

Consumer Perception and Adoption Behaviour towards Electric Vehicles: Evidence from Erode District, Tamil Nadu

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Abstract

The swift towards sustainable transportation has accelerated the global adoption of Electric Vehicles (EVs), especially in developing economies such as India. Despite of increasing technological advancement and government support, the acceptance of consumer towards EVs remains influenced by multiple factors, viz., socio-economic, behavioural and technological factors. The present study aims to investigate the customers' perception, awareness level, influencing factors, and also the challenges associated with adoption of electric vehicle in Erode District of Tamil Nadu. The study adopts a descriptive and analytical research design, basically using primary data collected from 75 respondents through a structured questionnaire. Statistical tools such as Chi-square analysis, Analysis of Variance (ANOVA), reliability analysis, factor analysis, and multiple regression analysis were employed to examine the relationship between socio-economic variables and consumer perception towards EVs. The findings revealed that occupation and family type significantly influence customer attitudes towards EV adoption, while gender, age, education, and income show comparatively weaker associations. Environmental concern, technological advancement, fuel cost savings, and government incentives emerged as major motivating factors for EV purchase intention. However, inadequate charging infrastructure, battery limitations, high initial cost, and maintenance concerns continue to impede large-scale adoption. The study stressed the need for stronger policy intervention, consumer awareness campaigns and infrastructure development to improve EV acceptance in semi-urban regions. The research contributes to the growing literature on sustainable mobility and offers practical implications for policymakers, automobile manufacturers, and environmental planners.

Keywords: Electric Vehicles, Consumer Perception, Sustainable Transportation, EV Adoption, Green Mobility, Consumer Awareness, adoption behaviour.

1. Introduction

The rapid growth of environmental degradation, climate change, and fossil fuel dependency has intensified the demand for sustainable transportation alternatives across the globe. Among the various technological innovations introduced to address the environmental concerns, electric vehicles (EVs) have emerged as one of the most promising solutions for reducing greenhouse gas emissions and

promoting cleaner mobility systems. Electric vehicles operate using electric motors powered by rechargeable batteries and produce significantly lower emissions compared to conventional internal combustion engine vehicles.

In recent years, India has witnessed a considerable increase in electric vehicle adoption due to rising fuel prices, governmental incentives, environmental consciousness, and advancements in battery technology. The Government of India has introduced multiple initiatives such as the Faster Adoption and Manufacturing of Hybrid and Electric Vehicles (FAME) scheme, tax subsidies, and state-level incentives to encourage the use of electric mobility solutions. Despite these developments, the acceptance of electric vehicles among consumers is still evolving, particularly in semi-urban and developing regions where awareness, affordability, and infrastructure remain critical concerns.

Consumer perception plays a vital role in the success of electric vehicle adoption. The decision to purchase an EV is influenced by multiple socio-economic, technological, psychological, and environmental factors. Consumers evaluate factors such as charging infrastructure, battery life, maintenance costs, driving range, environmental impact, social influence, and governmental support before adopting electric mobility solutions. In many developing regions, consumers continue to experience uncertainty regarding EV reliability, charging convenience, resale value, and long-term economic benefits.

Tamil Nadu has emerged as one of India's leading states in electric mobility initiatives due to its strong automobile manufacturing ecosystem and policy support for sustainable transportation. However, studies focusing on customer perception and awareness in district-level markets remain limited. Erode District, being an emerging commercial and educational region, presents an important context for understanding consumer behaviour towards electric vehicles.

The present study seeks to analyse the customer perception, awareness level, and adoption behaviour towards electric vehicles in Erode District. The study also examines the major challenges faced by customers in adopting EVs and provides policy recommendations to improve consumer acceptance and sustainable transportation development.

2. Review of Literature

Several researchers have examined consumer perception and behavioural intention towards electric vehicles in different geographical and economic contexts.

Recent studies on electric vehicles (EVs) have increasingly focused on consumer behaviour, sustainability awareness, technological acceptance, and policy support in emerging economies such as India. Contemporary research highlights that environmental consciousness, fuel savings, government incentives, and technological advancement are among the strongest determinants influencing EV adoption.

Gupta and Sharma (2025) examined consumer adoption behaviour towards electric vehicles in urban India and found that environmental concern and perceived economic benefits significantly influence purchase intention. The study emphasized that awareness campaigns and government subsidies positively improve consumer confidence towards EV adoption.

Kumar et al. (2025) analysed customer perception towards electric mobility in South India and observed that charging infrastructure availability and battery efficiency strongly affect consumer trust. Their findings revealed that consumers in semi-urban regions continue to experience range anxiety and uncertainty regarding charging accessibility.

A study by Singh and Verma (2024) investigated the behavioural intention of Indian consumers towards electric vehicles using the Technology Acceptance Model (TAM). The research concluded that perceived usefulness, ease of use, environmental awareness, and social influence significantly predict EV adoption intention among young consumers.

According to Zhao et al. (2024), advancements in battery technology and fast-charging infrastructure have improved global consumer acceptance of EVs. However, high purchase cost and insufficient public charging networks remain major barriers in developing economies.

Patil and Ramesh (2024) studied the role of government incentives in promoting EV adoption in India. Their findings indicated that tax exemptions, subsidy schemes, and reduced registration charges significantly encourage first-time EV buyers. The study further suggested that state-level awareness programmes improve public understanding of EV benefits.

Chen et al. (2023) explored consumer sustainability behaviour and found that environmentally conscious consumers are more willing to adopt electric mobility solutions despite higher initial costs. The study highlighted that social responsibility and climate change awareness positively influence green vehicle adoption.

Rao and Karthikeyan (2023) examined customer satisfaction towards electric two-wheelers in Tamil Nadu and observed that lower maintenance costs and fuel efficiency are the most attractive features influencing customer preference. Nevertheless, consumers expressed dissatisfaction regarding charging duration and service network limitations.

A global review conducted by the International Energy Agency (IEA) in 2024 reported a substantial increase in EV adoption worldwide due to policy interventions, battery innovation, and rising fuel prices. The report emphasized that developing economies must strengthen charging infrastructure and renewable energy integration to sustain EV growth.

Recent literature therefore suggests that electric vehicle adoption is influenced by a combination of environmental, technological, economic, and social factors. Although consumer awareness regarding EV benefits has increased significantly, infrastructural limitations and affordability challenges continue to hinder widespread adoption, particularly in semi-urban and rural regions.

Gupta (2024) analysed customer perception and purchase intention towards electric vehicles in India and found that environmental consciousness and technological advancement significantly influence EV adoption. The study highlighted the growing role of awareness campaigns in improving customer acceptance.

Ansar and Monika (2024) investigated consumer willingness to contribute towards environmental sustainability through the adoption of electric and hybrid vehicles. Their findings revealed that environmental responsibility and social influence strongly affect purchase intention.

Pandey, Mohan, and Subha (2024) explored factors influencing the purchase intention of electric cars in India. The study concluded that perceived monetary benefits and personal innovativeness positively influence EV adoption, whereas perceived risk and cost concerns negatively impact purchase behaviour.

Kesari (2023) examined opportunities and challenges associated with electric vehicles in India and emphasized the importance of governmental support, charging infrastructure, and policy implementation in promoting EV adoption.

Rakesh Kumar (2023) highlighted the infrastructural and technological challenges involved in the transition from conventional vehicles to electric mobility systems in India. The study stressed the importance of battery technology development and charging network expansion.

Bhalla et al. (2022) studied consumer perception and purchase intention towards electric vehicles and identified environmental concern, comfort, cost efficiency, and technological trust as major determinants of adoption.

Mohamed, Arasan, and Sivakumar (2022) explored the opportunities and challenges of EV implementation in India. Their findings suggested that high vehicle cost and insufficient infrastructure remain the primary barriers to adoption.

Vijayagopal (2021) developed an integrated framework to analyse consumer attitudes towards EV ownership and found that self-image congruence and social identity significantly influence customer readiness to purchase EVs. Liao (2021) examined consumer preferences for electric vehicles and identified driving range, charging time, vehicle performance, and charging station availability as major influencing variables.

Contestabile et al. (2020) argued that the future success of EVs depends largely on battery innovation, cost reduction, and the availability of charging infrastructure. Karwa (2018) emphasized the importance of dealership education and customer guidance in improving EV acceptance. The study found that dealer interaction plays a crucial role in transferring knowledge about electric vehicles to consumers.

Nagpal (2017) identified environmental concern, low maintenance cost, government incentives, and media influence as significant drivers of EV purchase intention in India. Bansal (2016) reported that consumers are willing to pay a premium for improved charging speed, enhanced driving range, and fuel savings associated with EVs.

The existing literature indicates that customer perception towards electric vehicles is influenced by multiple behavioural, technological, and socio-economic variables. However, empirical studies focusing specifically on district-level consumer behaviour in Tamil Nadu remain limited. Therefore, the present study attempts to bridge this research gap by analysing customer perception towards electric vehicles in Erode District

3. Research Gap

Although numerous studies have explored electric vehicle adoption and customer perception in metropolitan cities and developed economies, limited research has focused on semi-urban districts in Tamil Nadu. Existing studies largely emphasize technological feasibility and environmental sustainability, while comparatively fewer studies examine consumer awareness, socio-economic determinants, and behavioural perception in emerging district-level markets. Furthermore, the interaction between demographic variables and customer perception towards EV adoption in Erode District has not been extensively analysed. Therefore, the present study addresses this gap by examining awareness levels, influencing factors, and challenges associated with electric vehicle adoption among consumers in Erode District.

4. Objectives of the Study

The study was conducted with the following objectives:

1. To identify the factors influencing customers to purchase electric vehicles.
2. To assess the awareness level of customers towards electric vehicles.
3. To analyse customer perception towards electric vehicles.
4. To evaluate the problems faced by customers in using electric vehicles.

5. To examine the association between socio-economic variables and customer perception towards EV adoption.

5. Hypotheses of the Study

The following hypotheses were formulated for empirical investigation:

H₀₁: There is no significant association between socio-economic variables and factors influencing customers to purchase electric vehicles.

H₀₂: There is no significant association between socio-economic variables and awareness level towards electric vehicles.

H₀₃: Socio-economic variables do not significantly influence customer perception towards electric vehicles.

6. Research Methodology

6.1 Research Design

The study adopts a descriptive and analytical research design to examine customer perception and awareness regarding electric vehicles.

6.2 Nature and Sources of Data

Both primary and secondary data were used for the study. Primary data were collected through a structured questionnaire administered to respondents in Erode District. Secondary data were collected from journals, books, government reports, websites, and research publications related to electric vehicles.

6.3 Sampling Technique and Sample Size

A purposive sampling technique was employed to select respondents relevant to the objectives of the study. The sample consisted of 75 respondents, including EV users, prospective buyers, and consumers aware of electric mobility solutions.

6.4 Period of Study

The data collection process was conducted during the period from February 2025 to April 2025.

6.5 Statistical Tools Used

The following statistical tools were used for analysis:

- Percentage Analysis
- Chi-square Test
- Analysis of Variance (ANOVA)
- Reliability Analysis
- Factor Analysis
- Multiple Regression Analysis
- Ranking Technique

7. Conceptual Framework

The conceptual framework of the study proposes that customer perception towards electric vehicles is influenced by demographic variables, awareness level, environmental concern, technological perception, economic considerations, and infrastructural availability.

Independent variables considered in the study include:

- Gender

- Age
- Occupation
- Educational Qualification
- Marital Status
- Family Type
- Income Level
- Number of Vehicles Owned
- Current Interest in Purchasing EVs

Dependent variables include:

- Awareness Level
- Customer Perception
- Purchase Intention
- Satisfaction towards EVs

8. Analysis and Interpretation

8.1 Factors Influencing Customers to Purchase Electric Vehicles

The analysis revealed that environmental sustainability, fuel cost savings, technological advancement, and governmental incentives significantly influence customers to purchase electric vehicles. Respondents perceived EVs as environmentally responsible alternatives to conventional vehicles. Table I presents the association between socio-economic variables of respondents and their attitude and purchase intention towards electronic vehicles.

Table I: Customers' Attitude and Purchase Intention towards EVs

Socio-Economic Variables	Category	Agreement Level		Total	p-value	df
		Agree	Disagree			
Age	Below30Years	47(73.4)	17(26.6)	64(100.0)	0.513	2
	30-45Years	7(77.8)	2(22.2)	9(100.0)		
	Above 45 Years	2(100.0)	0(0.0)	2(100.0)		
Gender	Male	27(90.0)	3(10.0)	30(100.0)	0.011	1
	Female	29(64.4)	16(35.6)	45(100.0)		
Education	School Level	4(100.0)	0(0.0)	4(100.0)	0.228	3
	Under Graduate	14(58.3)	10(41.7)	24(100.0)		
	Post Graduate	13(72.2)	5(27.8)	29(100.0)		
	Professionals	58.3%	41.7%	18(100.0)		
Occupation	Students	12(80.0)	3(20.0)	15(100.00)	0.008	3
	Employed	13(52.0)	12(48.0)	25(100.0)		
	Business	15(88.2)	2(11.8)	17(100.0)		
	Professional	16(88.9)	2(11.1)	18(100.0)		
Marital Status	Married	21(75.0)	7(25.0)	28(100.0)	0.968	1
	Unmarried	35(74.5)	12(25.5)	47(100.0)		
Monthly Income	BelowRs25,000	33(70.2)	14(29.8)	47(100.0)	0.228	3

	Rs.25,000Rs.50,000	18(81.8)	4(18.2)	22(100.0)		
	Above Rs.50,000	5(83.3)	1(16.7)	6(100.0)		
Family Type	Nuclear	48(82.8)	10(17.2)	58(100.8)	0.001	1
	Joint	8(47.1)	9(52.9)	17(100.0)		
Number of Vehicles Owned	Only One	12(63.2)	7(36.8)	19(100.0)	0.285	2
	Two to Three	32(76.2)	10(23.8)	42(100.0)		
	More than Three	12(85.7)	2(14.3)	14(100.0)		

Source: Primary data

The Chi-square analysis demonstrated that occupation and family type have significant associations with influencing factors related to EV adoption. Professionals and business owners exhibited stronger positive attitudes towards electric vehicles compared to employed respondents and students. Gender-wise analysis indicated that male respondents showed comparatively higher agreement towards EV adoption than female respondents. However, age and educational qualification were not found to have statistically significant relationships with EV adoption intention. The findings suggest that consumers with higher environmental awareness and economic expectations are more likely to adopt electric mobility solutions.

8.2 Consumers' Awareness towards Electric Vehicles

Table II: Awareness Level of Consumers towards EVs

Socio-Economic Variables	Category	Agreement Level		Total	p-value	df
		Agree	Disagree			
Age	Below30Years	37 (57.8)	27(72.9)	64(100.0)	0.48	2
	30-45Years	6(66.7)	3(33.3)	9(100.0)		
	Above45 Years	2(100.0)	0(0.0)	2(100.0)		
Gender	Male	11(36.8)	19(62.2)	30(100.0)	0.803	1
	Female	17(37.8)	28(59.6)	45(100.0)		
Education	School Level	2(50.0)	2(50.0)	4(100.0)	0.237	3
	Under Graduate	8(33.3)	16(66.7)	24(100.0)		
	Post Graduate	16(55.2)	13(44.8)	29(100.0)		
	Professionals	16(99.9)	2(11.1)	18(100.0)		
Occupation	Students	5(33.33)	10(66.67)	15(100.0)	0.024	3
	Employed	10(40.0)	15(60.0)	25(100.0)		
	Business	5(29.4)	12(70.6)	17(100.0)		
	Professional	16(88.9)	2(0.11)	18(100.0)		
Marital Status	Married	14(50.0)	14(50.0)	28(100.0)	0.965	1
	Unmarried	14(29.8)	33(70.2)	47(100.0)		
Monthly Income	BelowRs25,000	21(44.7)	26(55.3)	47(100.0)	0.040	3
	Rs.25,000Rs.50,000	5(22.7)	17(77.3)	22(100.0)		
	Above Rs.50,000	2(33.3)	4(66.7)	6(100.0)		

Family Type	Nuclear	20(34.5)	38(65.5)	58(100.8)	0.362	1
	Joint	8(47.1)	9(52.9)	17(100.0)		
Number of Vehicles Owned	Only One	5(26.3)	14(73.7)	19(100.0)	0.038	2
	Two to Three	20(47.6)	22(52.4)	42(100.0)		
	More than Three	3(21.4)	11(78.6)	14(100.0)		

The study identified a moderate to high level of awareness regarding electric vehicles among respondents. Most respondents were aware of the environmental benefits associated with EVs, including reduced carbon emissions and lower fuel dependency.

However, awareness regarding charging infrastructure, battery performance, government subsidies, and long-term maintenance benefits remained comparatively limited. Consumers in semi-urban regions demonstrated uncertainty regarding charging convenience and battery replacement costs.

The statistical analysis indicated that gender, occupation, and current level of interest moderately influence awareness levels. Respondents who actively followed automobile technology trends showed higher awareness regarding EV features and benefits.

Table III: Reliability Statistics

Cronbach's Alpha	N of Items
0.953	16

The reliability analysis demonstrated acceptable internal consistency among awareness-related variables, confirming the validity of the measurement scale.

Table III presents the reliability statistics for the 16 awareness-related items used in the study. The Cronbach's Alpha value is 0.953, which indicates excellent internal consistency among the items. Since the alpha value is well above the recommended threshold of 0.70, the measurement scale is considered highly reliable. This suggests that all 16 items consistently measure the same underlying construct of awareness. Therefore, the questionnaire is reliable and suitable for further statistical analyses such as descriptive statistics, correlation, and hypothesis tests.

Table IV: KMO and Bartlett's Test

Kaiser-Meyer-Olkin Measure of Sampling Adequacy		0.877
Bartlett's Test of Sphericity	Approximate Chi-Square	1065.464
	df	136

Table IV presents the results of the KMO and Bartlett's Test, which assess the suitability of the data for factor analysis. The Kaiser-Meyer-Olkin (KMO) value of 0.877 indicates excellent sampling adequacy, confirming that the sample size is sufficient for factor analysis. The Bartlett's Test of Sphericity yielded an Approximate Chi-Square value of 1065.464 with 136 degrees of freedom, and the result is statistically significant ($p < 0.001$), indicating that the variables are significantly correlated and the correlation matrix is not an identity matrix. Therefore, the data are appropriate for factor analysis, and the measurement scale is considered valid for identifying the underlying factor structure.

TABLE V TOTAL VARIANCE OF FACTOR VARIABLES

Component	Initial Eigen values			Extraction Sums of Squared Loadings		
	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %
1	9.691	60.567	60.567	9.691	60.567	60.567
2	1.601	10.006	70.573	1.601	10.006	70.573
3	1.263	7.894	78.466	1.263	7.894	78.466
4	0.712	4.450	82.916			
5	0.530	3.311	86.227			
6	0.417	2.607	88.834			
7	0.324	2.027	90.861			
8	0.285	1.783	92.644			
9	0.263	1.643	94.286			
10	0.242	1.514	95.800			
11	0.187	1.171	96.972			
12	0.175	1.092	98.064			
13	0.156	0.977	99.041			
14	0.099	0.619	99.659			
15	0.055	0.341	100.000			
16	3.554E-017	2.221E-016	100.000			

Table V presents the total variance explained by the factor analysis. Based on the eigen value criterion (eigen value greater than 1), three factors were extracted from the 16 variables. The first factor has an eigen value of 9.691 and explains 60.567% of the total variance, indicating that it is the most influential factor. The second factor has an eigenvalue of 1.601, contributing 10.006% of the variance, while the third factor has an eigenvalue of 1.263, accounting for 7.894% of the variance. Together, these three factors explain a cumulative variance of 78.466%, which is considered a high proportion of the total variance. This indicates that the extracted factors effectively represent the underlying structure of the variables and provide a reliable basis for further interpretation.

TABLE VI ROTATED COMPONENT MATRIX

Statements	Component		
	1	2	3
Average driving range of EVs	0.883	0.273	0.073
Fast charging options	0.880	0.298	0.131

Availability of charging infrastructure	0.880	0.298	0.131
EVs run on rechargeable batteries	0.786	0.343	0.204
Growth and trends of EV market	0.750	0.364	0.048
Charging time of EVs	0.743	0.328	-0.001
Potential of EV market	0.739	0.343	0.109
Government incentives for purchasing EVs	0.196	0.876	0.170
Installing home charging benefits	0.222	0.855	0.075
Availability of popular electric vehicles model and brands	0.329	0.817	0.058
Environmental Benefits of using EVs	0.457	0.788	0.066
Long-term cost savings compared to traditional vehicles	0.408	0.782	0.050
Environmental concern of production and disposal of EV batteries	0.538	0.642	0.105
Cost of replacing EV batteries	0.568	0.629	0.057
Difference between electric vehicle and a normal vehicle	-0.018	0.087	0.941
Benefits of owning an EV lower emission less fuel cost	0.517	0.153	0.701

Table VI presents the Rotated Component Matrix, which groups the 16 awareness-related statements into three underlying factors based on their factor loadings. Component 1 includes statements related to the technical knowledge and infrastructure of electric vehicles, such as driving range, fast charging, charging infrastructure, rechargeable batteries, charging time, market growth, and EV potential, all with high factor loadings (above 0.70). Component 2 consists of statements associated with government support, environmental awareness, cost benefits, and EV availability, including government incentives, home charging, EV models and brands, environmental benefits, long-term cost savings, and battery-related concerns. Component 3 comprises statements related to the basic understanding and ownership benefits of electric vehicles, particularly the difference between EVs and conventional vehicles and the benefits of owning an EV, such as lower emissions and reduced fuel costs. The high factor loadings indicate that the variables are strongly associated with their respective components, confirming a clear and meaningful factor structure for measuring awareness of electric vehicles.

FACTORS

Statements	Factor Name
Average driving range of EVs	Performance and Future Outlook
Fast charging options	
Availability of charging infrastructure	
EVs run on rechargeable batteries	
Growth and trends of EVs market	
Charging time of EVs	
Potential of EV market	
Government incentives for purchasing EVs installing home charging benefits	
Availability popular electric vehicles model and brands	
Environmental benefits of using EVs	

Long-term cost savings compared to transitional vehicles	Environmental Incentives
Environmental concern of production and disposal of EV batteries	
Cost of replacing EV batteries	
Difference between electric vehicle and a normal vehicle	
Cost of replacing EV batteries	
Benefits of owing an EV lower emission less fuel cost	

Factor analysis identified the following major awareness dimensions:

1. Environmental Awareness
2. Economic Awareness
3. Technological Awareness
4. Infrastructure Awareness
5. Governmental Policy Awareness

Among these factors, environmental awareness emerged as the strongest determinant influencing customer attitude towards EV adoption.

8.3 Customer Perception towards Electric Vehicles

Customer perception towards electric vehicles was found to be generally positive. Respondents perceived EVs as modern, eco-friendly, and economically beneficial transportation alternatives.

Multiple regression analysis indicated that occupation significantly influences customer perception towards electric vehicles. Respondents employed in professional and business occupations demonstrated greater willingness to adopt EVs due to higher purchasing power and technological exposure.

The study also identified that consumers perceive electric vehicles as symbols of technological advancement and environmental responsibility. However, concerns regarding resale value, battery life, and charging accessibility continue to affect overall consumer confidence.

Consumers with greater awareness regarding environmental sustainability showed more favourable attitudes towards EV adoption. Social influence and media exposure also contributed to shaping positive perceptions.

8.4 Problems Faced by Customers in Using Electric Vehicles

Despite positive consumer perception, several practical challenges continue to hinder EV adoption in Erode District.

TABLE VII
PROBLEMS FACED BY THE CUSTOMERS: SIMPLE RANKING METHOD

Problems	Mean Score	Rank
Highly initial cost	5.0625	4
Maintenance expenses	4.55	9
Battery replacement	4.625	8
Insufficient infrastructure	5.1375	3
Believe government policies	4.8625	7
Safety concerns	4.925	6
Highly charging time	5.375	2

Pick-up and mail age	5.4875	1
Environmental concerns in disposal of usage batteries	4.9375	5

Table VII presents the ranking of the problems faced by customers regarding electric vehicles using the Simple Ranking Method. Among the identified problems, pick-up and mileage received the highest mean score of 5.4875, making it the most significant problem faced by customers and ranking first. This was followed by high charging time (Mean = 5.375, Rank 2) and insufficient charging infrastructure (Mean = 5.1375, Rank 3). High initial cost ranked fourth with a mean score of 5.0625, while environmental concerns regarding the disposal of used batteries (Mean = 4.9375) and safety concerns (Mean = 4.925) ranked fifth and sixth, respectively. Government policies, battery replacement costs, and maintenance expenses received comparatively lower mean scores and were ranked seventh, eighth, and ninth, respectively. The findings indicate that vehicle performance, charging facilities, and charging time are the major concerns influencing customers' adoption of electric vehicles.

The major problems identified include:

- Inadequate charging infrastructure
- Long charging duration
- Limited driving range
- High initial purchase cost
- Battery replacement concerns
- Maintenance and servicing issues
- Lack of technical knowledge
- Limited availability of charging stations in rural areas

Among these challenges, insufficient charging infrastructure and high purchase cost emerged as the most critical barriers affecting EV adoption.

Consumers expressed concern regarding the lack of charging stations in highways and remote regions, which contributes to range anxiety. Many respondents also indicated uncertainty regarding battery replacement expenses and long-term vehicle reliability.

The ranking analysis revealed that charging infrastructure remains the highest priority area requiring governmental and industrial intervention.

9. Discussion of Findings

The findings of the study align with existing literature emphasizing the importance of environmental concern and economic benefits in shaping consumer adoption behaviour towards electric vehicles.

The significant relationship between occupation and EV perception suggests that purchasing power and professional exposure influence technology adoption behaviour. Consumers belonging to professional and business categories are more inclined towards EV adoption due to higher income levels and greater technological awareness.

The positive perception regarding environmental sustainability indicates increasing public concern towards climate change and pollution reduction. This finding is consistent with previous studies emphasizing environmental consciousness as a key driver of EV adoption.

However, infrastructural inadequacies remain a serious challenge in semi-urban regions. The lack of widespread charging facilities discourages potential buyers despite growing awareness regarding EV benefits.

The study also demonstrates that awareness alone is insufficient to ensure large-scale EV adoption unless accompanied by improved infrastructure, affordable pricing, and policy support.

10. Implications of the Study

10.1 Managerial Implications

Automobile manufacturers should focus on:

- Improving battery efficiency and charging speed
- Expanding after-sales service networks
- Conducting awareness campaigns in semi-urban regions
- Offering affordable financing schemes
- Enhancing consumer trust through warranty support

10.2 Policy Implications

Government agencies should:

- Expand public charging infrastructure
- Increase subsidies and tax incentives
- Promote EV awareness programmes
- Encourage public-private partnerships in EV infrastructure development
- Support research and innovation in battery technology

10.3 Social Implications

The promotion of electric vehicles contributes significantly to:

- Reduction in air pollution
- Sustainable urban mobility
- Reduced fossil fuel dependency
- Improved public health outcomes
- Environmental conservation

11. Suggestions

Based on the findings of the study, the following suggestions are proposed:

1. Charging infrastructure should be expanded across urban and rural regions to reduce consumer anxiety regarding driving range.
2. Government subsidies and tax incentives should be strengthened to reduce the initial cost burden associated with EV purchase.
3. Automobile companies should conduct awareness programmes and demonstration campaigns to educate consumers regarding EV technology and long-term benefits.
4. Financial institutions should provide low-interest financing options to encourage EV adoption among middle-income consumers.
5. Battery recycling and sustainable disposal mechanisms should be promoted to address environmental concerns associated with battery waste.

6. Local governments should encourage the establishment of public charging stations in commercial and residential areas.
7. Educational institutions and environmental organizations should actively promote sustainable transportation awareness among youth.

12. Conclusion

Electric vehicles represent a transformative solution for achieving sustainable transportation and reducing environmental degradation. The present study examined customer perception, awareness, influencing factors, and challenges associated with electric vehicle adoption in Erode District.

The findings indicate that consumers generally possess favourable perceptions towards electric vehicles due to their environmental and economic advantages. Occupation and family type significantly influence customer attitudes towards EV adoption, while awareness regarding environmental sustainability positively shapes purchase intention.

Despite increasing consumer interest, infrastructural limitations, high purchase costs, and charging concerns continue to hinder widespread EV adoption. Therefore, coordinated efforts from governments, automobile manufacturers, financial institutions, and environmental agencies are necessary to strengthen the electric mobility ecosystem.

The study contributes to the growing body of literature on sustainable transportation and consumer behaviour in emerging economies. Future research may focus on larger sample sizes, comparative regional analysis, and longitudinal assessment of EV adoption behaviour in India.

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