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"Consumer Acceptance and Market Potential of Electric Two-Wheelers in Delhi"

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ABSTRACT

This research explores the level of consumer acceptance and the emerging market potential for the electric two-wheelers (E2Ws) in Delhi. With increasing environmental concerns, rising fuel prices and policy support from the government, E2Ws are gaining attention as a sustainable alternative to conventional petrol-powered two-wheelers. The primary objective of this study is to understand consumer awareness, evaluate the factors influencing adoption, and assess the effectiveness of government interventions in accelerating the use of E2Ws in the capital region. To achieve these goals, a structured questionnaire was distributed among 50 respondents residing in Delhi and surrounding areas. The survey collected both quantitative and qualitative data on demographics, awareness levels, preferences, perceived barriers, and expectations related to E2Ws. Secondary data from the government policies documents, market reports and academic studies supplemented the analysis. The study employed descriptive statistics and thematic analysis to interpret findings. The results reveal that young consumers, particularly students, are the most aware and receptive to E2Ws. Affordability, access to charging infrastructure, and vehicle performance emerged as the primary factors influencing purchase decisions. Although government policies have positively influenced awareness and initial interest, high upfront costs and limited charging options remain critical challenges. The study concludes that while the E2W market in Delhi shows promising potential, its growth depends on improving affordability, expanding infrastructure, and building consumer trust. These insights can help policymakers, manufacturers, and investors develop more effective strategies to promote electric mobility and support the transition to sustainable urban transportation.

CHAPTER 1: -INTRODUCTION

1.1 _Background of the Study

India's transport sector is currently at a pivotal point, transitioning toward more sustainable and eco-friendly mobility solutions. Among the various electric vehicle (EV) segments, electric two wheelers (E2Ws) have emerged as a prominent choice, particularly in urban environments such as Delhi. The rising concerns of air pollution, escalating fuel costs, and traffic congestion have made E2Ws an attractive alternative to conventional petrol-driven two-wheelers. These vehicles not only offer lower operating costs and reduced emissions but also align with national and regional sustainability goals. Technological advancements, coupled with government incentives, have further accelerated their adoption.

Delhi serves as a unique and insightful case for studying the adoption of electric two-wheelers, given their high population density, severe air quality challenges, and forward-thinking policy measures. The Delhi Electric Vehicle Policy, introduced in August 2020, has provided financial and infrastructural support that has significantly boosted EV registrations in the region.

1.2_Research Problem

"Despite the growing popularity of electric two-wheelers and supportive policy frameworks, several barriers continue to hinder their widespread adoption. High upfront costs, inadequate charging infrastructure, range anxiety, and concerns about vehicle reliability remain key challenges". Moreover, while data indicates a rise in E2W registrations, consumer awareness, perceptions, and behavioral factors influencing purchase decisions are not fully understood. There is a need for a detailed exploration into these aspects to inform future policy and market strategies.

1.3 _Research Objectives

This study aims to achieve the following objectives:

- "To assess the consumer awareness and perception regarding the electric two-wheelers in Delhi".
- "To identify the key factors influencing the adoption of electric two-wheelers".
- "To evaluate the effectiveness of government policies and incentives in promoting E2W usage".
- To analyze the challenges and barriers faced by consumers and manufacturers.

To forecast the potential market growth and opportunities for E2Ws in Delhi.

1.4 Research Questions

- 1. How aware are consumers in Delhi about electric two-wheelers?
- 2. Where do consumers typically get information about electric two-wheelers?
- 3. Which factors play the biggest role in influencing the consumers to buy electric two-wheelers?
- 4. What are the main obstacles that discourage consumers from purchasing electric two-wheelers?
- 5. How important is the availability of charging facilities when consumers decide on electric two-wheelers?
- 6. What price range do consumers find reasonable for electric two-wheelers?
- 7. Do consumers believe that the market for electric two-wheelers in Delhi is expanding?

8. How effective do consumers find government initiatives in promoting electric two-wheelers? 9. What enhancements do consumers expect in future models of electric two-wheelers?

10. What is the general perception of consumers towards electric two-wheelers in Delhi?

1.5 Scope of the Study

"This research focuses on the electric two-wheeler market within the National Capital Territory of Delhi. The study examines consumer behavior, policy impacts, manufacturer trends, and infrastructural development in the region. It includes a review of sales data, policy documents, and consumer surveys to provide a comprehensive overview of the current and future landscape of E2Ws in Delhi. The study period spans from 2020, when the Delhi EV Policy was introduced, to the financial year 2023–24".

1.6 _Significance of the Study

"The findings of this study hold substantial importance for a wide range of stakeholders. For policymakers", it provides insights into the effectiveness of current strategies and areas needing improvement. For manufacturers and investors, it highlights consumer preferences and market dynamics essential for strategic planning. Urban planners and environmental agencies can use the findings to support sustainable transport initiatives. Ultimately, the study contributes to the broader goal of transitioning to cleaner urban mobility and achieving climate action targets through increased.

CHAPTER 2: -LITERATURE REVIEW

2.1 Review of existing Studies

"Electric two-wheelers (E2Ws) are becoming more popular in India, especially in cities like" Delhi. With rising fuel prices, traffic problems, and air pollution, more people are looking for cleaner and cheaper ways to travel. E2Ws offer a good solution because they cost less to run and are better for the environment.

Delhi's Role in E2W Growth

Delhi is one of the top cities in India when it comes to electric vehicle adoption. In 2020, the Delhi government launched the Electric Vehicle Policy, which helped boost sales by offering financial support, tax benefits, and support for charging stations. According to government data, over 19,000 EVs were registered in Delhi during the first year, and more than half of them were electric two-wheelers. What Consumers Think

Even though many people in Delhi know about electric vehicles, not all are ready to buy one yet. A study by Kantar (2021) found that 80% of people had heard of E2Ws, but only 30% were seriously considering buying one. The main concerns include:

- Battery life and charging time.
- Not enough charging stations
- High initial cost
- Worries about resale value.

A report by CEEW also said that older people are more doubtful, mostly due to lack of information or chances to try out electric scooters. **Who Is Buying E2Ws?**

Certain groups of people are more likely to use electric two-wheelers. These include:

- Delivery drivers and gig workers
- Office workers who travel short distances
- Students and young professionals

They are attracted by the low running costs—just $\gtrless 0.25$ to $\gtrless 0.50$ per kilometers—compared to $\gtrless 2$ or more for petrol scooters. Popular brands like Ola Electric, Ather, and TVS are doing well in cities like Delhi because they meet needs of these users.

2.2 Theoretical Framework (Including Indian Perspectives)

To understand what makes people accept or reject electric two-wheelers, we can look at a few key theories:

"Technology Acceptance Model (TAM)"

"The Technology Acceptance Model explains that individuals are more likely to adopt new technology if they perceive it to be beneficial and simple to operate. In the context of Delhi, key factors influencing the adoption of electric two-wheelers include their cost-effectiveness and the ease of accessing charging infrastructure".

• "Diffusion of innovation theory"

This theory explains how new ideas spread. In Delhi, younger people and tech-savvy riders are often the first to try electric scooters. Their experiences can influence others to follow.

• "Theory of Planned Behavior (TPB)'

This theory says that what people believe, what others think, and how much control they feel they have all affect their choices. For example, a Delhi resident may decide to buy an E2W if their friends support it and charging stations are easy to access. **India-Based Views**

- NITI Aayog's EV Vision focuses on making electric vehicles more affordable and easier to charge, especially in big cities like Delhi.
- TERI's Behavioral Study found that Indian buyers often care more about short-term savings than long-term benefits, and they also look at what others are doing before making a decision.

2.3 Conceptual Model

Based on the research, the following key factors influence consumer decisions about E2Ws in Delhi: **Main Factors:**

- Awareness about E2Ws
- Price and government subsidies
- Availability of charging points
- Social influence (friends, family, and social media)
- Features like speed, battery life, and design

Middle Factors (Perceptions):

- Belief in long-term savings
- Trust in technology
- Concern for the environment

Final Outcome:

• Willingness to buy and use electric two-wheelers.

This model will help guide the research and understand what truly drives or blocks adoption in Delhi.

2.4 Research Gaps

Even though many studies talk about electric vehicles, there are still areas that need more attention, especially in Delhi's case:

1. Lack of Local Information

Most studies focus on India as a whole. There's not enough research on what people in Delhi specifically think or experience when it comes to E2Ws.

2. Trust and Reliability Issues

Many people are still unsure if electric scooters are reliable in the long run. More studies are needed on how much trust people have in these vehicles.

3. After-Sales Support

There's little information about what buyers think of service centers, repairs, or battery replacement after buying an E2W.

4. Price Confusion

Although E2Ws cost less to run, people are still worried about the high purchase price. Many don't understand the long-term cost benefits clearly.

5. Social Influence

There's not much research on how peer pressure, social media, and cultural beliefs affect buying decisions.

3.1 _Research Design

"This study employs a **descriptive research design** to understand the consumer acceptance and market potential of electric two-wheelers (E2Ws) in Delhi. The research focuses on gathering detailed information about consumer attitudes, awareness, preferences, and barriers related to electric two-wheelers. The design allows for both quantitative and qualitative data collection to provide a comprehensive view of the current market scenario and user perceptions".

3.2 Data Collection Methods

Primary Data

"Primary data are collected using a structured online questionnaire targeting residents of Delhi and the National Capital Region (NCR) who are either current users or potential buyers of electric two-wheelers. The questionnaire will include both closed-ended questions (for quantitative data such as ratings, preferences, and demographic details) and open-ended questions (to capture qualitative insights such as personal experiences and opinions)". **Secondary Data**

"Secondary data will be gathered from existing sources such as government reports, industry publications, market research studies, and scholarly articles". "This data will provide context and support for the primary findings by offering information on electric vehicle policies, market trends, and previous research conducted on electric mobility in India".

3.3 Sampling Techniques

"A **convenience sampling** method will be used to select respondents for the survey". This approach involves reaching out to easily accessible participants through online platforms, social media groups focused on electric vehicles, and professional or academic networks in Delhi NCR. While convenience sampling may limit the representativeness of the data, "it is appropriate for this exploratory study given the focus on capturing the

vine convenience sampling may mine the representativeness of the data, it is appropriate for this exploratory study given the focus on capturing the views of active and interested consumers in a timely and cost-effective manner".

3.4 Data Analysis Methods

"The collected data will be analyzed using **descriptive statistical techniques**". Quantitative data will be summarized through frequency distributions, percentages, means, and cross-tabulations to identify patterns in consumer awareness, preferences, and concerns.

Qualitative responses will be examined using **thematic analysis**, which involves identifying common themes and sentiments expressed by respondents regarding electric two-wheelers. Visualization tools such as charts and graphs will be used to present findings clearly.

The data analysis will be carried out primarily using Microsoft Excel for statistical calculations and data visualization.

3.5_ Limitations of the Study

- The use of convenience sampling may affect the generalizability of the results to the entire population of Delhi or India.
- Reliability on internet surveys could exclude potential respondents who are less tech-savvy or have limited internet access.
- "The sample size may be relatively small due to time and resource constraints, limiting the depth of statistical analysis".
- The study focuses mainly on consumer perspectives and does not cover supply-side factors such as manufacturer strategies or dealer networks in detail.

CHAPTER 4:-

DATA ANALYSIS AND INTERPRETATION

1 Demographic Overview of Respondents

"A large portion of the respondents (93.8%) are in the 18–24 age group, indicating that the target audience for electric two-wheelers is predominantly youthful and likely to be more open to adopting new, eco-friendly technologies". The sample was largely male (81.3%) with a smaller female representation (18.8%). Additionally, a significant percentage of participants (93.8%) identified as students, reflecting that affordability, convenience, and practicality are key driving factors for this demographic. Geographically, the majority of responses (75%) were from Delhi, with Noida and Ghaziabad contributing smaller shares of 25% and 6.3%, respectively. This reinforces the study's focus on the Delhi NCR region.



2 "Consumer Awareness of Electric Two-Wheelers"

In terms of awareness, a considerable portion of the respondents (43.8%) rated their knowledge of electric two-wheelers as 4/5, while 25% rated it as 5/5. This indicates a strong understanding of the product within this group, suggesting that consumers are already familiar with electric two-wheelers. A small percentage (6.3%) reported a lower awareness rating, signaling that while most are informed, there may still be room for greater consumer education.



3 Factors Influencing the Purchase Decision

"When asked about the key factors influencing their purchase decision for an electric two-wheeler, 62.5% of respondents identified price as the most critical factor, emphasizing that affordability plays a crucial role in their decision-making". Other important considerations include maintenance costs (18.8%) and vehicle performance (25%). Additionally, charging infrastructure was highlighted as important by 43.8% of respondents, reinforcing the necessity for easy access to charging stations for these vehicles.



4 Barriers to Purchasing Electric Two-Wheelers

A significant barrier to purchasing electric two-wheelers is the high cost, as identified by 56.3% of respondents. The next major concern was battery charging, with 37.5% of respondents indicating that the availability and convenience of charging options could influence their decision. Lack of trust and resale value was less of an issue, with very few respondents pointing these out as barriers to purchase.



5 Affordability of Electric Two-Wheelers

When it comes to price expectations, 43.8% of respondents believe that electric two-wheelers should cost under ₹50,000, with another 43.8% opting for a price range of ₹50,000-₹80,000. Only 12.5% consider electric two-wheelers priced between ₹80,000-₹1,00,000 to be affordable. Notably, no respondents viewed vehicles above ₹1,00,000 as affordable, highlighting the importance of affordability in encouraging market adoption.



6 Importance of Charging Infrastructure

Charging infrastructure was considered a crucial element in purchasing decisions by 43.8% of respondents, who rated its importance as 5/5. "Another 25% rated it as 4/5, underlining that accessible charging options play a significant role in consumers' willingness to invest in electric two-wheelers".



7 "Market Growth for Electric Two-Wheelers in Delhi"

"According to the responses, 62.5% believe that the market for electric two-wheelers in Delhi is growing rapidly, while 37.5% think it is growing slowly". This indicates a general perception that the market is expanding, albeit at varying rates



8 Effectiveness of Government Policies

"An overwhelming 87.5% of respondents feel that government policies are effective in promoting the adoption of electric two-wheelers". Only 12.5% expressed the view that these policies are ineffective, suggesting that government support is largely seen as a positive factor for the growth of this market.



9 Desired Improvements in Future Electric Two-Wheelers

Respondents expressed various preferences for future improvements in electric two-wheelers. 31.3% are most interested in better performance and design, while 25% want fast charging options. 18.8% indicated the need for more charging stations to enhance accessibility, and 18.8% focused on after-sales service. Affordable prices and better app integration were also highlighted by a small number of respondents.



10 Overall Sentiment Towards Electric Two-Wheelers Price

The general sentiment towards electric two-wheelers is overwhelmingly positive, with 93.8% of respondents expressing a positive opinion. Only 6.3% indicated a very positive view, and none rated their opinion as negative or very negative, suggesting strong acceptance of electric two-wheelers.



4.2 _Statistical Analysis

This section explains the main statistical findings based on survey responses from participants living in Delhi and nearby NCR areas. "The data focuses on consumer awareness, preferences, and perceptions of electric two-wheelers".

1. Age and Gender Distribution

- Age Group:
 - Most respondents (93.8%) were between 18–24 years, showing strong interest in electric two-wheelers among young people.
- Gender:

Around 81.3% of the participants were male, and 18.8% were female.

2. Awareness Levels

- On a scale of 1 to 5:
 - 43.8% rated their awareness as 4.
 - 25% rated it as 5.
 - O Mean Awareness Score: 4.0
 - O This shows that respondents are fairly well-informed about electric two-wheelers.

3. Key Purchase Influencing Factors

- Price was the most important factor for 62.5% of respondents.
- Other important factors:
 - Charging infrastructure: 43.8%
 - Vehicle performance: 25%
 - O Maintenance cost: 18.8%

4. Barriers to Buying Electric Two-Wheelers

- High cost is the biggest concern for 56.3% of people.
- Charging issues are also a concern for 37.5%.

Only a small number of people mentioned low resale value or lack of trust.

5. Price Preferences

- 43.8% of respondents want electric two-wheelers priced below ₹50,000.
- 43.8% prefer a price range of ₹50,000–₹80,000.
- Only **12.5%** are okay with a price above ₹80,000.
- 0% accept prices above ₹1,00,000.

This clearly shows that **affordability is very important** to most consumers.

6. Importance of Charging Infrastructure

- 43.8% rated charging facility importance as 5/5
- 25% rated it as 4/5.
- Average rating: 4.2 out of 5

This proves that easy access to charging stations is a major deciding factor.

7. Views on Market Growth

- 62.5% think the market for electric two-wheelers is growing rapidly.
- 37.5% believe it is growing slowly.

This shows that most people are optimistic about the future of electric vehicles in Delhi.

8. Effectiveness of Government Policies

- 87.5% said that government policies are effective in promoting electric two-wheelers.
- Only **12.5%** said policies are not effective.

This means that support from the government is making a real difference.

9. Desired Improvements in Future Models

When asked about what features they would like to see improved:

- 31.3% want better design and performance.
- 25% want fast charging.
- 18.8% want more charging stations.
- 18.8% want better after-sales service.
- Others mentioned **better apps** and **affordable prices**.

10. Overall Sentiment

- 93.8% of people have a positive opinion about electric two-wheelers.
- Only 6.3% had a very positive opinion.
- 0% were negative.

This shows strong acceptance and interest in electric two-wheelers among Delhi residents.

4.3_ Key Findings

- Young Consumers Are Leading the Shift Most respondents were between 18–24 years old, showing that younger people are more open to adopting electric two-wheelers.
 High Awareness Among Respondents
- Many participants rated their knowledge about electric two-wheelers as 4 or 5 out of 5, indicating strong awareness in the target group.
- 3. Price Is the Most Important Factor

"Over 60% of people said that price plays the biggest role in their decision to buy an electric two-wheeler". "This highlights the need for more budget-friendly options".

4. Charging Infrastructure Matters

Nearly half of the respondents said that access to charging stations is very important, showing the need for better infrastructure in Delhi NCR.

- High Cost Remains a Barrier More than half of the respondents said that the current prices are too high, which prevents them from buying electric two-wheelers.
- 6. Most People Prefer Lower Price Ranges Around 88% of people said that electric two-wheelers should cost under ₹80,000, with many preferring prices below ₹50,000.
- 7. Government Support Seen as Helpful

A large majority of respondents believe that government incentives and policies are effective in encouraging people to switch to electric twowheelers.

8. Positive View of Market Growth

Most participants "feel the electric two-wheeler market in Delhi" is expanding, though some feel it is growing slowly.

- 9. Consumers Want Better Features
- People are looking for faster charging, improved designs, more charging stations, and better after-sales service in future models.
- 10. Overall Sentiment Is Very Positive

Almost all respondents had a positive opinion about electric two-wheelers, showing strong acceptance and interest in eco-friendly transport options.

CHAPTER 5: -

DISCUSSION & CONCLUSION

5.1_ Summary of Findings

"The research aimed to evaluate consumer acceptance and the market potential of electric two-wheelers (E2Ws) in Delhi. The key findings from the survey of 50 respondents include":

- High Awareness: Most respondents, especially those aged 18–24, are aware of electric two-wheelers and their environmental and cost-saving benefits.
- Affordability Concerns: Price was the most significant factor influencing purchase decisions, with 88% of participants considering electric two-wheelers affordable only if priced below ₹80,000.
- Charging Infrastructure as a Key Barrier: Over 43% rated the availability of charging stations as a critical factor influencing their decision.
- Battery Life and Performance Doubts: Concerns over battery range and long-term performance are still prevalent.
- Positive Sentiment: Nearly all respondents (94%) had a positive outlook on electric two-wheelers, indicating a receptive market.

5.2 Discussion in Context of Literature Review

The findings align closely with prior studies. As highlighted in the CEEW and Kantar reports, consumers are well-informed but remain cautious due to infrastructure limitations and high initial costs. The literature also emphasized that while Delhi's EV policy has boosted awareness and registrations, affordability and convenience remain central to mass adoption.

This study reinforces the idea that **younger consumers** and **students** are the most receptive demographic, which corresponds with national trends reported by the Economic Times and NITI Aayog. However, as seen in earlier research, long-term reliability and limited consumer trust in battery performance remain gaps that need addressing.

5.3_ Managerial Implications

For manufacturers, policymakers, and EV startups, the study presents several actionable insights:

- Product Strategy: Focus on launching budget-friendly models (below ₹80,000) targeting young, urban consumers.
- Infrastructure Planning: Collaborate with local authorities to expand charging infrastructure across residential and commercial areas in Delhi.
- Marketing: Emphasize long-term cost savings and environmental benefits in promotional strategies.
- After-Sales Support: Build trust by offering extended warranties, easy service, and transparent communication about battery replacement costs.

5.4 _Recommendations

Based on the study results and market trends, the following recommendations are proposed:

- 1. Reduce Initial Costs
 - Expand government subsidies.
 - 0 Offer low-interest financing and EMI plan to increase affordability.
- 2. Improve Charging Infrastructure
 - Install more public and residential charging points.
 - Promote mobile charging solutions and fast-charging stations.
- 3. Enhance Battery Technology
 - Invest in R&D for longer battery life and faster charging.
 - Offer battery replacement plans and promote battery recycling.

4. Educational Consumers

- O Run awareness campaigns on EV incentives and ownership costs.
- Use influencers and digital platforms to reach younger audiences.

5. Strengthen After-Sales Service

- 0 Build a wide service network with reliable customer support.
- O Provide online support channels and regular maintenance packages.
- 6. Target Key Segments
 - O Focus on delivery partners, students, and young professionals who rely on personal mobility.
 - Highlight savings, convenience, and pollution reduction in campaigns.
- 7. Leverage Government Support
 - O Partner with government bodies to optimize the Delhi EV policy.
 - Use policy incentives to attract new buyers and encourage manufacturers.

5.5_Limitations & Future Scope of Study

Limitations:

- "The study was conducted with a small sample size (n = 50), limiting its generalizability to the entire Delhi population".
- Convenience sampling may introduce bias, as the sample mainly included students and young users.
- Data was collected through online surveys, which may exclude non-digital users.

Future Scope:

- Future studies can expand to a larger and more diverse sample, including working professionals, senior citizens, and low-income groups.
- Comparative research across different cities like Mumbai, Bengaluru, and Hyderabad can offer insights into regional differences in EV adoption.
- Longitudinal studies can track changes in consumer behavior over time, especially as infrastructure and government policies evolve.
- Research can also focus on user experience, long-term vehicle performance, and the resale "market for electric two-wheelers".

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