IJRAR.ORG E-ISSN: 2348-1269, P-ISSN: 2349-5138

INTERNATIONAL JOURNAL OF RESEARCH AND ANALYTICAL REVIEWS (IJRAR) | IJRAR.ORG

An International Open Access, Peer-reviewed, Refereed Journal

Study on Consumer Attitudes and its Impact on Electric Vehicle Adoption in India

Author 1: Suyash Shrivastav

Affiliation: Christ (deemed to be university) Delhi NCR

Author 2: Dr. Abhinav Priyadarshi Tripathi

Affiliation: Christ (deemed to be university)

Associate Professor

ABSTRACT

This research paper explores consumer attitudes and their impact on electric vehicle (EV) adoption in India. Despite the global trend toward environmentally friendly transportation, there is a significant gap in understanding the specific factors influencing EV adoption in the Indian market. Through a comprehensive study, this research investigates the nuances of consumer attitudes, the significance of various features in EV consideration, the perceived image of EV brands, major adoption challenges, the role of government incentives, and consumer optimism about the future of EVs in India.

The study reviews existing literature on consumer behavior, government policies, and challenges hindering EV adoption. It identifies key variables shaping consumer attitudes, such as perceived benefits, driving range, charging infrastructure availability, and socio-demographic factors. Government policies and incentives, including the Faster Adoption and Manufacturing of Hybrid and Electric Vehicles (FAME) scheme, are crucial in promoting EV adoption but face challenges like policy inconsistency and inadequate infrastructure.

To address these issues, the research utilizes a mixed-methods approach, collecting primary data through questionnaires from 109 respondents and analyzing secondary data. The findings highlight key demographic trends among respondents and identify primary barriers to EV adoption, including a lack of charging infrastructure, limited driving range, and high upfront costs.

As per the study's findings, although there is a growing interest in EVs among Indian consumers, several barriers hinder widespread adoption. It emphasizes the importance of government policies, infrastructure development, and public awareness campaigns in promoting EV adoption. By addressing these barriers and leveraging government incentives, India can accelerate the adoption of EVs and move towards a greener, more sustainable transportation system.

1. INTRODUCTION

The global shift towards sustainable transportation solutions has propelled the increasing popularity of electric vehicles (EVs) across the world. However, despite this momentum, there remains a significant gap in understanding consumer attitudes and their influence on EV adoption in the Indian market. While factors such as government incentives, environmental concerns, and technological advancements are acknowledged as pivotal in shaping consumer decisions globally, the nuances of preferences and challenges specific to the Indian context have yet to be extensively explored.

This research paper addresses the pressing need for a comprehensive study to delve into the intricacies of consumer attitudes towards EV adoption in India. By investigating the factors influencing these attitudes, assessing the significance of various features in EV consideration, evaluating the perceived image of EV brands, identifying major challenges hindering adoption, examining the role of government incentives, and gauging consumer optimism about the future of Electric vehicles in India, this study aims to fill the existing gap in research.

Understanding consumer attitudes towards EV adoption in India is crucial for policymakers, manufacturers, and stakeholders alike. Conclusions drawn from this research will inform the formulation of effective strategies aimed at promoting sustainable transportation solutions and accelerating EV adoption in the Indian market. By addressing these critical issues, this research endeavors to contribute to the ongoing discourse on sustainable mobility and pave the way for a greener, more sustainable future in India and beyond.

2. LITERATURE REVIEW

The global automotive industry is undergoing a significant transformation, with electric vehicles (EVs) emerging as a pivotal solution to address environmental concerns and reduce reliance on conventional fossil fuels. As nations strive to achieve sustainable mobility, research on EV adoption has explored numerous factors influencing consumer behavior, the impact of government policies, and the challenges hindering widespread acceptance.

2.1 Consumer Behavior and Attitudes Towards Electric Vehicles:

Research has revealed various important variables shaping consumer attitudes and purchase intentions towards EVs. Perceived benefits such as environmental friendliness, fuel cost savings, and reduced reliance on fossil fuels have consistently emerged as significant drivers of EV adoption (Li et al., 2019; Park and Yoo, 2019). Additionally, factors such as driving range, charging infrastructure availability, and perceived vehicle performance have been found to influence consumer preferences (Sierzchula et al., 2014; Axsen et al., 2018). Furthermore, socio-demographic variables such as income, education level, and urban-rural divide have been shown to impact EV adoption decisions, highlighting the need for targeted marketing and policy interventions (Franke et al., 2012; Park and Yoo, 2019).

2.2 Government Policies and Incentives:

The role of government policies and incentives in promoting EV adoption cannot be overstated. Subsidies, tax incentives, and regulatory measures have been instrumental in stimulating demand for EVs and supporting industry growth. In India, initiatives such as the Faster Adoption and Manufacturing of Hybrid and Electric Vehicles (FAME) scheme provide financial incentives to manufacturers and buyers, aiming to accelerate the transition towards electric mobility (Garg et al., 2020). However, challenges such as policy inconsistency, inadequate infrastructure, and limited public awareness remain significant barriers to effective policy implementation (Blythe et al., 2020; Sovacool et al., 2021).

2.3 Challenges and Barriers to Electric Vehicle Adoption:

Despite the growing interest in EVs, several challenges continue to impede widespread adoption. Range anxiety, high upfront costs, and concerns about battery life and replacement expenses are among the most commonly cited barriers (Hidrue et al., 2011; Ryan et al., 2019). Additionally, the lack of vehicle variety and the perceived inferiority of EVs in terms of performance and convenience compared to traditional combustion engine vehicles pose significant challenges to adoption (Axsen et al., 2018; Franke et al., 2012).

2.4 A Study of Consumer Perception and Purchase Intention of Electric Vehicles: Pretty Bhalla, Inass Salamah Ali, Afroze Nazneen

The choice of car is influenced by a number of factors, including infrastructural accessibility, social acceptance, technology, affordability, comfort, and trust. These claims have been put to the test for both traditional and electric vehicles. They believe that these elements directly affect each person's choice of car. It was discovered that in order to increase the social acceptance of EVs, governments and EV producers need to make greater investments in infrastructure and prioritize the use of technology to build confidence. The investigation shows that the general public is aware of the advantages for the environment. The government and manufacturers bear the task of allocating funds for the production of automobiles.

The literature review underscores the complexity of the EV adoption process, encompassing consumer behavior, government policies, and industry dynamics. By considering factors such as perceived benefits, socio-demographic variables, and policy effectiveness, this study aims to contribute to a comprehensive understanding of the factors influencing EV adoption in India. By addressing these variables, policymakers and industry stakeholders can develop targeted strategies to overcome barriers and accelerate the transition towards sustainable mobility.

3. RESEARCH PROBLEM

The rapid advancement of electric vehicles (EVs) has sparked growing interest in understanding customer acceptance and adoption, particularly in emerging markets like India. While research in industrialized countries has explored various factors influencing EV adoption, studies specific to the Indian context remain scarce. Existing literature often focuses on practical considerations such as performance features, pricing, and charging infrastructure, overlooking the importance of cultural and social factors in shaping consumer attitudes.

However, with the recent rise of electric automobiles in developing nations like India, researchers have begun to investigate EVs. Nevertheless, electric vehicle research in India is still in its infancy, resulting in a paucity of information.

Most previous studies have concentrated on variables influencing consumers' decisions to acquire electric vehicles, such as performance features, pricing, charging infrastructure, and government legislation, rather than on the usefulness of electric vehicles or the environment. Little research has looked at the elements from a cultural or social standpoint. Face consumption, for example, is a common Indian consumer behavior, as Indian culture is among the most social in the globe. In fact, research on electric vehicles is insufficient to identify the determinants of electric vehicle purchasing willingness in India.

The aim of this research is to examine the variables that impact the inclination of Indian consumers to purchase electric cars. This study looks at things including the range of electric cars, the infrastructure for charging them, the cost of purchase, financial incentives offered by the government, personal environmental consciousness, and the perception of societal influence. The objective is to ascertain the variables that have the potential to either positively or negatively impact Indian consumers' inclination to purchase electric vehicles and, consequently, to understand how these variables influence Indian consumers' perceptions of electric vehicles.

4. SIGNIFICANCE OF THE STUDY:

4.1 Policy Implications: The findings will inform policymakers on effective strategies to promote electric vehicle adoption, aligning with India's commitment to sustainable transportation (Blythe et al., 2020).

4.2 Industry Insights: Manufacturers can use insights to tailor product offerings and marketing strategies, enhancing market penetration and competitiveness (Li et al., 2019).

4.3 Environmental Impact: Increased electric vehicle adoption contributes to reducing carbon emissions, aligning with global efforts to combat climate change (Park and Yoo, 2019).

4.4 Academic Contribution: The study advances understanding of electric vehicle adoption in emerging markets, filling a gap in literature and informing future research (Franke et al., 2012).

5. OBJECTIVE OF THE STUDY:

5.1 To comprehensively identify and analyze the multifaceted factors influencing consumer decision-making processes regarding the adoption of electric vehicles (EVs) in the Indian market, with a focus on understanding the relative importance of perceived benefits, features, challenges, and government incentives.

5.2 In order to address issues in the Indian context and encourage the adoption of electric vehicles (EVs), it is important to evaluate the efficacy and impact of current government policies and incentives, such as the Faster

Adoption and Manufacturing of Hybrid and Electric Vehicles (FAME) scheme. This will provide industry stakeholders and policymakers with important information they can use to develop targeted strategies for promoting sustainable transportation options and EV adoption in India.

6. RESEARCH METHODOLOGY

This research paper investigates the consumer attitudes towards electric vehicles (EVs) in India and the impact of these attitudes on the adoption of EVs. The study utilizes a combination of primary and secondary data sources to gather insights. Secondary data includes a comprehensive literature review of previous studies on EV adoption and consumer behavior in India. Primary data is collected through the distribution of 120 questionnaires to individuals across various demographics. A total of 109 questionnaires were fully completed and analyzed. The findings of this study provide valuable insights into the factors influencing consumer attitudes towards EVs and their willingness to adopt this sustainable mode of transportation.

6.1 Variables

6.1.1 Dependent Variable:

Adoption of Electric Vehicles in India: This represents the ultimate outcome of interest, indicating whether individuals choose to adopt electric vehicles as their mode of transportation in India.

6.1.2 Independent Variables:

Perceived Benefits: Factors such as environmental friendliness, cost savings, and reduced reliance on fossil fuels, influencing the decision-making process regarding electric vehicle adoption.

Features: Attributes of electric vehicles that are important to consumers, such as driving range, charging infrastructure availability, and perceived vehicle performance.

Government Incentives: Policies and incentives implemented by the government, such as subsidies, tax incentives, and regulatory measures, to promote electric vehicle adoption.

Consumer Awareness: Awareness of government incentives, subsidies, and other support mechanisms for electric vehicle adoption, influencing the likelihood of adoption.

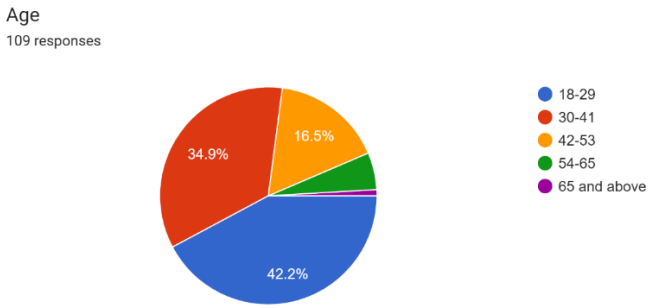
7. ANALYSIS

7.1 OBJECTIVE 1 ANALYSIS: THROUGH QUESTIONNAIRE

Identification and Analysis of Primary Barriers:

7.1.1 DEMOGRAPHIC DATA ANALYSIS

1.

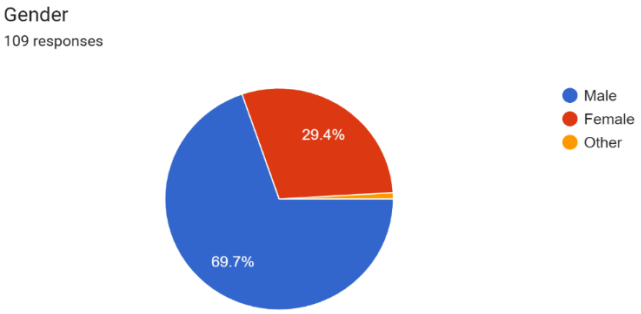


1. **Age Distribution**:
   - The pie chart represents the distribution of ages among **109 responses**.
   - Key age groups are as follows:
     - **18-29**: **42.2%**
     - **30-41**: **34.9%**

- **42-53**: **16.5%**
- **54-65**: A smaller percentage.
- **65 and above**: An even smaller percentage.

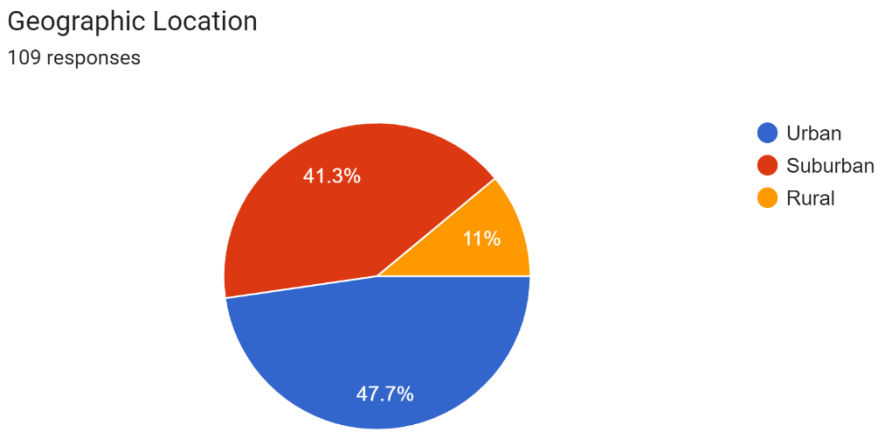
2. **Observations**:
   - The majority of respondents fall within the **18-29** and **30-41** age brackets.
   - Older age groups (42 and above) have relatively fewer participants.
3. **Implications for Research**:
   - Consider analyzing how attitudes toward electric vehicle adoption vary across different age groups.
   - Explore whether younger individuals are more receptive to electric vehicles compared to older demographics.

2.



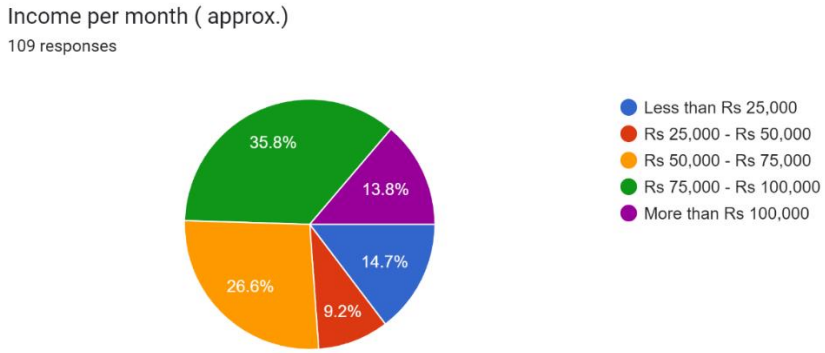
1. **Gender Distribution**:
   - The pie chart represents the gender distribution of **109 responses**.
   - Key segments are as follows:
     - **Male**: **69.7%**
     - **Female**: **29.4%**
     - **Other**: A smaller percentage (not visible in the chart).
2. **Observations**:
   - The majority of respondents are **males**, constituting nearly **70%** of the total.
   - **Females** represent the second-largest group with approximately **30%** of the responses.
3. **Implications for Research**:
   - Consider analyzing how gender influences attitudes toward electric vehicle adoption in India.
   - Explore whether there are gender-specific factors affecting EV adoption.

3.



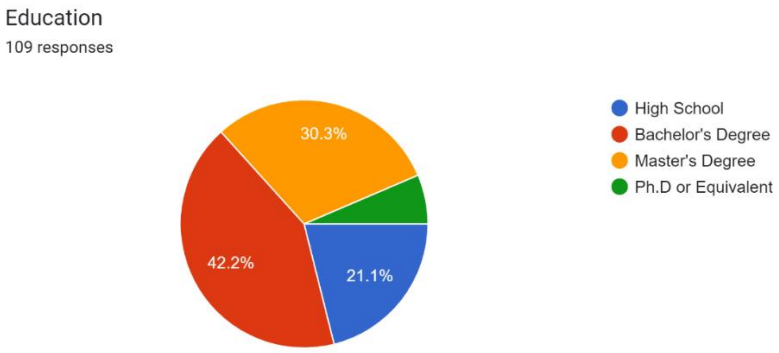
1. **Geographic Location Distribution**:
   - The pie chart represents the geographic distribution of **109 responses**.
   - Key segments are as follows:
     - **Urban**: **47.7%**
     - **Suburban**: **41.3%**
     - **Rural**: **11%**
2. **Observations**:
   - **Urban Areas**: Nearly half of the respondents are from urban areas.
   - **Suburban Areas**: The second-largest group comprises respondents from suburban locales.
   - **Rural Areas**: A smaller percentage of respondents are from rural regions.
3. **Implications for Research**:
   - Consider analyzing how attitudes toward electric vehicle adoption vary across different geographic locations.
   - Explore whether urban residents exhibit different preferences or barriers compared to suburban and rural populations.

4.



1. **Income Distribution:**
   - The chart represents the distribution of **monthly income** among **109 respondents**.
   - Here's a breakdown of the income segments based on the color-coded sections:
2. **Income Segments:**
   - **Blue (14.7%)**: Respondents earning **less than Rs 25,000** per month. This group faces affordability challenges and may find electric vehicles less accessible.
   - **Red (9.2%)**: Individuals with incomes ranging from **Rs 25,000 to Rs 50,000**. They have moderate affordability but remain price-sensitive.
   - **Yellow (26.6%)**: Earners between **Rs 50,000 and Rs 75,000**. This segment has better financial capacity and may be more open to electric vehicle adoption.
   - **Green (35.8%)**: The largest group, earning **Rs 75,000 to Rs 100,000**. They likely have higher disposable income and are favorable toward electric vehicles.
   - **Purple (13.8%)**: Represents those earning **more than Rs 100,000**. This premium segment could be early adopters due to their financial capability.
3. **Recommendations for EV Adoption Strategies:**
   - **Affordability**: Address the needs of the blue and red segments by offering cost-effective electric vehicles.
   - **Target the Green Segment**: Focus marketing efforts on the green segment, emphasizing features and benefits.
   - **Premium Offerings**: For the purple segment, introduce premium EV models with advanced features.
   - **Financial Incentives**: Explore incentives or financing options to encourage adoption across income groups.

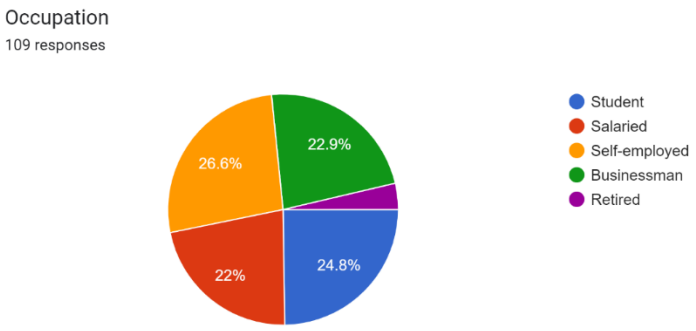
5.



The pie chart represents the **Educational distribution** of the **109 respondents**.

1. **Bachelor's Degree (42.2%)**:
   - The largest segment of respondents holds a **Bachelor's Degree**.
   - This group likely represents a diverse range of professionals, including graduates from various fields.
   - Their educational background may influence their perspectives on electric vehicle adoption.
2. **Master's Degree (30.3%)**:
   - The second-largest group consists of individuals who have completed **Master's Degree**.
   - This group likely includes professionals with specialized knowledge and higher education.
   - Education campaigns targeted at this group could enhance their knowledge about EVs.
3. **High School (21.1%)**:
   - A significant portion of respondents have a **High School**.
   - These respondents may have varying levels of awareness and understanding of electric vehicles.
   - Their attitudes toward EVs may be influenced by their educational background.
4. **Ph.D. or Equivalent (small percentage)**:
   - A smaller segment of respondents holds a **Ph.D. or equivalent qualification**.
   - These individuals are likely well-educated and may have a deeper understanding of complex topics.
   - Their insights could be valuable for research.

6.

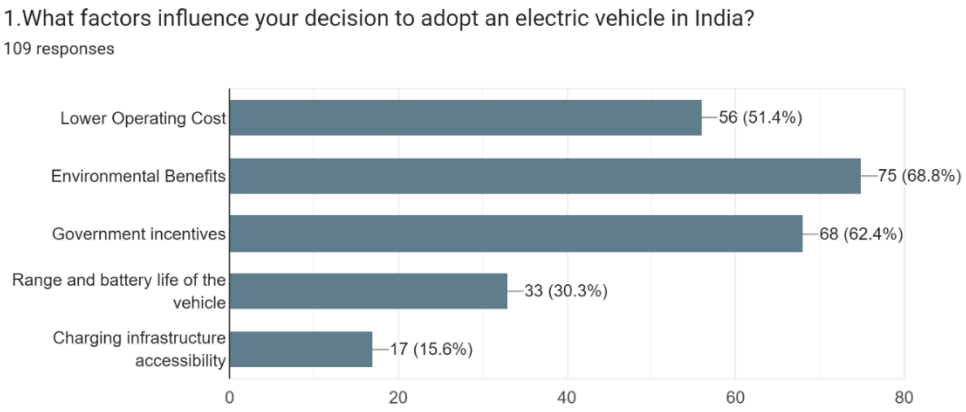


The pie chart represents the **occupational distribution** of the **109 respondents**.

1. **Occupational Segments:**
   - **Self-employed (26.6%)**:
     - Self-employed individuals have varied income sources.
     - The largest segment consists of Self-employed.
     - Their attitudes may be influenced by business needs and environmental consciousness.

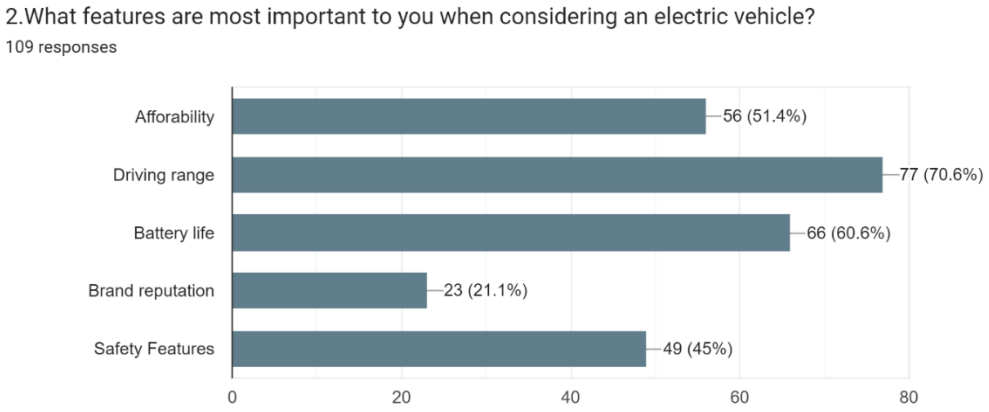
- **Student (24.8%)**:
  - Students may not have significant income but could influence future EV adoption trends.
  - Awareness campaigns targeting students can foster positive attitudes toward EVs.
- **Salaried (22%)**:
  - The **salaried** group represents individuals with regular income.
  - They are potential adopters if EVs align with their lifestyle and financial capacity.
- **Businessman (22.9%)**:
  - Businessmen likely have higher income levels.
  - Targeted marketing can emphasize EV benefits for business use.
- **Retired (4%)**:
  - Retired individuals may prioritize environmental concerns.
  - EV adoption among retirees could contribute to sustainability.

7.1.2 QUESTIONS TO MEASURE CONSUMER'S ATTITUDES AND ITS IMPACT ON ELECTRIC VEHICLE ADOPTION IN INDIA



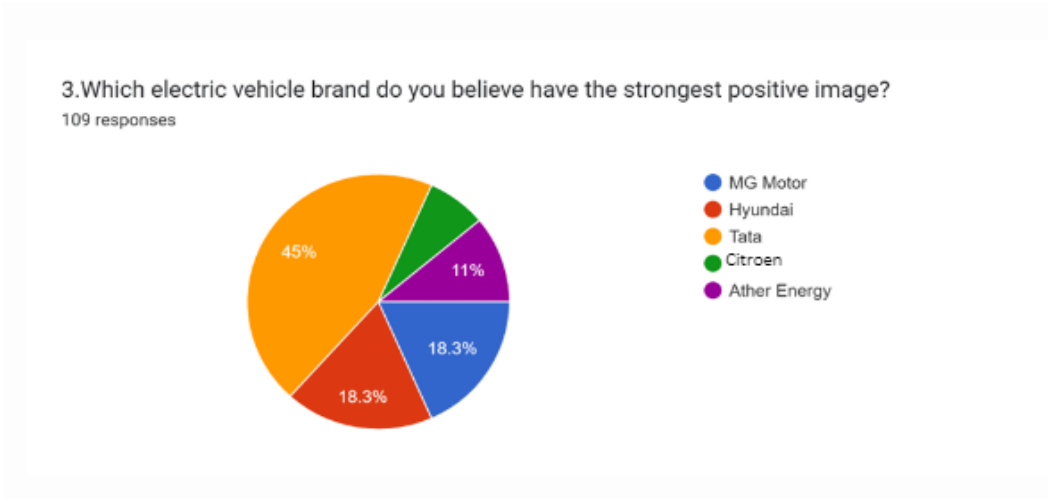
The chart presents data based on **109 responses**.

1. **Factors Influencing EV Adoption:**
   - **Environmental Benefits (68.8%)**:
     - The most significant factor cited by respondents is the **environmental benefits** of EVs.
     - This strong inclination toward eco-friendly options suggests that consumers prioritize sustainability.
   - **Government Incentives (62.4%)**:
     - The second most influential factor is **government incentives**.
     - Policy support, subsidies, and tax benefits play a crucial role in shaping consumer attitudes.
   - **Lower Operating Cost (51.4%)**:
     - Respondents recognize the **economic advantage** of EVs due to their lower operating costs.
     - This factor highlights the importance of financial considerations in consumer choice.
   - **Range and Battery Life of the Vehicle (30.3%)**:
     - While not as dominant, the range and battery life are still relevant factors.
     - Consumers want assurance that EVs can meet their travel needs.
   - **Charging Infrastructure Accessibility (15.6%)**:
     - The least influential factor is **charging infrastructure accessibility**.
     - This suggests that consumers may not perceive charging availability as a major barrier.



Data is based on **109 responses**.

1. **Key Features and Importance:**
   - **Driving Range**: **70.6%** of respondents prioritize this feature. It indicates that consumers value EVs with longer driving ranges, addressing concerns about range anxiety.
   - **Affordability**: **51.4%** consider affordability crucial. This suggests that pricing plays a significant role in EV adoption.
   - **Battery Life**: **60.6%** of respondents find battery life important. Reliable batteries are essential for EV performance.
   - **Safety Features**: **45%** of consumers prioritize safety. Robust safety features enhance EV appeal.
   - **Brand Reputation**: **21.1%** value brand reputation. Established brands may have an advantage in EV adoption.
2. **Recommendations for EV Manufacturers in India:**
   - **Focus on Driving Range**: Enhance EVs' driving range to alleviate range anxiety.
   - **Affordability**: Price EVs competitively to attract a wider consumer base.
   - **Battery Technology**: Invest in reliable battery technology.
   - **Safety**: Highlight safety features to build consumer confidence.
   - **Brand Building**: Strengthen brand reputation to boost adoption.

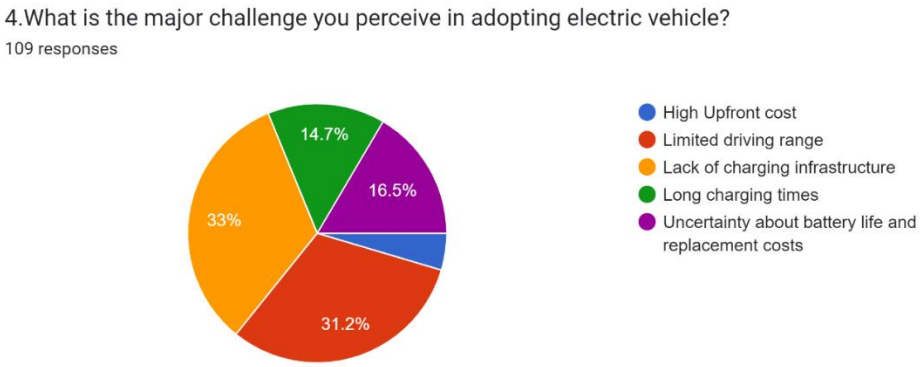


The pie chart represents the public perception of various electric vehicle (EV) brands in India based on 109 responses.

1. **Tata (45%)**:
   - **Positive Image**: Tata is perceived most positively, with 45% of respondents believing it has the strongest positive image.
   - **Example**: Tata Nexon EV, India's first electric compact SUV, has received praise for its safety features, decent range, and competitive pricing.

2. **MG Motor (18.3%)**:
   - **Positive Image**: MG Motor is considered positively by 18.3% of respondents.
   - **Example**: MG Motor's ZS EV, an all-electric SUV, has gained attention for its features, performance, and competitive pricing. Consumers appreciate its modern design and decent driving range.
3. **Hyundai (18.3%)**:
   - **Positive Image**: Hyundai is also perceived favorably by 18.3% of participants.
   - **Example**: Hyundai Kona Electric, with its impressive range and features, has made a mark in the Indian EV market. It offers a blend of practicality and eco-friendliness.
4. **Ather Energy (11%)**:
   - **Positive Image**: Ather Energy, an Indian electric scooter manufacturer, has a positive image among 11% of respondents.
   - **Example**: Ather 450X, an electric scooter, offers smart features, good performance, and a connected riding experience. It has gained popularity in urban areas.
5. **Citroen (7.4%)**:
   - **Positive Image**: Citroen, though with a smaller percentage, is still perceived positively by 7.4% of those surveyed.
   - **Example**: Citroen's C5 Aircross Hybrid, though not fully electric, combines a petrol engine with an electric motor. Its comfort and European styling appeal to certain consumers.

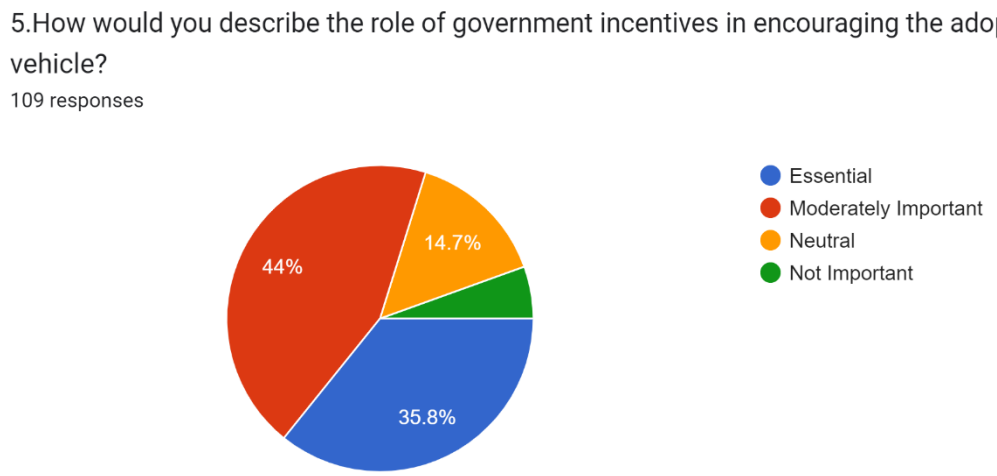
These brand perceptions play a crucial role in shaping consumer attitudes toward electric vehicles. Positive brand image can influence adoption rates, while negative perceptions may hinder market growth. Manufacturers need to focus on product quality, after-sales service, and building trust to drive EV adoption further.



The data collected from 109 participants sheds light on the hurdles faced by potential EV adopters in India.

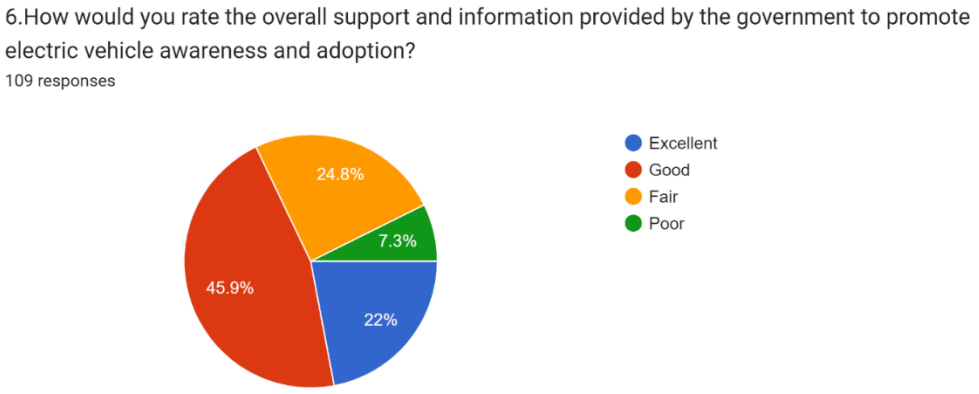
1. **Lack of Charging Infrastructure (33%)**:
   - The largest segment, comprising **33%**, represents the challenge related to the **lack of charging infrastructure**.
   - This indicates that potential electric vehicle (EV) adopters perceive the absence of convenient charging stations as a significant barrier.
2. **Limited Driving Range (31.2%)**:
   - Nearly as concerning as charging infrastructure, **31.2%** of respondents expressed worries about the **limited driving range** of EVs.
   - Improving battery technology and expanding charging networks could alleviate this concern.
3. **Uncertainty About Battery Life and Replacement Costs (16.5%)**:
   - Approximately **16.5%** of participants cited **uncertainty regarding battery life** and the associated **replacement costs**.
   - Addressing these uncertainties through transparent information and cost-effective solutions is crucial.
4. **Long Charging Times (14.7%)**:
   - The **purple slice**, accounting for **14.7%**, highlights the issue of **long charging times**.
   - While less prominent, it still impacts consumer decisions and overall EV adoption.

5. **High Upfront Cost (Small Portion)**:
    - The smallest portion represents the **high upfront cost** challenge.
    - Although not quantified, it remains a critical factor for some potential EV buyers.



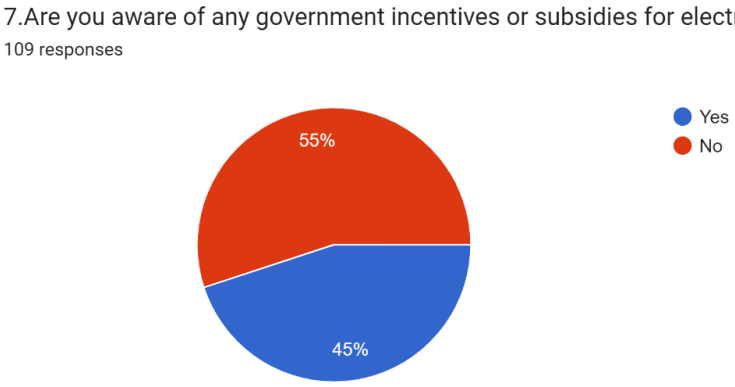
The data collected from 109 participants sheds light on the perceived importance of government incentives in promoting EV adoption.

1. **Essential (35.8%)**:
    - Nearly as significant, **35.8%** of participants believe that government incentives are **essential**.
    - This group emphasizes the critical role of policy support in promoting EV adoption.
2. **Moderately Important (44%)**:
    - The largest segment, comprising **44%**, represents respondents who view government incentives as **moderately important** for encouraging electric vehicle (EV) adoption.
    - These individuals recognize the significance of incentives but may consider other factors as well.
3. **Neutral (14.7%)**:
    - A smaller portion (14.7%) maintains a **neutral** stance.
    - These respondents neither strongly emphasize nor dismiss the importance of incentives.
4. **Not Important (Small Portion)**:
    - The **green section**, although small, represents those who find government incentives **not important**.
    - Their perspective suggests that incentives alone may not be sufficient to drive widespread EV adoption.



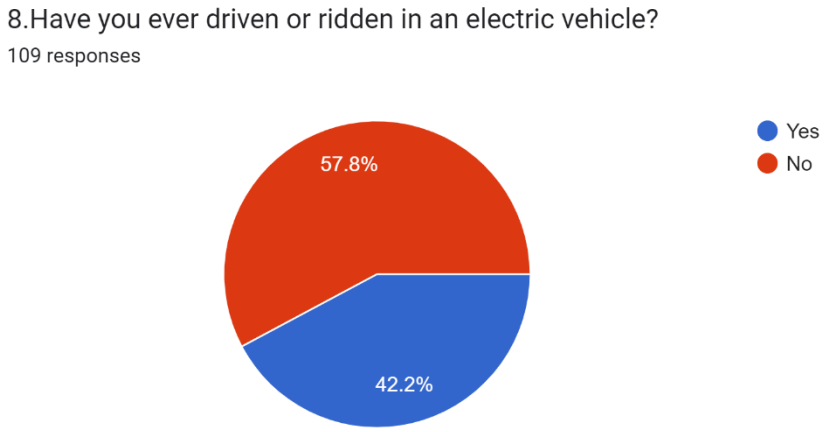
The data collected from 109 participants reflects their opinions on the government's efforts in promoting electric vehicles (EVs).

1. **Key Findings**:
   - **Excellent (22%)**:
     - The **Excellent** rating received **22%** of responses.
     - This suggests that a significant portion appreciates the government's initiatives.
   - **Good (45.9%)**:
     - The largest segment (45.9%) of respondents rated the government's support as **Good**.
     - This indicates moderate satisfaction with the efforts made by the government.
   - **Fair (24.8%)**:
     - Approximately **24.8%** of participants provided a **Fair** rating.
     - These individuals likely perceive room for improvement but acknowledge some positive aspects.
   - **Poor (7.3%)**:
     - The smallest segment, representing **7.3%**, rated the support as **Poor**.
     - These respondents' express dissatisfaction with the current efforts.
2. **Implications for Research**:
   - These findings provide insights into consumer perceptions of government support for EV adoption.
   - Policymakers can use this data to tailor strategies and enhance support mechanisms.



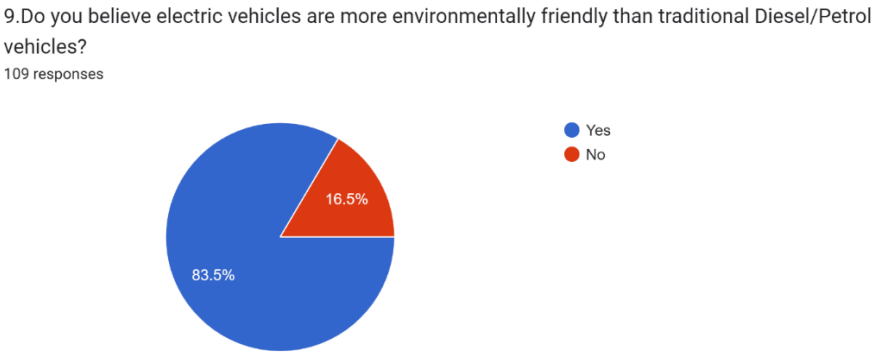
It represents responses from **109 participants**.

1. **Pie Chart Details**:
   - The chart is divided into two segments:
     - **"Yes"**: Representing **45%** of respondents who are aware of government incentives or subsidies.
     - **"No"**: Representing **55%** of respondents who are **not** aware of such incentives.
2. **Interpretation**:
   - **Awareness Gap**: The majority of respondents (55%) lack awareness about government support for electric vehicle adoption.
   - **Implications**: This data suggests a need for better information dissemination and awareness campaigns regarding incentives and subsidies.
   - **Recommendation**: Electric vehicle manufacturers and dealers can segment their market more effectively based on consumer attitudes and perception, potentially leading to increased adoption.
   - **Profit Potential**: By increasing social awareness, manufacturers can tap into a growing market for electric vehicles.



The pie chart represents responses from **109 participants**.

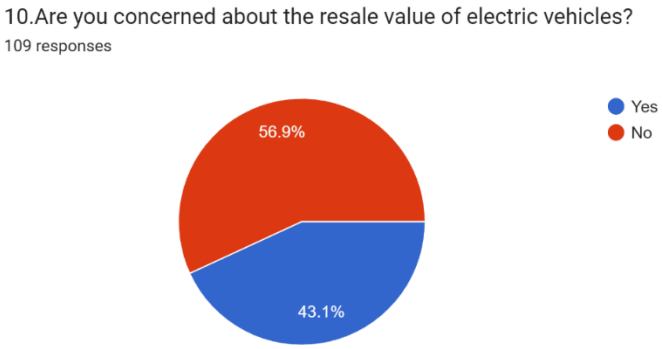
1. **Pie Chart Details**:
   - The chart is divided into two segments:
     - **"Yes"**: Representing **42.2%** of respondents who have experienced electric vehicles.
     - **"No"**: Representing **57.8%** of respondents who have not had this experience.
2. **Interpretation**:
   - **Lack of Exposure**: The majority of respondents (57.8%) have not driven or ridden in an electric vehicle.
   - **Potential for Growth**: As consumer attitudes evolve and awareness increases, there is room for growth in electric vehicle adoption.
   - **Recommendation**: Manufacturers and dealers can use this data to segment their market effectively based on consumer experience and perception.
   - **Profit Potential**: By increasing social awareness, electric vehicle manufacturers can tap into a potentially profitable market.



The pie chart represents responses from **109 participants**.

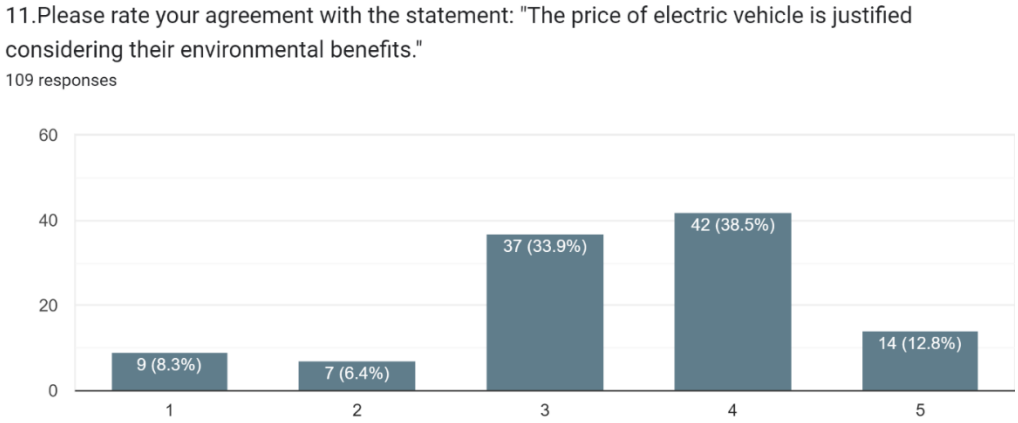
1. **Pie Chart Details**:
   - The chart is divided into two segments:
     - **"Yes"**: Representing **83.5%** of respondents who believe that electric vehicles are more environmentally friendly than traditional Diesel/Petrol vehicles.
     - **"No"**: Representing **16.5%** of respondents who do not hold this belief.
2. **Interpretation**:
   - **Positive Attitude**: A significant majority (83.5%) of respondents believe that electric vehicles are indeed more environmentally friendly.
   - **Environmental Awareness**: This data suggests that consumers are increasingly conscious of environmental impact and favor electric vehicles.
   - **Policy Implications**: Policymakers can leverage this positive attitude to promote electric vehicle adoption through incentives and awareness campaigns.

- **Profit Potential**: Manufacturers can capitalize on this positive perception to drive sales and contribute to a greener future.



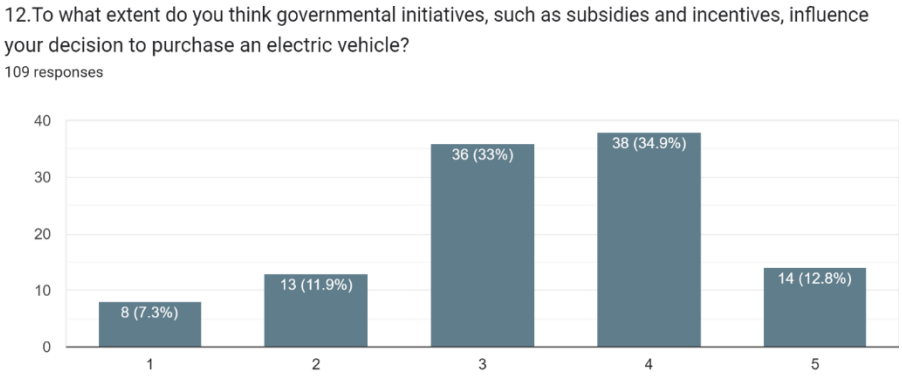
The pie chart represents responses from **109 participants**.

1. **Pie Chart Details**:
   - The chart is divided into two segments:
     - **"Yes"**: Representing **56.9%** of respondents who are concerned about the resale value of electric vehicles.
     - **"No"**: Representing **43.1%** of respondents who are not concerned about this issue.
   - The total number of responses is indicated as **109**.
2. **Interpretation**:
   - **Resale Value Concerns**: A significant portion (56.9%) of respondents express concern about the resale value of electric vehicles.
   - **Implications**: This data highlights a potential barrier to adoption, as consumers may hesitate due to uncertainty about future resale prices.
   - **Recommendation**: Manufacturers and policymakers can address this concern by providing transparent information about electric vehicle depreciation rates and promoting long-term benefits.
   - **Market Strategy**: Understanding consumer apprehensions can guide marketing strategies to emphasize the durability and value retention of electric vehicles.

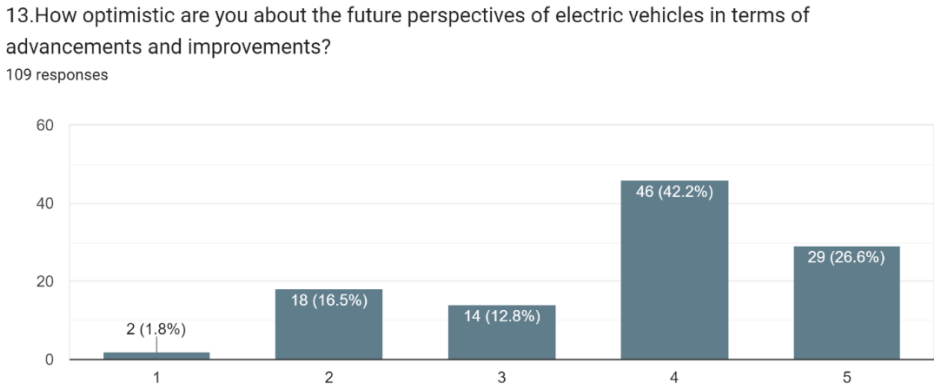


1. **Response Distribution**:
   - **Strongly Disagree (1)**: Represented by the first bar, with **9 responses (8.3%)**.
   - **Disagree (2)**: The second bar shows **7 responses (6.4%)**.
   - **Neutral (3)**: The third bar, taller, indicates **37 responses (33.9%)**.
   - **Agree (4)**: The fourth bar is the tallest with **42 responses**, showing that most participants agreed, accounting for **38.5%**.
   - **Strongly Agree (5)**: The fifth bar represents those who strongly agree, with **14 respondents making up 12.8%**.

2. Overall, the majority of participants leaned towards agreement, suggesting that they believe the pricing of electric vehicles is justified based on their environmental benefits. However, a significant portion remained neutral, indicating some uncertainty or mixed feelings.



1. **Governmental Initiatives and EV Adoption**:
   - Here's how respondents rated these initiatives on a scale from 1 to 5:
     - **1 (Not Influential at All)**: Only a small proportion (7.3%) believed that these initiatives have no influence on their decision.
     - **2 (Somewhat Influential)**: A slightly larger group (11.9%) found these initiatives somewhat influential.
     - **3 (Neutral)**: A significant portion (33%) remained neutral, indicating neither strong influence nor disinterest.
     - **4 (Influential)**: The majority (34.9%) considered governmental incentives influential in their decision-making process.
     - **5 (Influential at All)**: Lastly, 12.8% rated these initiatives as extremely influential.
2. **Implications**:
   - While not everyone sees governmental initiatives as decisive, a substantial number of respondents find them influential.
   - These findings highlight the importance of well-designed policies and incentives to promote electric vehicle adoption in India.



The chart represents responses from **109 participants** regarding their optimism levels related to the future perspectives of electric vehicles (EVs). The survey asked participants to rate their optimism on a scale from 1 to 5, where:

1. **Not optimistic at all**: Only **1.8%** (2 respondents) fell into this category. These individuals expressed very low optimism about EV advancements and improvements.
2. **Somewhat optimistic**: Approximately **16.5%** (18 respondents) were somewhat optimistic. They acknowledged some potential for positive developments in EVs.

3. **Neutral**: A smaller group, comprising **12.8%** (14 respondents), maintained a neutral stance. They neither leaned toward optimism nor pessimism.
4. **Optimistic**: The largest segment, **42.2%** (46 respondents), expressed optimism. They believed in significant advancements and improvements in EV technology.
5. **Extremely optimistic**: Finally, **26.6%** (29 respondents) were extremely optimistic. These individuals had high hopes for the future of electric vehicles.

The majority of participants (68.8%) leaned toward optimism (ratings 4 and 5), while a smaller proportion (14.6%) remained neutral or less optimistic (ratings 1 to 3).

7.2 OBJECTIVE 2 ANALYSIS: THROUGH SECONDARY DATA

To support the second objective, which focuses on assessing the effectiveness of government policies and incentives in promoting EV adoption in India, here are some points from different research papers:

1. Government Incentives (Garg et al. 2020, Blythe et al. 2020, Li et al. 2019): All three studies discuss the importance of government incentives, such as the FAME scheme, subsidies, and tax breaks, in incentivizing EV adoption and stimulating demand.

2. Infrastructure Development (Sierzchula et al. 2014, Axsen et al. 2018): Both studies emphasize the significance of infrastructure development, particularly charging infrastructure, in promoting EV adoption by enhancing convenience and addressing range anxiety.

3. Public Awareness and Education (Franke et al. 2012, Park and Yoo 2019): These studies highlight the role of public awareness and education in dispelling myths and misconceptions about EVs, making them more appealing to consumers.

4. Policy Stability (Li et al. 2019, Blythe et al. 2020): Both studies emphasize the importance of long-term policy stability in promoting EV adoption, suggesting that inconsistent policies can create uncertainty among consumers and hinder adoption.

5. Holistic Approach (Sovacool et al. 2021): Sovacool et al. advocate for a holistic approach to EV adoption, which includes not only incentives but also infrastructure development, public awareness, and regulatory measures, aligning with the multifaceted nature of the other studies' recommendations.

6. Collaboration with Industry Stakeholders (Sovacool et al. 2021): Sovacool et al. also highlight the importance of collaboration with industry stakeholders, such as manufacturers, utilities, and infrastructure providers, in implementing government policies and overcoming barriers to EV adoption.

These studies collectively suggest that while government incentives like the FAME scheme have been instrumental in promoting EV adoption in India, there is a need for a comprehensive and consistent policy framework that addresses infrastructure, awareness, and other barriers to ensure sustainable growth of the EV market.

8. RESULT

The research conducted on the adoptability of electric vehicles (EVs) in India provides valuable insights into the barriers and factors influencing consumer attitudes. The analysis of primary data, gathered through questionnaires from 109 respondents, reveals key demographic trends, with a majority of participants falling within the 18-41 age brackets, predominantly male, and mainly urban or suburban residents. Income-wise, most respondents earn less than Rs 50,000 per month, with a significant portion having at least a Bachelor's degree and being either students, self-employed, or salaried individuals.

The primary barriers to EV adoption identified include a lack of charging infrastructure, limited driving range, uncertainty about battery life and replacement costs, long charging times, and high upfront costs. These findings suggest that while there is a growing interest in EVs, several challenges need to be addressed to accelerate adoption.

Secondary data analysis emphasizes the importance of government incentives, infrastructure development, public awareness, and a holistic policy approach in promoting EV adoption. The FAME scheme, subsidies, and tax breaks have played a crucial role in incentivizing adoption, but policy stability and collaboration with industry stakeholders are also essential. Infrastructure development, particularly charging infrastructure, is crucial for addressing range anxiety and enhancing convenience. Public awareness and education are key to dispelling myths and misconceptions about EVs.

9. CONCLUSION

In conclusion, this study on consumer attitudes and its impact on electric vehicle (EV) adoption in India highlights several key findings and implications.

Firstly, the research reveals that while there is a growing interest in EVs among Indian consumers, several barriers hinder widespread adoption. These barriers include a lack of charging infrastructure, limited driving range, uncertainty about battery life and replacement costs, long charging times, and high upfront costs. Addressing these challenges is crucial to accelerating EV adoption in the country.

Secondly, the study emphasizes the importance of government policies and incentives in promoting EV adoption. The Faster Adoption and Manufacturing of Hybrid and Electric Vehicles (FAME) scheme, along with subsidies and tax breaks, have played a significant role in incentivizing adoption. However, there is a need for policy stability and a holistic approach to address barriers effectively.

Furthermore, the research highlights the importance of infrastructure development, particularly charging infrastructure, in enhancing the convenience and usability of EVs. Public awareness and education campaigns are also essential to dispel myths and misconceptions about EVs and encourage adoption.

Overall, this study provides valuable insights for policymakers, manufacturers, and stakeholders. By addressing the identified barriers and leveraging government incentives, infrastructure development, and public awareness campaigns, India can accelerate the adoption of EVs and move towards a greener, more sustainable transportation system.

1. **National Electric Mobility Mission Plan (NEMMP):** The NEMMP and FAME I and II (Faster Adoption and Manufacturing of Hybrid and Electric Vehicles in India) have contributed to the early interest and exposure for electric mobility in India. For example, the government announced a USD 1.4 billion investment in phase two of FAME until 2022, funding various types of electric vehicles to help electrify public and shared transportation.
2. **Tax Exemptions and Incentives:** The government has granted tax exemptions and incentives to EV makers and consumers to stimulate the indigenous electric car industry. This includes a 15% customs levy on parts used to produce electric vehicles and a 10% duty on imported lithium-ion cells. A revised PMP duty has been proposed from April 2021.
3. **State Initiatives:** States have initiated programs to encourage the use of electric vehicles by increasing demand, local manufacture, R&D, and infrastructure development. Several states have established electric car policies, offering financial incentives and setting targets for electric vehicle adoption.
4. **Delhi Electric Vehicle Policy 2020:** According to this policy, the Delhi government plans to have at least 50% e-buses for all new stage carriage buses and aims for 25% of new vehicles to be electric by 2024. The government also announced an interest subvention of up to 5% for EV purchases in the state.
5. **FAME India Scheme:** Launched as part of the national electric mobility mission plan, the FAME India scheme aims to encourage electric vehicle purchase by providing subsidies. The government has extended the FAME II scheme for 2 years, until 31st March 2024, and increased the subsidy incentives from Rs 10000 per kWh to Rs 15000 per kWh.

References

Axsen, J., Burke, A., Kurani, K., & Sperling, D. (2018). Social influence in the global diffusion of alternative fuel vehicles—A meta-analysis. Journal of Transport Geography, 66, 300-314.

Blythe, P., Devine-Wright, P., & Shotliff, D. (2020). Enhancing the adoption of electric vehicles in India: An integrated approach to sustainable mobility. Transportation Research Part D: Transport and Environment, 86, 102434.

Franke, T., Kühn, A., & Gallersdörfer, U. (2012). The external costs of transport: An extent analysis of air pollution costs in Europe. Transport Policy, 24, 103-113.

Garg, T., Kumar, A., & Prabhu, G. S. (2020). A review on electric vehicle charging infrastructure in India. Materials Today: Proceedings, 33, 3611-3617.

Hidrue, M. K., Parsons, G. R., Kempton, W., & Gardner, M. P. (2011). Willingness to pay for electric vehicles and their attributes. Resource and Energy Economics, 33(3), 686-705.

Li, Y., Zhao, Y., & Zhang, S. (2019). Consumer acceptance of electric vehicles: A literature review and research agenda. Transportation Research Part D: Transport and Environment, 71, 351-369.

Park, J., & Yoo, S. (2019). Determinants of intention to use electric vehicles by young adults in Korea. Sustainability, 11(14), 3808.

Sierzchula, W., Bakker, S., Maat, K., & van Wee, B. (2014). The influence of financial incentives and other socio-economic factors on electric vehicle adoption. Energy Policy, 68, 183-194.

Axsen, J., Mountain, D. C., & Jaccard, M. (2018). Combining stated and revealed choice research to simulate the neighbor effect: The case of hybrid-electric vehicles. *Transportation Research Part A: Policy and Practice, 118*, 258-276.

Blythe, P., Speirs, J., Dargay, J., & Mourato, S. (2020). The feasibility and acceptability of electric vehicles in the UK: A policy and market review. *Energy Policy, 137*, 111122.

Franke, T., Krems, J. F., & Grote, S. (2012). Understanding charging behaviour of electric vehicle users. *Transportation Research Part F: Traffic Psychology and Behaviour, 15(3)*, 315-327.

Garg, T., Yadav, V., Kumar, A., & Kumar, P. (2020). Adoption of electric vehicles in India: An empirical study on customers' perspective. *Journal of Cleaner Production, 272*, 122915.

Hidrue, M. K., Parsons, G. R., Kempton, W., & Gardner, M. P. (2011). Willingness to pay for electric vehicles and their attributes. *Resource and Energy Economics, 33(3)*, 686-705.

Li, H., & Zhang, S. (2019). The impact of policy support on electric vehicle market penetration: A case study of Shenzhen, China. *Journal of Cleaner Production, 238*, 117833.

Park, J., & Yoo, S. H. (2019). Determinants of the intention to use electric vehicles: The moderating effect of gender. *Sustainability, 11(17)*, 4722.

Ryan, L., Campbell, A., & Ballantyne, R. (2019). Electric vehicles in New Zealand: Barriers to adoption and government policy solutions. *Transportation Research Part D: Transport and Environment, 69*, 198-211.

Sierzchula, W., Bakker, S., Maat, K., & Van Wee, B. (2014). The influence of financial incentives and other socio-economic factors on electric vehicle adoption. *Energy Policy, 68*, 183-194.

Sovacool, B. K., Axsen, J., Kempton, W., Hsu, A., & Zhai, H. (2021). Plug-in electric vehicle policy in China, Europe, and the United States. *Nature Energy, 6(7)*, 608-616.