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ASSESSING CUSTOMER PERCEPTION TOWARD ELECTRIC VEHICLES IN POLLACHI

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ABSTRACT
This study explores customer perception towards electric vehicles (EVs) in Pollachi, a semi-urban region of Tamil Nadu. Given the increasing environmental concerns and advancements in technology, it is essential to comprehend public attitudes towards electric vehicles (EVs) for their effective integration into the market. This research utilized structured questionnaires to collect data from 152 participants, concentrating on their awareness, factors influencing their decisions, levels of satisfaction, and intent to purchase EVs. Statistical analyses, including Chi-square and ANOVA tests, were conducted to explore the relationships between demographic characteristics and consumer perceptions. The Chi-square tests indicated a notable correlation between gender and overall perception, as well as between income levels and the willingness to buy EVs. The ANOVA analysis revealed variations in satisfaction levels among different income brackets. The results underscore that, despite high levels of awareness, issues related to cost, charging infrastructure, and service quality continue to hinder the adoption of EVs. The study advocates for localized awareness initiatives, targeted financial incentives, and improved infrastructure to promote the growth of EV adoption.
KEYWORDS: *Electric Vehicles, Customer Perception, Chi-Square Test, ANOVA, EV Adoption, Pollachi, Satisfaction, Income Level*

I. INTRODUCTION

The shift toward electric vehicles (EVs) marks a significant transformation in the global transportation landscape. Governments and manufacturers are accelerating the push for EV adoption in response to climate change, rising fuel costs, and urban pollution. While metro cities have seen a surge in EV uptake, smaller towns and semi-urban regions like Pollachi are still at a formative stage. Understanding customer perception in such regions is crucial to ensuring balanced growth in EV adoption.

Pollachi, a town in the Coimbatore district of Tamil Nadu, presents a unique blend of urban and rural consumers. This study focuses on analyzing the perceptions, preferences, and barriers faced by potential EV users in Pollachi. It explores factors influencing EV adoption, such as affordability, charging infrastructure, environmental awareness, and after-sales support. The objective is to provide actionable insights for stakeholders to design region-specific strategies that can accelerate EV adoption in non-metro markets.

II. REVIEW LITERATURE

1. **Sheykhfard et al. (2025)** analyze consumer experiences in purchasing used EVs using structural equation modelling. They highlight that charging ease significantly impacts future purchase intentions, whereas negative experiences deter repeat purchases. Their findings suggest that improving charging infrastructure and addressing battery concerns can enhance the used EV market (Sheykhfard et al., 2025).
2. **Chen and Zhang (2024)** study EV purchase intentions based on customer evaluations and personal information. They use the random forest method to predict purchase behaviors and suggest that brand perception and technological advancements play crucial roles in consumer decision-making (Chen and Zhang, 2024).
3. **Kumar et al. (2024)** investigate factors influencing post-purchase behavior of E-Bike users. Their research identifies key motivators such as mileage, comfort, and maintenance costs while highlighting safety concerns as a deterrent (Kumar et al., 2024).
4. **Jagtap and Alvi (2023)** examine the two-wheeler market, focusing on consumer preferences and post-purchase satisfaction. Their study suggests that brand image and perceived quality strongly influence purchase decisions (Jagtap and Alvi, 2023).

5. **Thamotharan et al. (2023)** discuss factors shaping post-purchase satisfaction of E-Bike users, emphasizing economic and physical benefits over traditional vehicles. They note that peer influence plays a significant role in purchase decisions (Thamotharan et al., 2023).
6. **Khraim (2022)** explores post-purchase dissonance in EV consumers, finding that perceived risks and functional characteristics significantly impact consumer satisfaction. The study calls for improved consumer education to reduce dissonance (Khraim, 2022).

III. RESEARCH OBJECTIVE

1. To analyze consumer awareness and perception of electric vehicles (EVs) in Pollachi, including their preferences and concerns.
2. To identify key factors influencing EV adoption, such as price, charging infrastructure, battery life, maintenance costs, and environmental awareness.
3. To examine what are the different factors that limit the consumers to choose electric vehicles
4. To assess customer satisfaction with EVs in terms of performance, cost-effectiveness, and convenience compared to conventional fuel-powered vehicles.

IV. SCOPE OF RESEARCH

1. This study explores customer perceptions of EVs in Pollachi, focusing on key factors like price, charging infrastructure, maintenance, battery life, performance, and after-sales support.
2. It examines the influence of demographic variables such as age, gender, income, and education on consumer attitudes and EV ownership experiences.
3. The research also assesses the local EV infrastructure and provides actionable recommendations for manufacturers and policymakers to enhance adoption in semi-urban areas.

V. RESEARCH METHODOLOGY

This study adopts a **descriptive research design** to analyze customer perception towards electric vehicles (EVs) in Pollachi, a semi-urban region in Tamil Nadu. The research focuses on understanding awareness, adoption drivers, satisfaction levels, and perceived barriers related to EV usage.

Study Area and Population

The research was conducted in **Pollachi**, targeting residents who are either current EV users or potential buyers. Respondents included students, professionals, farmers, and business owners.

Sampling Technique and Sample Size

A **convenience sampling** method was used to select respondents who were easily accessible and willing to participate. A total of **152 respondents** were surveyed.

Data Collection

- **Primary data** was collected through a **structured questionnaire** that covered demographics, awareness, influencing factors, satisfaction levels, and perceptions related to EVs.
- **Secondary data** was sourced from journals, articles, government reports, and EV industry publications.

Tools for Analysis

Data was analyzed using **SPSS** software with the following tools:

- **Percentage Analysis** – To assess frequency and distribution of responses.
- **Chi-Square Test** – To examine associations between categorical variables.
- **ANOVA** – To analyze differences in satisfaction across income groups.

The results were visually represented using **charts and tables** for clarity and better interpretation.

Hypothesis of study

- **H_{01}:** There is no significant association between gender and overall perception of electric vehicles.
- **H_{02}:** There is no significant association between age group and barriers to purchasing electric vehicles.
- **H_{03}:** There is no significant difference in the overall perception of electric vehicles among different age groups.

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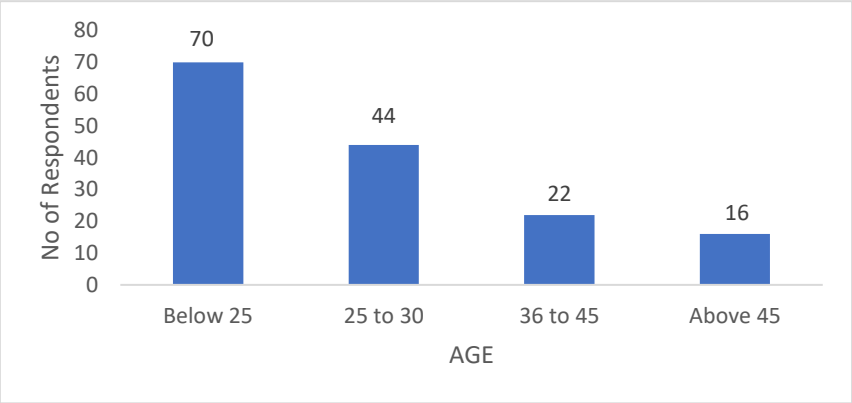
VI. DATA ANALYSIS AND INTERPRETATION

➢ PERCENTAGE ANALYSIS

Age Wise Classification of the Respondents

Age in Years	No. of Respondents	Percentage
Below 25	70	46.1
25 to 30	44	28.9
36 to 45	22	14.5
Above 45	16	10.5
Total	152	100.0

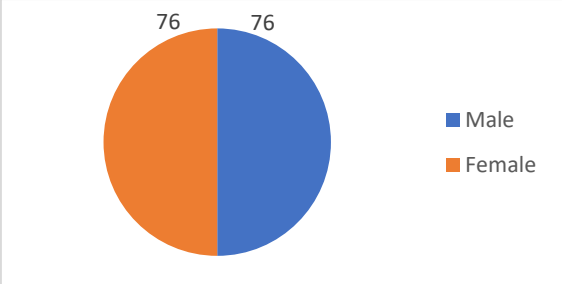
Most respondents (46.1%) are under the age of 25, indicating a youthful sample base.



Gender-wise Distribution of Respondents

Gender	No. of Respondents	Percentage
Male	76	50.0
Female	76	50.0
Total	152	100.0

The respondents are evenly split between male and female, each comprising 50% of the sample.

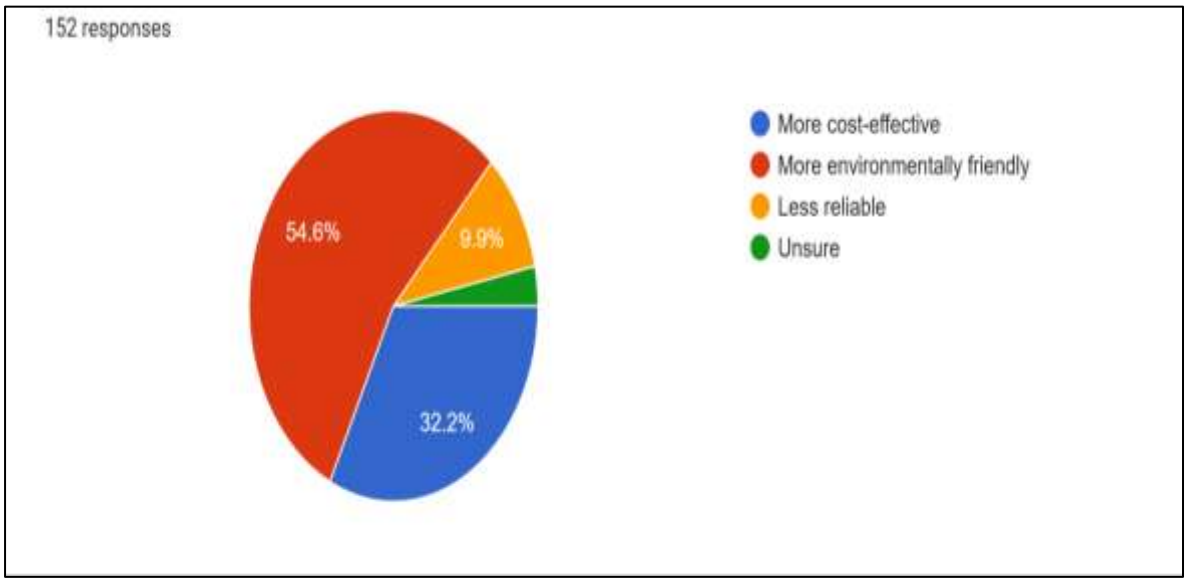


Perception of EVs Compared to ICE Vehicles

Perception Category	No. of Respondents	Percentage
More cost effective	49	32.2
More environmentally friendly	83	54.6
I have concern about reliability	15	9.9
Unsure	5	3.3
Total	152	100.0

A majority (54.6%) perceive EVs as more environmentally friendly, while 32.2% see them as more cost-effective.

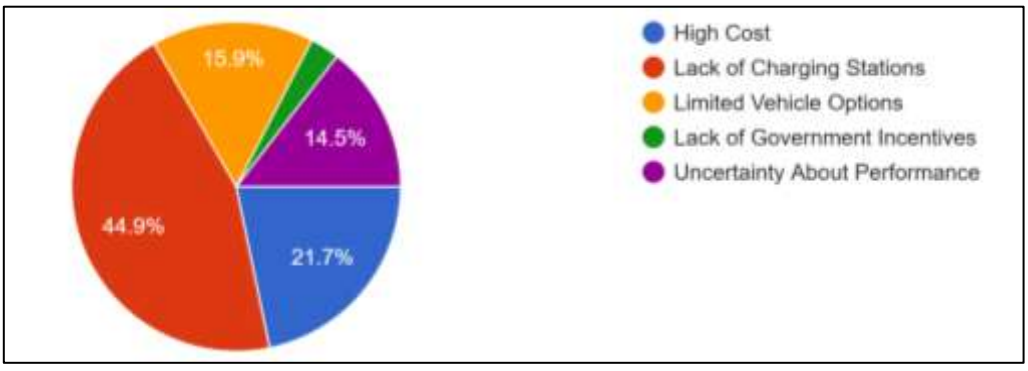
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Barriers to EV Purchase (Among Non-EV Owners)

Preventing Factors	No. of Respondents	Percentage
High Cost	15	9.9
Lack of Charging Stations	31	20.4
Limited Vehicle Options	11	7.2
Lack of Government Incentives	2	1.3
Uncertain about Performance	10	6.6
Total (non-owners only)	69	45.4

The most cited barrier is the lack of charging stations (20.4%), followed by high cost (9.9%).



Occupation-wise Distribution of Perception Levels

Occupation	Very Poor	Poor	Fair	Good	Excellent	Total Respondents
Student	10	22	18	6	5	61
Working Professional	5	12	23	9	7	56
Business	3	6	12	1	1	23
Agriculture	2	5	5	3	0	15
Total	20	45	58	19	13	152

Across occupations, most respondents rated their overall EV perception as *fair* or *poor*, with working professionals showing slightly more favorable perceptions.

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- **CHI-SQUARE TEST**

Gender of the Respondents and Overall Perception Electric Vehicles

	Value	df	Asymptotic Significance (2-sided)
Pearson Chi-Square	18.769	4	.001
Likelihood Ratio	21.593	4	.000
Linear-by-Linear Association	13.251	1	.000
N of Valid Cases	152		

H_0: There exist no association between gender of the respondents and overall perception of electric vehicles.
Calculated $\chi 2$ Value: 18.769
Degree of freedom: 4
Signification level: .001

INTERPRETATION

As the calculated $\chi 2$ value (18.769) is significant (.001) at five percent level, there exist an association between gender of the respondents and overall perception of electric vehicles. Hence the null hypothesis is **rejected**. So, Gender plays a significant role in shaping consumer perception of electric vehicles; hence, promotional strategies may benefit from being gender-sensitive.

Age of the Respondents and Barriers to buy EV

	Value	df	Asymptotic Significance (2-sided)
Pearson Chi-Square	9.838	12	.630
Likelihood Ratio	10.282	12	.591
Linear-by-Linear Association	.966	1	.326
N of Valid Cases	69		

H_0: There is no association between age group and barriers to purchasing EVs.
Calculated $\chi 2$ Value: 9.838
Degree of freedom: 12
Signification level: .630

INTERPRETATION

As the calculated χ^2 value (9.838) is not statistically significant ($p = 0.630$), which is greater than the five percent significance level ($\alpha = 0.05$), it suggests that there is no significant association between the age group of the respondents and the barriers to purchasing electric vehicles. Hence, the null hypothesis is not rejected.

- **ANOVA (ANALYSIS OF VARIANCE)**

Age of the Respondents and their overall perception of EVs

ONE-WAY ANOVA					
	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	2.703	3	.901	.693	.557
Within Groups	192.291	148	1.299		
Total	194.993	151			

H0: There is no significant difference in the overall perception of electric vehicles among different age groups.
H1: There is a significant difference in the overall perception of electric vehicles among different age groups.

INTERPRETATION

As the significance value ($p = 0.557$) is greater than the 5% level of significance ($\alpha = 0.05$), the result is not statistically significant. This indicates that there is **no significant difference** in the overall perception of electric vehicles among different age groups. Hence, the **null hypothesis is not rejected**.

VII. FINDINGS

- High Awareness, Low Adoption: Although awareness about electric vehicles (EVs) is high among Pollachi residents, actual adoption remains limited due to practical concerns.
- Demographic Influence: Gender has a significant influence on perception—male and female respondents differ in how they perceive EVs. Age does not significantly affect the perception or the barriers to adoption.

- Key Perceptions: 54.6% consider EVs more environmentally friendly. 32.2% believe they are more cost-effective than traditional vehicles. A minority express concerns about reliability or remain unsure.
- Main Barriers to Adoption: Lack of Charging Stations (20.4%) is the most cited concern. Followed by High Cost (9.9%) and Limited Vehicle Options (7.2%).
- Satisfaction Levels: Majority of respondents, across occupations, rate their perception of EVs as either "Fair" or "Poor." Students and professionals show more openness but also concern about affordability and reliability.

VIII. SUGGESTIONS AND RECOMMENDATIONS

- Enhance Charging Infrastructure: Establish more public and private charging stations in and around Pollachi to reduce range anxiety and encourage confidence in EV usability.
- Provide Financial Incentives: Offer region-specific subsidies or low-interest loans for EV purchases. Tailor incentives to different income groups to boost affordability.
- Gender-Specific Outreach: Since perception varies significantly by gender, create targeted awareness campaigns to address differing priorities and concerns.
- Educate Consumers: Conduct workshops, roadshows, and demo drives to debunk myths about EV performance and reliability. Highlight environmental and long-term financial benefits.
- Encourage Local Dealerships and Service Center: Improve after-sales service by setting up authorized EV service points. Expand dealership networks to ensure availability and reduce buyer hesitation.

IX. CONCLUSION

The study reveals that while awareness of electric vehicles (EVs) is relatively high in Pollachi, adoption remains limited due to barriers such as high cost, lack of charging infrastructure, and limited-service support. However, adoption is steadily rising, driven by falling battery prices, expanding charging networks, and improved after-sales services. Most respondents view EVs as environmentally friendly but are concerned about practicality and affordability. To enhance EV adoption in semi-urban areas, region-specific policies, better infrastructure, financial incentives, and public education are essential. A collaborative effort by manufacturers, policymakers, and local stakeholders is needed to promote sustainable transportation through EV integration in emerging markets.

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