban and rural regions of Uttar Pradesh. The final sample included 251 respondents from diverse age, gender, income, residence and education groups.

3.4 Data Collection Methods

- Primary Data: Structured questionnaire with closed- and open-ended questions on factors influencing BEV purchase intentions.
- Secondary Data: Literature, government reports, industry publications and market studies on India's EV sector, especially Uttar Pradesh.

3.5 Data Analysis Techniques

Descriptive statistics (frequency, percentage, mean/weighted average) were used to summarize responses and present sample characteristics.

3.6 Reliability and Validity

- Reliability: Pilot testing showed Cronbach's Alpha values between 0.71–0.84, indicating acceptable to high reliability.
- Validity: Expert consultation ensured content validity and accurate measurement of BEV adoption factors.

4. ANALYSIS AND INTERPRETATION OF DATA

A: Demographic Data:

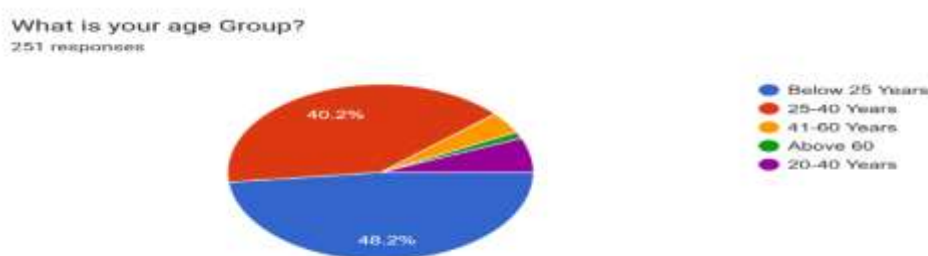


Figure no. 2: Age Group

Interpretation of Data: Young respondents below 25 years form the largest group (48.2%), followed by those aged 25–40 (40.2%). Together, below-40 groups account for 88.4% of the sample, while only 11.6% are above 40, indicating limited older-age representation.

Gender
251 responses



Figure no. 3: Gender

Interpretation of Data: Male respondents form 63.7% of the sample, females 36.3%, showing a male-majority but fairly balanced survey. No transgender representation was recorded.

What is your highest level of education?
251 responses



Figure no. 4: Education Level

Interpretation of Data: Postgraduates form the largest group (42.6%), followed by Graduates (19.9%) and Undergraduates (18.3%), reflecting a well-educated sample. Doctorate/Professional degree holders account for 17.5%, while only 1.6% are High School or below.

What is your monthly Income Level?
251 responses

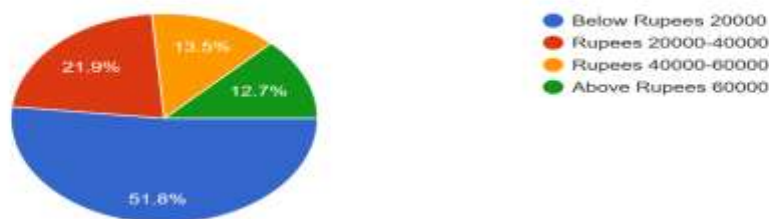


Figure no. 5: Monthly Income

Interpretation of Data: Over half of respondents (51.8%) earn below ₹20,000/month, 35.4% fall in the ₹20,000–60,000 range, while only 12.7% earn above ₹60,000, showing limited high-income representation.

Where do you Reside?
250 responses



Figure no. 6: Residential Status

Interpretation of Data: Urban residents form the majority (54.4%), while semi-urban (23.6%) and rural (22%) together account for 45.8%, ensuring balanced urban–non-urban representation.

B: Factors Influencing the Purchase Intention of Battery Electric Vehicles (BEVs)

Table no. 1: Respondent's Interest in Battery Electric Vehicle

Research Question	Scooter/Bike	Electric Car
Which Battery Electric Vehicle are you interested in?	50.6% i.e.127 out of 251 Respondents	49.4% i.e.124 out of 251 Respondents

Interpretation of Data: The Mean number of respondents interested in either scooters or cars is 125.5(251/2), with 1-2 respondents being the average deviation from this mean. The interest is almost evenly split between scooters and cars, indicating a balanced demand for both forms of electric mobility in Uttar Pradesh.

Table no. 2: Affordability of Battery Electric Vehicles

Research Question	Very Important	Important	Neutral	Not Important
How important is the affordability of Battery electric vehicles to you?	(39%) i.e. 98 out of 251 Respondents	(40.2%) i.e.101 out of 251 Respondents	(19.5%) i.e. 49 out of 251 Respondents	(1.2%) i.e. 3 out of 251 Respondents

Weighted Mean Score Analysis: - We can assign weights:

Very Important = 4, Important = 3, Neutral = 2 and Not Important = 1

Weighted Mean= $(98 \times 4) + (101 \times 3) + (49 \times 2) + (3 \times 1) / 251$

= $796 / 251 = 3.17$

Interpretation: The weighted mean (3.17 out of 4) shows that respondents, on average, consider affordability “Important to Very Important.”

Table no. 3: Awareness of Government Incentives/Subsidies

Research Question	Yes, fully aware	Somewhat aware	Not aware
Are you Aware of Government Incentives/subsidies for purchasing Battery electronic vehicles?	(38.6%) i.e. 97 out of 251 Respondents	(49.8%) i.e. 125 out of 251 Respondents	(11.6%) i.e. 29 out of 251 Respondents

Interpretation of Data: The majority of respondents (88.4%) are at least somewhat aware of government incentives/subsidies for purchasing Battery electronic vehicles (49.8% somewhat aware + 38.6% fully aware). This analysis highlights a positive trend toward awareness of government incentives/subsidies. A smaller portion (11.6%) remains unaware, suggesting that there might be an opportunity for better outreach or education regarding these incentives.

Table no. 4: Long-term Savings in Fuel and Maintenance Cost

Research Question	Yes, significantly	Somewhat	Not at all
Do you think the long-term savings in fuel and maintenance cost make Battery electric vehicles more attractive?	(75.3%) i.e. 189 out of 251 respondents	(22.3%) i.e. 56 out of 251 respondents	(2.4%) i.e. 6 out of 251 respondents

Weighted Mean Score Analysis: - Assign weights as:

Yes, significantly = 3, Somewhat = 2 and Not at all = 1

$$\text{Weighted Mean} = (189 \times 3) + (56 \times 2) + (6 \times 1) / 251$$

$$= 685 / 251 = 2.73$$

Interpretation: On a 3-point scale, the mean score of 2.73 is very close to 3, indicating that respondents overwhelmingly agree that long-term savings make BEVs more attractive.

Table no. 5: Importance of Environmental Benefits in the Purchase Decisions

Research Question	Very Important	Important	Neutral	Not Important
How Important are the environmental benefits (reduced carbon footprint) in your decision to purchase a battery electric vehicle?	(53.8%) 135 out of 251 respondents	(37.8%) 95 out of 251 respondents	(7.2%) 18 out of 251 respondents	(1.2%) 3 out of 251 respondents

Weighted Mean Score Analysis: - Assign weights as:

Very Important = 4, Important = 3, Neutral = 2 and Not Important = 1

$$\text{Weighted Mean} = (135 \times 4) + (95 \times 3) + (18 \times 2) + (3 \times 1) / 251$$

$$= 864 / 251 = 3.44$$

Interpretation: With a weighted mean of 3.44 out of 4, environmental benefits are rated closer to “Very Important” than “Important.”

Table no. 6: Contribution of BEVs in reducing Air Pollution in City/Districts

Research Question	Strongly agree	Agree	Neutral	Disagree
Do you believe that battery electric vehicles contribute to reducing air pollution in your district/city/town?	(51.4%) 129 out of 251 respondents	(41%) 103 out of 251 respondents	(6%) 15 out of 251 respondents	(1.6%) 4 out of 251 respondents

Weighted Mean Score Analysis: - Assign weights as:

Strongly Agree = 4, Agree = 3, Neutral = 2 and Disagree = 1

$$\text{Weighted Mean} = (129 \times 4) + (103 \times 3) + (15 \times 2) + (4 \times 1) / 251$$

$$= 859 / 251 = 3.42$$

Interpretation: With a mean of 3.42 out of 4, respondents lean strongly towards agreement that BEVs reduce air pollution.

Table no. 7: Concern about Range (how far it can travel on a single charge) of EVs

Research Question	Very Concerned	Somewhat Concerned	Neutral	Not Concerned
How concerned are you about the range of a battery electric vehicle (how far it can travel on a single charge)?	(53.4%) 134 out of 251 respondents	(31.9%) 80 out of 251 respondents	(13.5%) 34 out of 251 respondents	(1.2%) 3 out of 251 respondents

Weighted Mean Score Analysis: - Assign weights as:

Very Concerned = 4, Somewhat Concerned = 3, Neutral = 2 and Not Concerned = 1

Weighted Mean = $(134 \times 4) + (80 \times 3) + (34 \times 2) + (3 \times 1) / 251$

= $847 / 251 = 3.37$

Interpretation: The weighted mean score of **3.37 out of 4** indicates that respondents are, on average, between “Somewhat Concerned” and “Very Concerned”, leaning closer to Very Concerned.

Table no. 8: Importance of Charging Infrastructure in BEV Purchase Decision

Research Question	Very Important	Important	Neutral	Not Important
How important is the availability of charging infrastructure in your decision to buy an battery electric vehicle?	(60.2%) 151 out of 251 respondents	(31.9%) 80 out of 251 respondents	(7.2%) 18 out of 251 respondents	(0.8%) 2 out of 251 respondents

Weighted Mean Score Analysis: - Assign weights as:

Very Important = 4, Important = 3, Neutral = 2 and Not Important = 1

= $(151 \times 4) + (80 \times 3) + (18 \times 2) + (2 \times 1) / 251$

= $882 / 251 = 3.51$

Interpretation: The weighted mean score of **3.51 out of 4** indicates respondents view charging infrastructure as closer to “Very Important.”

Table no. 9: Satisfaction Level with Current Technological Advancements in BEVs

Research Question	Very Satisfied	Satisfied	Neutral	Dissatisfied
How satisfied are you with the current technological advancements in battery electric vehicles (e.g., battery life, fast charging)?	(18.7%) i.e. 47 out of 251 respondents	(53%) i.e. 133 out of 251 respondents	(21.9%) i.e. 55 out of 251 respondents	(6.4%) i.e. 16 out of 251 respondents

Weighted Mean Score Analysis: - Assign weights:

Very Satisfied = 4, Satisfied = 3, Neutral = 2 and Dissatisfied = 1

= $713 / 251 = 2.84$

Interpretation: The weighted mean score of **2.84 out of 4** indicates that respondents lean towards being “Satisfied,” though not strongly.

Table no. 10: Importance of Advertisement in Rendering Useful Information

Research Question	Very Effective	Effective	Neutral	Ineffective
Do you find advertisements for battery electric vehicles effective in providing useful information?	(23.9%) i.e. 60 out of 251 respondents	(57%) i.e. 143 out of 251 respondents	(15.1%) i.e. 38 out of 251 respondents	(4%) i.e. 10 out of 251 respondents

Weighted Mean Score Analysis: - Assign weights as:

Very Effective = 4, Effective = 3, Neutral = 2 and Ineffective = 1

Weighted Mean= $(60 \times 4) + (143 \times 3) + (38 \times 2) + (10 \times 1) / 251$

= $755 / 251 = 3.01$

Interpretation: The weighted mean score of **3.01 out of 4** indicates that respondents, on average, consider BEV advertisements to be “Effective” in providing useful information.

Table no.11: Influence of BEVs Brand Reputation in the Purchase Intention

Research Question	Strongly Influence	Somewhat Influences	Neutral	Does Not Influence
How much does the brand reputation of a battery electric vehicle manufacturer influence your purchase intention?	(46.2%) 116 out of 251 respondents	(42.2%) 106 out of 251 respondents	(10.8%) 27 out of 251 respondents	(0.8%) 2 out of 251 respondents

Weighted Mean Score Analysis: - Assign weights as:

Strongly Influence = 4, Somewhat Influence = 3, Neutral = 2 and Does Not Influence = 1

Weighted Mean= $(116 \times 4) + (106 \times 3) + (27 \times 2) + (2 \times 1) / 251$

= $838 / 251 = 3.34$

Interpretation: Weighted mean of **3.34 out of 4** shows that brand reputation has a strong influence on EV purchase intention.

Table no. 12: Importance of Accurate and Transparent Information Availability about BEVs in Purchase Decision

Research Question	Strongly Agree	Agree	Neutral	Disagree
Do you think the availability of accurate and transparent information about battery electric vehicles is important for making a purchase decision?	(50.2%) 126 out of 251 respondents	(43%) 108 out of 251 respondents	(6.4%) 16 out of 251 respondents	(0.4%) 1 out of 251 respondents

Weighted Mean Score Analysis: - Assign weights as:

Strongly Agree = 4, Agree = 3, Neutral = 2 and Disagree = 1

Weighted Mean= $(126 \times 4) + (108 \times 3) + (16 \times 2) + (1 \times 1) / 251$

= $861 / 251 = 3.43$

Interpretation: Weighted mean of **3.43 out of 4** indicates that accurate and transparent information is perceived as highly important in BEV purchase decisions.

Table no.13: Awareness of Tax benefits or Rebates offered by Govt. on BEVs Purchase

Research Question	Yes, Fully Aware	Somewhat Aware	Not aware
Are you aware of any tax benefits or rebates offered by the government for purchasing battery electric vehicles?	(45.8%) 115 out of 251 respondents	(38.2%) 96 out of 251 respondents	(15.9%) 40 out of 251 respondents

Weighted Mean Score Analysis: - Assign weights as:

Fully Aware = 3, Somewhat Aware = 2 and Not Aware = 1

Weighted Mean= $(115 \times 3) + (96 \times 2) + (40 \times 1) / 251$

= $577/251 = 2.30$

Interpretation: Weighted mean 2.30 out of 3 suggests respondents are between somewhat aware and fully aware, leaning closer to the higher side.

Table no. 14: Influence of Govt. Policies (subsidies, tax rebates etc.) in BEV Buying Decision

Research Question	Very important	Important	Neutral	Not Important
How important are government policies (e.g., subsidies, tax rebates) in influencing your decision to buy a battery electric vehicle?	(41.8%) i.e. 105 out of 251 respondents	(45%) i.e. 113 out of 251 respondents	(12.4%) i.e. 31 out of 251 respondents	(0.8%) i.e. 2 out of 251 respondents

Weighted Mean Score Analysis: - Assign weights as:

Very Important = 4, Important = 3, Neutral = 2 and Not Important = 1

Weighted Mean= $(105 \times 4) + (113 \times 3) + (31 \times 2) + (2 \times 1) / 251$

= $823/251 = 3.28$

Interpretation: Weighted mean 3.28 out of 4, which is between Important and Very Important, closer to the higher side.

Table no. 15: Likelihood of BEV Purchase based on Recommendation of Friends & Family

Research Question	Very Likely	Likely	Neutral	Unlikely
How likely are you to purchase a battery electric vehicle based on recommendations from friends and family?	(27.8%) i.e. 72 out of 251 respondents	(53.4%) i.e. 134 out of 251 respondents	(14.7%) i.e. 37 out of 251 respondents	(0.8%) i.e. 2 out of 251 respondents

Weighted Mean Score Analysis: - Assign weights as:

Very Likely = 4, Likely = 3, Neutral = 2 and Unlikely = 1

Weighted Mean= $(72 \times 4) + (134 \times 3) + (37 \times 2) + (2 \times 1) / 251$

= $766/251 = 3.05$

Interpretation: Weighted mean = 3.05/4, leaning toward Likely, showing that peer (friends & family) influence plays a positive and moderate role.

Table no. 16: Growing Trends of BEVs among the Peers and BEV Purchase Decision

Research Question	Strongly Agree	Agree	Neutral	Disagree
Do you think the growing trend of battery electric vehicles among your peers influences your decision?	(25.1%) i.e. 63 out of 251 respondents	(55.8%) i.e. 140 out of 251 respondents	(14.3%) i.e. 36 out of 251 respondents	(4.8%) i.e. 12 out of 251 respondents

Weighted Mean Score Analysis: - Assign weights as:

Strongly Influence = 4, Somewhat Influence = 3, Neutral = 2 and Does Not Influence = 1

Weighted Mean= $(63 \times 4) + (140 \times 3) + (36 \times 2) + (12 \times 1) / 251$

=756/251=3.01

Interpretation: Weighted mean = **3.01/4**, leaning towards “Somewhat Influence,” showing moderate peer effect on purchase Decision.

Table no. 17: Barriers to Purchase a BEV

Research Question: What is the biggest barrier to purchase a Battery electric vehicle for you?	Percentages of Different Respondents
1. High purchase price	(47.2%) i.e.118 out of 251 Respondents
2. Insufficient Government Incentives	(18%) i.e. 45 out of 251 Respondents
3. Limited EV Model/Variety	(34.8%) i.e. 87 out of 251 Respondents
4. Concerns about performance (range, speed etc.)	(52%) i.e. 130 out of 251 Respondents
5. Lack of charging infrastructure	(51.2%) i.e. 128 out of 251 Respondents
6. Malfunctioning of e-vehicles, dangers and physical and Financial Losses	(25.6%) i.e. 64 out of 251 Respondents
7. There is high risk in using electronic vehicles	(15.2%) i.e. 38 out of 251 Respondents
8. High cost of Battery replacement	(4.8%) i.e. 12 out of 251 Respondents
9. Low Quality Electric Scooter	(8%) i.e. 20 out of 251 Respondents
10. Carbon emissions also occur in battery manufacturing, so the environment is also not free from zero carbon emissions.	(1.6%) i.e. 4 out of 251 Respondents
11. Other	(6.8%) i.e. 17 out of 251 Respondents

Interpretation of Data:

The **top 3 barriers** are **performance concerns (52%)**, **lack of charging infrastructure (51.2%)** and **high purchase price (47.2%)**, indicating that technical and financial constraints dominate consumer

hesitation.

5. FINDINGS, RECOMMENDATIONS AND CONCLUSIONS

5.1 FINDINGS

1. Interest in BEV Type (Table 1): Interest is evenly split between electric scooters (50.6%) and cars (49.4%), indicating balanced demand.
2. Affordability (Table 2): With a weighted mean of 3.17/4, affordability is considered important to very important, confirming price sensitivity.
3. Awareness of Govt. Subsidies (Table 3): Majority (88.4%) are aware at least to some extent, reflecting positive policy visibility.
4. Long-Term Savings (Table 4): Weighted mean 2.73/3 shows respondents strongly believe EVs offer significant cost savings in the long run.
5. Environmental Benefits (Table 5): Weighted mean 3.44/4 highlights that reducing carbon footprint is a very important purchase driver.
6. Air Pollution Reduction (Table 6): Weighted mean 3.42/4 indicates strong agreement that EVs help reduce city/district air pollution.
7. Range Concern (Table 7): Weighted mean 3.37/4 shows respondents are significantly concerned about driving range, confirming “range anxiety.”
8. Charging Infrastructure (Table 8): Weighted mean 3.51/4 suggests charging availability is among the most critical purchase factors.
9. Technology Satisfaction (Table 9): Weighted mean 2.84/4 indicates respondents are moderately satisfied with EV technology but expect improvements.
10. Advertisement Effectiveness (Table 10): Weighted mean 3.01/4 shows advertisements are considered moderately effective in spreading awareness.
11. Brand Reputation (Table 11): Weighted mean 3.34/4 reflects strong influence of brand image in shaping purchase decisions.
12. Information Transparency (Table 12): Weighted mean 3.43/4 indicates buyers place high importance on accurate and transparent EV information.
13. Tax Benefits Awareness (Table 13): Weighted mean 2.30/3 suggests respondents are fairly aware, leaning toward fully aware.
14. Government Policy Importance (Table 14): Weighted mean 3.28/4 confirms policies (subsidies, rebates) are highly influential in purchase intention.
15. Friends & Family Recommendations (Table 15): Weighted mean 3.05/4 indicates peer influence is moderately positive in EV purchase decisions.
16. Peer Trends (Table 16): Weighted mean 3.01/4 shows peer adoption moderately influences purchase intentions.
17. Barriers to BEV Purchase (Table 17):
 - Top 3 barriers: Performance concerns (52%), charging infrastructure (51.2%) and high purchase price (47.2%).
 - Moderate barriers: Limited variety (34.8%), malfunction risk (25.6%).
 - Minor barriers: Insufficient incentives (18%), high risk perception (15.2%), poor scooter quality (8%), battery replacement cost (4.8%) and environmental doubts about batteries (1.6%).

5.2 RECOMMENDATIONS

5.2.1 For Marketers

1. **Price-Value Communication:** Since affordability and high purchase price are major concerns, marketers should highlight long-term cost savings, fuel savings and maintenance benefits of BEVs in advertisements.
2. **Address Range Anxiety:** Campaigns must emphasize improved battery range, charging speed and reliability to reduce performance concerns.
3. **Transparent Communication:** Given the importance of information accuracy (mean = 3.43/4), marketers should use transparent advertising with detailed specifications, real-world mileage and warranty details.
4. **Brand Reputation:** Since brand image strongly influences purchase intention (mean = 3.34/4), companies must invest in trust-building strategies such as quality certifications, customer testimonials and after-sales support.
5. **Leverage Social Influence:** Since family and peers moderately affect BEV adoption, referral programs and word-of-mouth campaigns can be promoted.

5.2.2 For Policymakers

1. **Strengthen Subsidies & Tax Benefits:** Since 41.8% consider policies very important, enhanced subsidies, GST reduction and easy financing schemes should be expanded.
2. **Expand Charging Infrastructure:** With 51.2% highlighting it as a barrier, policymakers must set up fast-charging stations in urban and rural areas through PPP (Public–Private Partnerships).
3. **Awareness Campaigns:** Although awareness of incentives is fairly high, more localized campaigns in regional languages are required to reach rural and semi-urban consumers.
4. **Battery Recycling Policies:** As some respondents (1.6%) expressed concern about emissions from battery manufacturing, policies for eco-friendly recycling and disposal should be enforced.

5.2.3 For Manufacturers

1. **Affordable Models:** Introduce low-cost BEV models for middle-income groups, as over 50% of respondents earn below ₹20,000/month.
2. **Battery Innovation:** Focus on longer battery life, faster charging and cost-effective replacements to address concerns about range and high replacement cost.
3. **Variety Expansion:** Since 34.8% feel limited by model choices, manufacturers should diversify EV models—scooters, hatchbacks, SUVs and commercial vehicles.
4. **Quality Assurance:** To overcome doubts about malfunction (25.6%) and low-quality scooters (8%), stricter quality checks, extended warranties and safety certifications should be implemented.
5. **Localized Service Centers:** Establish regional BEV service and repair centers to build trust in after-sales support.

5.2.4 For Consumers

1. **Awareness of Benefits:** Consumers should recognize the lifetime cost advantage of BEVs despite higher upfront prices.
2. **Government Incentive Utilization:** Fully utilize available tax rebates, subsidies and incentive schemes to reduce purchase burden.
3. **Adopt Responsible Usage:** Ensure proper charging practices and battery maintenance to maximize efficiency and safety.

4. **Support Green Transition:** By adopting BEVs, consumers directly contribute to reducing urban air pollution and carbon footprint.

5.3 CONCLUSION

This study shows Consumer Perception of BEVs in Prayagraj, Lucknow, Varanasi and Mirzapur is influenced by economic, infrastructural, environmental and social factors. Affordability, charging availability and performance emerge as the most critical determinants, while growing environmental awareness and peer influence also shape purchase intentions. Government subsidies and tax benefits are recognized as supportive, yet their limited reach and visibility reduce their overall impact. High upfront costs, battery concerns and limited model choices continue to act as significant barriers.

In conclusion, BEVs hold strong potential as a sustainable mobility solution in India, but their widespread acceptance depends on affordability, technological advancements, reliable infrastructure and transparent policy implementation. A coordinated effort by policymakers, manufacturers and consumers is essential to accelerate adoption, reduce environmental burdens and foster sustainable growth in the mobility sector.

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