ISSN (Online): 2455-3662
EPRA International Journal of Multidisciplinary Research (IJMR) - Peer Reviewed Journal
Volume: 11| Issue: 5| May 2025|| Journal DOI: 10.36713/epra2013 || SJIF Impact Factor 2025: 8.691 || ISI Value: 1.188

A STUDY ON CONSUMER PREFERENCE AND ADOPTION OF ELECTRIC VEHICLES IN INDIA WITH SPECIAL REFERENCE TO POLLACHI

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ABSTRACT

Electric Vehicles (EVs) represent a future-focused answer to fight emissions of carbon substances while decreasing fossil fuel consumption. The move toward EV adoption in India confronts diverse hurdles together with different opportunities which are determined by how consumers behave alongside governmental support strategies and infrastructure development alongside public knowledge creation. The research investigates EV consumer behaviour and purchase preferences in Pollachi by examining how age, income status, educational background, occupational group, financial benefits and EV technology knowledge affect consumer decision-making. Research results show government support programs have weak effects whereas people's predictions about EV recharging facilities expansion together with increased awareness drive EV adoption patterns. Consumer decisions toward EV adoption are heavily influenced by the combination of three factors: demographic indicators together with EV familiarization and charging infrastructure preparations. EV purchases in Pollachi are mostly driven by factors different than financial incentives. The adoption rate of electric vehicles increases more effectively through better charging facilities and consumer education programs and environmental messaging rather than financial incentives.

KEYWORDS: *Electric Vehicles (EVs), Consumer Preference, EV Adoption, Demographic Factors, Vehicle Ownership, Government Incentives, EV Infrastructure, Charging Stations, Market Transition, Cost Efficiency.*

I. INTRODUCTION

Consumer decisions toward EV adoption are heavily influenced by the combination of three factors: demographic indicators together with EV familiarization and charging infrastructure preparations. EV purchases in Pollachi are mostly driven by factors different than financial incentives. The adoption rates show a more substantial response to improved infrastructure and environmental messaging and consumer education rather than financial incentives. Consumer choice toward EVs depends upon different variables including age groups demographic patterns together with the existing infrastructure and available financial supports and knowledge awareness about EVs. The present investigation evaluates consumer receptiveness to EVs in Pollachi by investigating both motivating and restricting factors and projected benefits of transitioning from standard vehicles to electric vehicles. The study seeks to deliver practical findings which will assist policymakers alongside manufacturers and other stakeholders understand how to enhance EV adoption strategies throughout their area of interest. India's EV market development depends heavily on how the country resolves technical obstacles and provides universal and affordable charging options. Stakeholders can develop strategic policies alongside investments to create better conditions for consumers when transitioning to sustainable mobility which leads to multiple benefits for both human populations and environmental sustainability.

II. REVIEW LITERATURE

1. Praveen Kumar and Kalyan Dash (2013), India should invest in small scale reinforcements to manage the load issues locally rather than going for an enormous change. Home charging should be encouraged. Proper planning of place, population, traffic density and safety should be considered before implementing the massive scale charging infrastructure. The integration of activities within the energy and transport fields is important. Development goals through different innovative policies and programs, for instance, drivers of electrical cars are offered a financial consumer incentive, like tax credits, purchase subsidies, discounted tolls, free parking, and access to restricted highway lanes will help the market to grow.

2. Fanchao Liao, Eric Molin & Bert van Wee (2017), Widespread adoption of EVs may contribute to lessening of problems like environmental pollution, global warming and oil dependency. However, this penetration of EV is comparatively low in spite of governments implementing strong promotion policies. They presented a comprehensive review of studies on consumer preferences for EV aiming to convey policy-makers and give direction to further research. They compared the economic and psychological approach towards consumer preference for Electric vehicle. The impact of financial and technical attributes of EV on its utility is generally found to be significant, including its purchase and operating cost, driving range, charging duration, vehicle performance and brand diversity on the market. The density of charging stations also positively affects the utility and promotion of EV. The impact of incentive policies, tax reduction is quite effective.

3. Mohamed M, G Tamil Arasan, and G Sivakumar (2018), The replacement of ICE with electric engines will reduce pollution to a great extent and be profitable to consumers. Many

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countries have implemented this technology and are contributing to the improvement of the environment. The researcher saw the opportunities and challenges faced in India over implementing EVs. Opportunities like Government Initiatives, Batteries, Industries, and Environment have been considered. With these challenges like cost of EVs, efficiency of EVs in India and demand for EVs were taken into consideration. The implementation of EVs in India aims primarily to scale back greenhouse emissions and cut oil expenses. The govt. should make the foremost out of the opportunities available and find suitable ways to tackle the challenges.

4. Masurali. A, Surya P (2018), India contributes around 18% in transport sector alone in terms of carbon emission. The Electric Vehicle (EV) is one of the foremost feasible alternative solutions to beat the crises. Several automotive companies are introducing EVs and are expanding their portfolio. Promoting EVs can help reduce fuel dependence and pollution and beneficial for both consumers and the nation. The education of people has significantly higher influence over their awareness level on EVs. Apart from manufacturers, Government should strive hard to spread awareness and influence positive perception among potential customers.

5. Pretty Bhalla, Inass Salamah Ali, Afroze Nazneen (2018), Choice of cars depends upon environmental concern, cost, comfort, trust, technology, social acceptance, infrastructure availability. These arguments have been tested for both conventional cars and EVs. They assume that these factors have direct influence on individual choice of vehicle. They found that EV manufacturers and Government have to invest more in social acceptance of the vehicle by creating more infrastructural facilities, putting more thrust on technology to create trust. The analysis depicts that the population is well aware of the environmental benefits. The responsibility lies on the shoulders of the Government and manufacturers to investing in the manufacturing of vehicles.

III. RESEARCH OBJECTIVE

1. The research aims to study both consumer demographics together with their existing car holdings.
2. We need to examine consumer awareness of electric vehicles and their main factors that make them reluctant to adopt these vehicles.
3. A study aims to determine the essential elements that drive or prevent EV purchase choices from consumers.
4. The research analyses customer predictions regarding EV market development as well as EV charging station development and industry changes from conventional gasoline-powered vehicles.

IV. SCOPE OF RESEARCH

- The research examines what role age level and income and education status and occupation play in deciding between traditional vehicles and electric vehicles through population segment analysis.
- The study examines consumer knowledge about EVs to reveal why people hesitate to adopt them because of battery performance and charging station constraints and price affordability.
- The research examines how well government financial aid programs drive EV adoption by measuring their effect on customer purchasing behavior.
- This research examines how EV infrastructure development will proceed according to consumer projections while studying its contribution to transitioning from gasoline vehicles to EVs.
- The study investigates present trends and makes policy recommendations for enhancing EV adoption by focusing on strategic policies combined with infrastructure development and monetary benefits together with educational programs.

V. HYPOTHESIS

H1: There is a significant association between demographic factors (age, income, education level, and occupation) and the type of vehicle currently owned by consumers in Pollachi.
H2: Higher familiarity with electric vehicles is associated with lower levels of concern regarding EV adoption in Pollachi.
H3: There is no significant association between a consumer's annual household income and their likelihood of being influenced by government incentives when deciding to purchase an electric vehicle.
H4: There is a significant relationship between consumer expectations of EV infrastructure growth and their willingness to switch from gasoline vehicles to electric vehicles.

VI. RESEARCH METHODOLOGY

Research methodology is a way of systematically solving the research problem. Research methodology deals with the research design and methods used to present the study.

RESEARCH DESIGN

A research design is a detailed blue print used to guide a research study towards its objective. The process of designing a research study involves many interrelated decisions. The most significant decision is the choice of research approach, because it determines how the information will be obtained. The choice of the research approach depends on the nature of the research that one wants to do.
The present study is **descriptive research** based on the survey method. The methods adopted in the choice of sample, selection of respondents, collection of data and tools of analysis are briefly discussed in this part.

AREA OF THE STUDY

The geographical area of the study chosen for this research is Pollachi, Coimbatore district, Tamil Nadu.

POPULATION OF THE STUDY

The population of the study are the people who are living in Pollachi, Coimbatore district and are using E-vehicles.

SAMPLING TECHNIQUE

A convenience sample is a sample where the respondents are selected, in part or in whole, at the convenience of the

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researcher. The researcher makes no attempt, or only a limited attempt, to ensure that this sample is an accurate representation of some larger group or population.

SAMPLE SIZE

Since the entire population cannot be taken for the study, the size of the sample was restricted to 153 respondents.

VII. DATA ANALYSIS AND INTERPRETATION

1.Age and Type of vehicle

Chi-Square Tests			
	Value	df	Asymptotic Significance (2-sided)
Pearson Chi-Square	38.328[a]	15	.001
Likelihood Ratio	30.681	15	.010
N of Valid Cases	153		
19 cells (79.2%) have expected count less than 5. The minimum expected count is .03.			

Interpretation

Since the p-values for both tests are below 0.05, we **reject the null hypothesis** (H_0) in Favor of the alternative hypothesis (H_1), confirming that demographic characteristics influence vehicle ownership in Pollachi.

2. **Income and Government Incentives**

Chi-Square Tests			
	Value	df	Asymptotic Significance (2-sided)
Pearson Chi-Square	5.023[a]	8	.755
Likelihood Ratio	4.843	8	.774
N of Valid Cases	153		
5 cells (33.3%) have expected count less than 5. The minimum expected count is 1.05.			

Interpretation

Since the p-values are above 0.05, we fail to reject the null hypothesis, meaning that annual household income is NOT significantly associated with a consumer's likelihood of being influenced by government incentives when purchasing an electric vehicle.

3. **Infrastructure and gasoline powered change over to EV's**

Chi-Square Tests			
	Value	df	Asymptotic Significance (2-sided)
Pearson Chi-Square	29.206[a]	10	.001
Likelihood Ratio	28.854	10	.001
N of Valid Cases	153		
a. 9 cells (50.0%) have expected count less than 5. The minimum expected count is .27.			

Interpretation

Since the p-value is highly significant (<0.05), we reject the null hypothesis and conclude that consumer expectations of EV infrastructure growth significantly influence their willingness to switch from gasoline vehicles to EVs.

VIII. FINDINGS

- Consumer preferences toward vehicles get influenced strongly by demographic elements which include age together with income while education level as well as occupation.
- The vehicle preferences between teenagers and senior citizens are opposed because teens look for efficiency and tech features but elders want dependable and adapted transportation systems.
- The analysis indicates financial incentives do not act as the leading factor behind EV adoption decisions because environmental awareness together with technological curiosity alongside long-term financial benefits produce greater impact.
- Statistical evidence demonstrates that customers believe infrastructure development is essential for making the switch from gasoline-powered to electric vehicles since consumers view EV adoption as directly influenced by charging infrastructure growth.
- Consumer awareness about electric vehicles produces lower resistance to their purchase. Test driving along with education about EVs alongside direct exposure to the technology enhances consumer confidence regarding EV capabilities.
- This leads users to doubt performance and maintenance issues less. The acceptance of EVs requires actors within the automaker and policy authority sectors to enhance consumer understanding because greater awareness leads to more acceptance.

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IX. SUGGESTIONS AND RECOMMENDATIONS

- The biggest obstacle to EV adoption is charging stations therefore policymakers along with businesses should work on expanding charging facilities while improving their ease of access and making charging durations faster for consumer convenience.
- A major portion of respondents indicated lack of knowledge about government incentives for EV purchases. The public can benefit from more obvious marketing initiatives and subsidy messages that explain the benefits which EV buyers receive through funding assistance.
- Efforts should be made to advertise EVs' capacity to cut down carbon emissions and boost sustainability since environmental advantages stand as main priorities for numerous EV buyers.
- The affordability concerns of many customers become easier to address through supportive payments and flexible financing solutions and price reduction programs.

X. CONCLUSION

Consumer decisions toward EV adoption are heavily influenced by the combination of three factors: demographic indicators together with EV familiarization and charging infrastructure preparations. EV purchases in Pollachi are mostly driven by factors different than financial incentives. Customer adoption of EVs responds more strongly to the development of charging stations combined with user education and green benefit promotion rather than incentives. India's EV market development depends heavily on how the country resolves technical obstacles and provides universal and affordable charging options. Stakeholders can develop strategic policies alongside investments to create better conditions for consumers when transitioning to sustainable mobility which leads to multiple benefits for both human populations and environmental sustainability.

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