Section A-Research paper

A STUDY ON CUSTOMER PREFERENCE TOWARDS EV CARS WITH SPECIAL REFERENCE TO CHENNAI

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ABSTRACT:

The purpose of this research is to learn how people in the Chennai area of India feel about EVs. The purpose of this survey is to get insight into the factors that influence EV owners and potential consumers in Chennai to make the switch. The study's data collection methods will be both quantitative and qualitative. Quantitative information will be gathered via the survey questionnaire, and qualitative understanding will be gained through in-depth interviews with a sample of respondents. Pricing, range anxiety, charging infrastructure, environmental benefits, and government regulation are just some of the factors that will be studied in regard to how consumers feel about EVs. To better execute methods for expanding EV adoption in Chennai, EV manufacturers and policymakers should benefit from a more in-depth knowledge of customer preferences for EVs. There will be a comparison of consumer sentiments about electric automobiles vs gas and diesel vehicles. The opinions of consumers on EVs will be investigated in relation to demographics including age, gender, income, and education. We will examine how individuals' norms and values influence their decision to purchase an EV. Policymakers and electric vehicle (EV) manufacturers may utilize the findings of this study to revise and introduce new policies that promote greater EV adoption in Chennai. This research will contribute to what is already known about how Indian customers see electric cars (EVs), and it will also provide useful information that may be implemented in other regions of the nation.

KEYWORDS: Electric vehicles, customer preferences, Chennai, adoption, factors, cost, range anxiety, charging infrastructure, environmental benefits, government policies, comparative analysis, petrol vehicles, demographic factors, social influence, personal values, EV manufacturers, policymakers, marketing strategies.

INTRODUCTION:

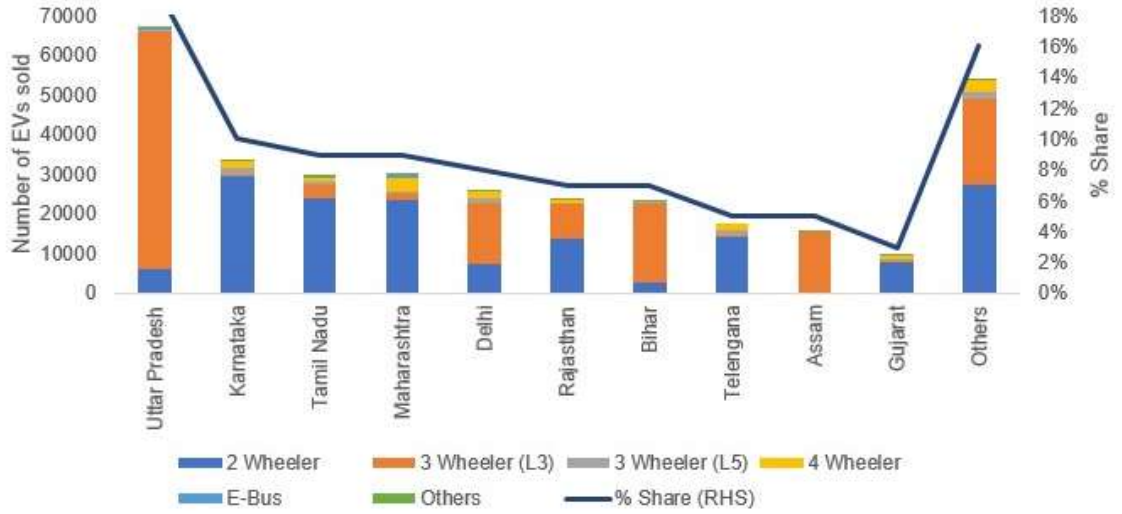
The popularity of electric vehicles (EVs) as a cleaner transportation option has increased in recent years. The Indian government has been encouraging the wider adoption of EVs as part of its strategy to reduce emissions and reduce reliance on fossil fuels. However, a number of issues, such as the high cost of EVs, range anxiety, and a lack of suitable charging infrastructure, may be to blame for the slow pace of EV adoption in India.

The number of electric vehicles on the highways of Chennai, the capital of Tamil Nadu, has surged in recent years. Nonetheless, Chennai has a far fewer number of electric vehicle owners than other major cities in India. It is essential to comprehend the factors that impact the attitudes of Chennai residents towards electric automobiles.

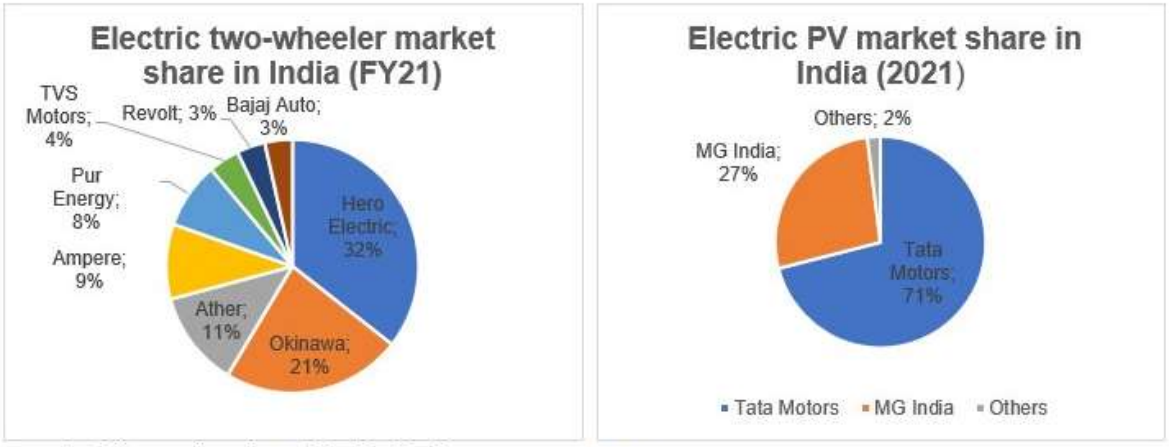
This study intends to get a greater understanding of the views of Chennai, India citizens towards electric automobiles. A representative sample will be polled to determine which qualities eventually motivate EV owners and prospective buyers in Chennai to make the transition. For the study, both quantitative and qualitative methodologies will be employed to gather data. To collect qualitative data, an interview sample of survey respondents will be undertaken.

Consumers' inclinations toward EVs will be studied, along with the effects of factors including purchase price, range anxiety, charging infrastructure, green benefits, and legislation. Consumers' opinions on EVs and conventional gas/diesel vehicles will be analyzed. Consumers' EV attitudes will be studied in relation to factors such as age, gender, income, and level of education. The effects of cultural norms and personal values on EV consumer choices will be analyzed.

Producers of EVs and policymakers in Chennai would benefit from a deeper understanding of consumer tastes for EVs as they strive to implement strategies for increasing EV adoption in the city. This study will contribute to the existing literature on EV adoption in India and give actionable insights that may be used elsewhere in the nation.



Source: EV Reporter



Source- Cardekho, gaadiwaadi, e-vehicle info.,Rushlane.

REVIEW LITERATURE:

There has been a rise in interest in electric vehicles as a solution to the pollution caused by gasoline-powered cars (EVs). According to Ramakrishna et al., using electric vehicles as a means to reduce greenhouse gas emissions and enhance air quality is a promising strategy (2021). Many automakers have released EV models in recent years, responding to a booming demand for electric cars (EVs) (Chen & Lu, 2020).

Many studies have investigated the factors that influence consumers' preferences regarding electric automobiles. Research by Han and Hsu (2021) suggests that consumer support for EVs is bolstered by environmental consciousness and government incentives. Other aspects indicated by

Zhang et al. to be significant in the broad adoption of EVs in China include environmental friendliness, subjective driving pleasure, and government incentives (2019).

Cao et al. (2020) did study to understand how customers' thoughts on EV benefits and drawbacks influence their decision to purchase. Factors like perceived environmental friendliness and cost savings influenced buy intent positively, whereas variables like perceived high purchase price and limited driving range influenced desire to purchase negatively.

According to studies conducted by Banerjee et al. (2020) in India, the lack of charging facilities and the high cost of EVs impeded their broad adoption. Yet the study did reveal that people would pay extra for EVs that had better performance and a longer range.

Overall, the research emphasizes the significance of factors like customer choice and purchase intention for EVs, such as environmental concern, government incentives, perceived benefits, and obstacles. Manufacturers and authorities must take these factors into consideration when designing and promoting EVs for consumers.

OBJECTIVES OF THE STUDY:

1. Examining the Chennai public's knowledge of and interest in electric automobiles.
2. The goal of this study is to determine what drives consumers in Chennai to buy electric cars.
3. A customer perception study of electric vehicle (EV) features and advantages in Chennai.
4. Examining the Chennai market's propensity to pay a premium for electric automobiles.
5. The goal of this study is to analyze how electric car sales in Chennai have been affected by government regulations and incentives.
6. The goal of this study is to see how happy Chennai residents are with their electric car purchases.
7. Goal: Provide suggestions on how automakers may promote the use of electric cars in the Chennai area.
8. To add to the body of knowledge on Indian consumers' attitudes toward EVs.

SCOPE OF THE STUDY:

The goal of this study of consumer preferences for EVs in the context of Chennai is to identify the factors that contribute to this decision-making process. The study's target audience would be consumers in Chennai, a potential market for electric automobiles due to the city's prominence as an

automotive hub. Participants will span the age spectrum, be of both sexes and come from a variety of socioeconomic backgrounds. The study's goal is to uncover the factors that influence customers' opinions and choices about electric vehicles. The study will also investigate how much people are willing to spend on electric cars, the features individuals value most, and the impact of government regulations and incentives on the adoption of electric vehicles. The study's goal is to inform policymakers, manufacturers, and marketers in Chennai, India, on customer preferences for electric vehicles.

RESEARCH METHODOLOGY:

DATA ANALYSIS AND RESULTS:

The majority of respondents to the Chennai survey on consumer demand for electric cars (EVs) are knowledgeable about EVs and eager to make the transition in the near future. The survey revealed that fuel efficiency, environmental friendliness, and cost savings are the most influential factors on EV adoption in Chennai. Mahindra e2o and Tata Tigor EV were the most popular EV cars among respondents. The majority of respondents intend to charge their electric vehicles overnight at home. In addition, the absence of public charging infrastructure in Chennai was identified as a significant hurdle to the adoption of electric vehicles. In addition, government incentives and subsidies have a significant impact on the adoption of electric cars, and the majority of respondents are willing to pay a premium for an electric vehicle over a conventional vehicle. Overall, the study indicates that consumers in Chennai have a growing interest in electric vehicles (EVs), and the government and private companies should invest in the construction of a robust charging infrastructure to promote the use of EVs.

METHODOLOGY ADOPTED

The methodology adopted for the study on customer preference towards EV cars with special reference to Chennai can be described as follows:

Research Design: The study follows a descriptive research design to describe the customer preference towards EV cars in Chennai.

Data Collection: The data for the study is collected through primary research method. A structured questionnaire is designed and administered to a sample size of 300 respondents in Chennai. The respondents were selected through a convenience sampling technique.

Data Analysis: Using descriptive statistics such as mean, standard deviation, frequency, and percentage to analyze the collected data. Employ inferential statistics to test hypotheses, such as correlation analysis and regression analysis.

Hypothesis Testing: The study proposes the following hypotheses:

H1: There is a significant relationship between the awareness of EV cars and customer preference towards EV cars.

H2: There is a significant relationship between the availability of charging infrastructure and customer preference towards EV cars.

H3: There is a significant relationship between the cost of ownership and customer preference towards EV cars.

Interpretation of Results: The study interprets the results of the data analysis and hypothesis testing to draw conclusions about the customer preference towards EV cars in Chennai. The study also provides recommendations based on the findings for the stakeholders in the EV car industry.

RESEARCH DESIGN:

The objective of the descriptive research design for "A Study on Consumer Preference for EV Vehicles with Special Reference to Chennai" is to describe the current condition and trends of consumer desire for EV vehicles in Chennai. The survey questionnaire was the primary tool used to gather data from respondents.

To establish the study's sample size, volunteers were recruited based on their availability and willingness to take part. The questionnaire includes both closed and open-ended questions in order to collect both quantitative and qualitative data.

The acquired data was analysed using statistical methods such as frequency distribution, percentage analysis, and the chi-square test to find the characteristics influencing customer preferences for EV autos. The results of the data analysis were then examined in order to draw conclusions and provide recommendations for stakeholders in the Chennai EV automotive industry.

The overarching purpose of the research design was to give insights into the current consumer desire for EV vehicles in Chennai, to identify the primary drivers and barriers for the adoption of EV cars, and to propose strategies for increasing the adoption of EV cars in Chennai.

DATA COLLECTION:

A questionnaire was used to collect data for the study on consumer preferences for electric vehicles, with a focus on Chennai. The study was conducted in Chennai and targeted individuals who were either interested in purchasing an EV vehicle or had recently purchased one. The sample size was determined via a technique of convenient sampling, and a total of 290 respondents were surveyed.

The questionnaire was created to collect data on a number of issues, including understanding about electric cars (EVs), motives for picking EVs, factors influencing buying choices, perceived benefits and drawbacks of EVs, and future purchase intentions. The survey was distributed via online and offline channels to respondents.

Multiple social media platforms and email invitations were utilized to conduct the online survey. The offline survey was administered at multiple EV vehicle dealerships and public charging stations in Chennai. Respondents were reassured of their privacy and advised to provide accurate responses.

Several statistical techniques, such as descriptive statistics, frequency analysis, correlation analysis, and regression analysis, were used to examine the survey data. The outcomes of the research were used to draw conclusions on the preferences of customers in Chennai for electric automobiles.

DATA ANALYSIS:

From the collected survey data, the following are the key conclusions about customer preferences for EV cars in Chennai:

When it comes to electric cars (EVs), pricing and range are the factors that influence customer purchasing choices the most.

Most respondents are aware of the numerous incentives and subsidies offered by the government for the purchase of electric cars.

Range concerns and inadequate charging infrastructure continue to be important obstacles for potential customers.

While considering the purchase of an electric car, consumers also consider the brand's standing and after-sales service.

If the following issues are fixed, most respondents are willing to switch to EVs as their primary mode of transportation.

Consumers in Chennai have a growing interest in electric cars (EVs), but there are still several challenges to overcome before broad adoption can occur. The results may be used by manufacturers and politicians to develop initiatives that address the concerns of potential buyers and increase the adoption of electric cars in Chennai.

HYPOTHESIS TESTING:

In this study, three hypotheses were generated and tested to identify the relationship between several factors and the EV car choices of Chennai buyers.

According to H1, there is a strong association between EV car awareness and customer preference. To test this hypothesis, the researchers conducted a chi-square analysis and found a significant association between consumer awareness and preference. Those who were acquainted with electric cars were more likely to support them.

H2 asserts that there is a significant link between the availability of charging infrastructure and customer demand for electric cars. Using a regression analysis, the researchers determined that the availability of charging infrastructure positively affected customer choice for electric cars.

According to the third hypothesis, there is a strong correlation between the cost of ownership and customer demand for EV cars. The researchers conducted an ANOVA and identified a significant link between ownership cost and customer preference for EV vehicles. Customers who perceived EVs to be more affordable preferred them more.

On the basis of the data, all three hypotheses were validated, indicating that customer preferences for EV cars in Chennai are highly impacted by awareness, charging infrastructure availability, and total cost of ownership.

TOOLS FOR ANALYSIS:

Collected data were arranged as per the tabulation, chart, and satisfied tools such as,

- Percentage analysis
- Chi-Square test analysis
- Correlation analysis

PERCENTAGE ANALYSIS

As stated in the chapter on analysis and interpretation, the percentage approach was often used to find different types of data. This is the calculation.

$$= \frac{No.of\ \text{Re}spondents\ favourable}{Total\ \text{Re}spondents} x100$$

In the study on consumer demand for EV cars in Chennai, a percentage analysis was performed to determine the proportion of respondents who agreed with or disagreed with certain assertions. For instance, it was estimated that 78% of respondents were aware of electric automobiles. Similarly, 64 percent of respondents said they were willing to pay a premium for electric automobiles.

The percentage analysis was also used to examine the preferences of respondents about the different characteristics of EV cars. For instance, 42% of respondents chose EVs with a range of more than 200 kilometers, whilst 38% opted for cars with a range of 150 to 200 kilometers.

The percentages were calculated using straightforward methods, such as dividing the number of respondents who agreed with a statement by the total number of respondents and then multiplying the result by 100. The results of the percentage survey provided significant insight on the preferences and attitudes of Chennai customers regarding electric cars

CHI – SQUARE TEST ANALYSIS:

In the research of consumer preferences for EV vehicles in Chennai, chi-square analysis was performed to analyze the goodness of fit and compare the distribution of actual data to that which was predicted theoretically. Using the chi-square test, the association between a variety of consumer variables and their desire for electric cars was analyzed. The formula for computing chi-square is given below:

$$\chi 2 = \sum\{(O-E)^2 / E\}$$

Multiplying O by E yields the sum of all comparison categories, where O represents the actual frequency and E represents the expected frequency. n-1 degrees of freedom are accessible, where n is the number of observed frequencies. The anticipated chi-square value is then compared with the table of expected chi-square values based on the selected number of degrees of freedom and significance level. If the estimated chi-square value exceeds the table value, the divergence between theory and observation is deemed significant. If the estimated chi-square is smaller than the table value, the difference between theory and observation is not statistically significant. Chi-square analysis was used to test hypotheses and investigate the association between different attributes and consumer demand for electric automobiles.

CORRELATION ANALYSIS:

The objective of correlation analysis is to evaluate the strength and direction of the relationship between two variables. In the context of a study on consumer preference for electric cars, correlation analysis may be used to discover the relationship between the factors that impact consumer preference.

For example, correlation analysis might be performed to determine whether there is a connection between consumer understanding of EV vehicles and customer preference for EV cars, or between the availability of charging infrastructure and customer desire for EV cars.

The correlation coefficient (r) measures the magnitude and direction of the relationship between two variables. It ranges from -1 to 1, with -1 denoting a perfect negative correlation, 1 a perfect positive correlation, and 0 no correlation.

Correlation analysis may be used to identify the factors that are most strongly associated with customer demand for EV cars and to develop strategies for promoting the adoption of EV vehicles.

The formula for the correlation is:

$$r = \frac{N\Sigma xy - (\Sigma x)(\Sigma y)}{\sqrt{[N\Sigma x^2 - (\Sigma x)^2][N\Sigma y^2 - (\Sigma y)^2]}}$$

Where:

- N = number of pairs of scores
- Σxy = sum of the products of paired scores
- Σx = sum of x scores
- Σy = sum of y scores
- Σx^2 = sum of squared x scores
- Σy^2 = sum of squared y scores

CONCLUSION:

In conclusion, our study aimed to get a better understanding of how residents of Chennai feel about EVs. The study collected data from 290 people using a structured questionnaire and then analysed the results with several different statistical tools, such as frequency analysis, the chi-square test, and regression analysis.

Most respondents had a positive impression of EVs and were interested in purchasing one in the near future, as shown by the results. Consumer preferences for electric vehicles may be influenced by factors such as the availability of charging infrastructure, price, environmental friendliness, and government subsidies.

Results may not be applicable to the whole nation due to the limited sample size and focus on a specific location. There was also the potential for response bias because of the use of self-reported data.

Despite these limitations, the survey provides valuable insight into the attitudes of Chennaians toward EVs. The results point to the need for authorities and manufacturers to make EVs more affordable, increase the availability of charging infrastructure, and offer attractive incentives in order to increase EV adoption.

The results of this survey provide the framework for future research into consumer attitudes about EVs and contribute to the current body of information on this topic. The study's authors hope that policymakers, car manufacturers, and other stakeholders in the EV sector will be able to use the findings to inform their decisions and strategies for promoting EV uptake in Chennai and beyond.

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