

Unearthing the Factors Behind Adoption of Electric Cars: An Indian Perspective

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Abstract-- The transition to electric vehicles shows the shift from combustion automotive industry due to environmental concerns, governmental policies and technological advancements. And India has been rapidly changing from traditional automotive industry to Electric vehicles. There have been significant changes from the last few years that can be easily seen. In India the government has been providing subsidies and other policies to the manufacturer and consumer due and also many other factors have been affecting the consumer behaviour. This study aims to understand and identify the factors that are influencing the consumers in Suchitra to adapt from automotive industry to electric vehicles. It also helps us to understand the perception, preferences about electric cars. This study aims to understand the factors behind adoption of electric cars and how this factors influence the consumers of Suchitra Region. From 50 respondents the data was gathered by using practical sampling method. The sample respondents were given questionnaires in order to gather the primary data. According to the study, the factors have significant impact which resulting in adoption to electric cars.

Index Terms-Electric vehicles, consumer behavior, government policies, environmental concerns, Suchitra region, adoption, technological advancements.

I. INTRODUCTION

The Issues related to climate change and its effects have become increasingly important in the global scale. The greenhouse gases, carbon dioxide, has damaged our ecosystem, resulted in decrease in the availability of water, and increase in flooding, and a rise in diseases. Customers are focusing upon eco-friendly initiatives to improve air quality by lowering greenhouse gases as a result of growing environmental awareness due to climatic changes and global warming.

Customers are now more interested to consider electric vehicles (EVs) as an alternative to vehicles that run on fuels like gasoline, diesel, and compressed natural gas

(CNG) and also the environmental concerns caused by emissions from this fuels. By replacing fuels with electricity, Electric vehicles are found to have more environmental and economic advantages.

In India, interest in electric vehicles (EVs) is growing as the nation looks for eco - friendly transportation options. An increasing number of EV's efficient mobility solutions are available in India. Numerous reasons, includes such as governmental regulations, infrastructures, technological advancements, and change in consumer requirements, are increasing the Electric vehicles revolution.

The infrastructure creation is essential in order to acceptance of electric vehicles. There are plans to increase the number of public charging stations, fast-charging networks options available throughout cities and highways. This infrastructure development ensures convenient and easy charging alternatives for electric vehicle customers and also reduce capacity issues.

By above we can say that India's decision to legalize electric vehicles is a big step towards the direction of cleaner, Eco-friendly transportation. Electric cars are expected to be a major part of India's transportation system due to favourable regulations, technological advancements, infrastructural support, and growing customer preferences.

II. OVERVIEW OF THE TOPIC

Electric vehicles (EVs) works on electric motors, not internal combustion engines which uses fuel for power. Electric vehicles are considered as a potential alternative to traditional cars, focusing to reduce pollution, climate change, and resource depletion. EVs have been existed for a while, they have gained a significant impact in the last decade due to reasons

about environmental impact from fuel-powered vehicles.

In India, the first important decision about electric vehicles has been taken in 2010. The Ministry of New and Renewable Energy (MNRE), government announced the financial incentive for manufacturers of Electric vehicles in India. However, the subsidy scheme was withdrawn by MNRE in March 2012.

All Electric vehicles which are referred as EV's don't use gasoline and instead use the large battery that powers on or more electric motors in a vehicle. And at present all electric vehicles range is from 80 to 300km. And all the electric vehicles don't require huge maintenance like oiling, petrol or diesel etc.

All the Electric vehicles can be charged at home using standard 120 volts or 240 volts' house plugs or charging stations which has been increasing year by year. One of the major advantage of electric chargers is that they are capable of using the DC fast chargers which provide a good amount for a vehicle.

There are 3 main types of electric vehicles:

1. Battery electric vehicles (BEV's)

BEV's run on complete electricity which is stored in the batteries, which involves powering the motor that results in driving of the vehicle. They produce zero emissions and eco-friendly.

Ex: - Tesla Model 3, Nissan Leaf, Chevrolet Bolt

2. Plug in hybrid electric vehicle (PHEV's)

The vehicles have both electric and fuel engines. It helps the vehicles give more range and distance the vehicle can travel.

Ex: - Toyota prius prime, Hyundai ioniq

3. Fuel cell electric vehicles (FCEV's)

Instead of electric batteries the hydrogen fuel cells are used in order to run the vehicle. Hydrogen tank is mixes with the oxygen in order to produce electricity. But hydrogen concept is still in early stages of development.

Ex: - Toyota mirai

III. INTRODUCTION TO THE COMPANY

TATA MOTORS

Tata motors limited is an Indian multinational automobile company which is located in Mumbai, Maharashtra.

Vision: The Tata motors vision is to be most aspired brand of 2024. And also to be aspiration to its customers, shareholders and increase brand loyalty and experience by delivering the value that they expect for being with the company.

Mission: And the mission of Tata motors is to develop mobility solutions and to enhance the quality of life.

IV. RESEARCH METHODOLOGY

RESEARCH GAP

A survey reveals that there are many studies that has been done on factors behind adoption of electric cars in India. And the research gap is the factors that are affecting the Indian consumers to adopt from combustion vehicles to electric cars and how far the people are aware about the electric vehicles. In this study it involves the factors affecting the Indian consumers are examined. In this study the association between factors including gender, qualification, age group and level of awareness about electric cars will be examined

NEED FOR THE STUDY

The adoption to electric vehicles will provide a greater advantage to reduce effect of combustion vehicles. And it also improves the consumer experience. Customers are now more interested to consider electric vehicles (EVs) as an alternative to vehicles that run on fuels like gasoline, diesel, and compressed natural gas (CNG) and also the environmental concerns caused by emissions from this fuels.

And by understanding the factors that are affecting the Indian consumers will provide an understanding about consumer behaviour and shifts. And also helps in promoting the eco-friendly transportation.

It will be providing the understanding about the factors which are driving the consumer behaviour based on the different age groups, gender etc.

OBJECTIVE OF THE STUDY

1. To study the consumer awareness about electric cars in Suchitra region.
2. To study the factors affecting the consumers to adopt electric cars.

V. RESEARCH DESIGN

Research design can be defined as the analytical approach and the strategies that is used in guiding the research project is known as research design.

RESEARCH TYPE: Descriptive in Nature

SAMPLING TECHNIQUE: Non random sampling technique is used for the purpose of the study.

DATA COLLECTION METHODS

Primary data involves the data that will be collected personally and the data that does not exist which can only be collected by direct observation.

And the data can be gathered by surveys and questionnaire methods.

Secondary data refers to the data that is already existed and can be found in journals, articles and case studies which can be utilised to understand the previous research and findings.

POPULATION: 100

SAMPLE SIZE: 50

SAMPLE UNIT: Suchitra

QUESTIONNAIRE:A structured questionnaire is used for gathering the data. Likert scale and multiple choice are used in the survey

TOOLS USED: Google forms, chi-square, Bar Graphs and percentages.

HYPOTHESIS:

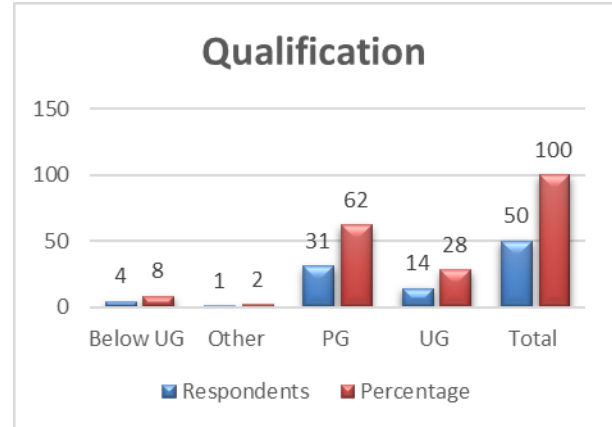
H0- There is no relationship between factors and consumer behaviour.

H1- There is relationship between factors and consumer behaviour.

VI. DATA ANALYSIS

- 1) What is the highest qualification of the respondents and their percentage?

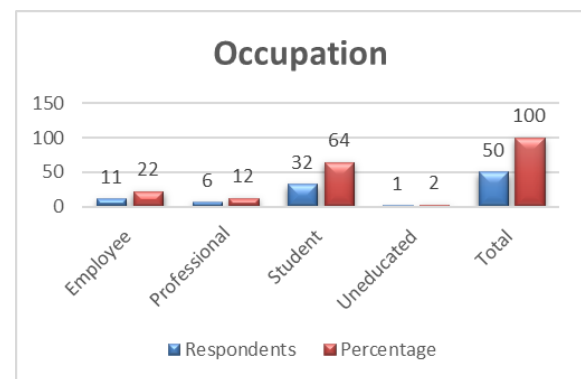
Qualification	Below UG	Other	PG	UG	Total
Respondents	4	1	31	14	50
Percentage	8	2	62	28	100



Interpretation: Most of the respondents are from PG with 62% and 28% are from UG.

- 2) What is the occupation of the respondents and the percentage?

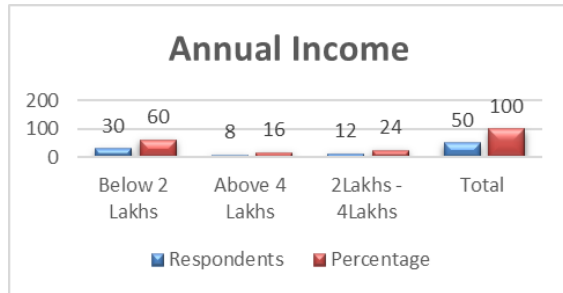
Occupation	Employee	Professional	Student	Uneducated	Total
Respondents	11	6	32	1	50
Percentage	22	12	64	2	100



Interpretation: Most of the respondents are Students with 64% and 22% are the employees.

3) What is the Annual income of the respondents and their percentage?

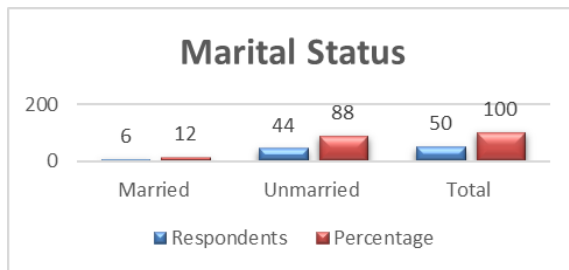
Annual Income	Below 2 Lakhs	Above 4 Lakhs	2Lakhs - 4Lakhs	Total
Respondents	30	8	12	50
Percentage	60	16	24	100



Interpretation: Most of the respondents Income level is Below 2 Lakhs and followed with Above 2lakhs-4lakhs.

4) What is the percentage and the respondents of married and unmarried?

Marital Status	Married	Unmarried	Total
Respondents	6	44	50
Percentage	12	88	100



Interpretation: Out of 50 respondents 88% are Unmarried and 12% are Married.

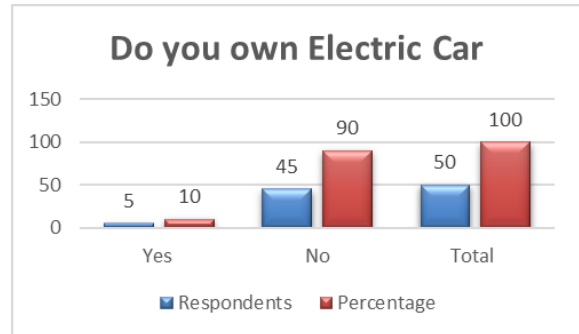
5) What is the percentage and respondents of awareness about the electric cars?



Interpretation: 94% of the respondents are aware about electric cars out of 50 respondents and 6% of them are unaware.

6) What is the respondents and percentage of owning an electric car?

Do you own Electric Car	Yes	No	Total
Respondents	5	45	50
Percentage	10	90	100

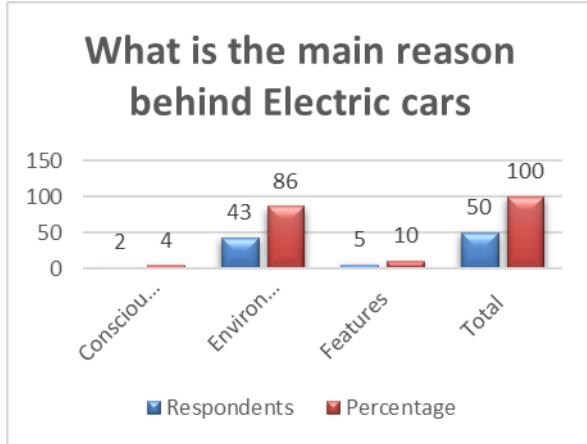


Interpretation: 90% of the respondents does not own an electric car and only 10% of them own an electric car.

7) What is the percentage and respondents knowing reason behind electric cars?

What is the main reason behind Electric cars	Conscious of Health	Environmental Safety	Features	Total
Respondents	2	43	5	50
Percentage	4	86	10	100

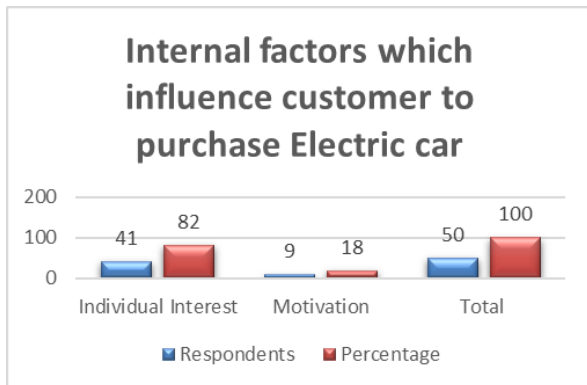
Are you aware of Electric Cars	Yes	No	Total
Respondents	47	3	50
Percentage	94	6	100



Interpretation: 86% of the consumers think that Electric cars are important for Environmental Safety. Followed by features and conscious of health.

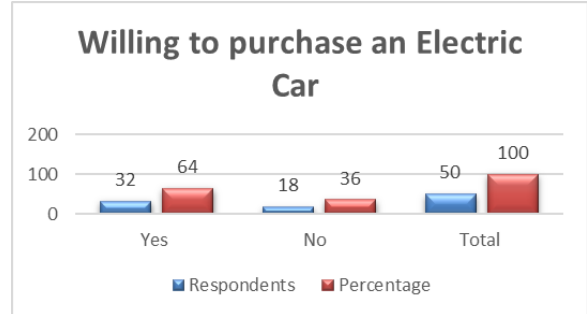
8) What is the percentage and respondents of internal factors which influence customer to purchase electric car?

Internal factors which influence customer to purchase Electric car	Individual Interest	Motivation	Total
Respondents	41	9	50
Percentage	82	18	100



Interpretation: 82% of the Customers influence by individual interest and 18% by motivation.

9) What is the respondents and percentage of willing to purchase an Electric Car?

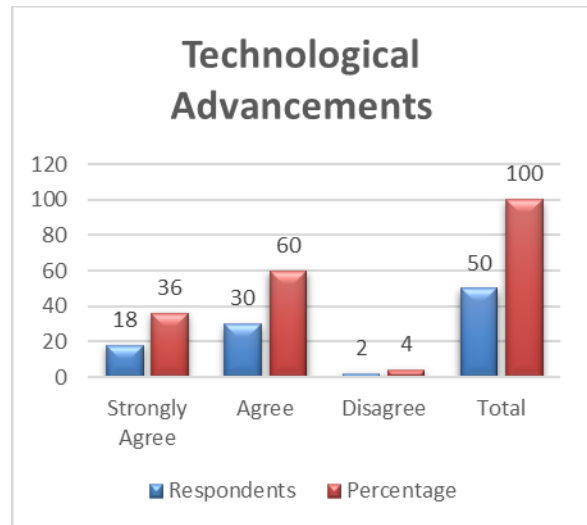


Interpretation: 64% of the customers are willing to purchase an Electric car and 36% said no.

Factors that influencing Customer to buy an Electric Car:

10) What are the respondents and percentage of Technological Advancements?

Technological Advancements	Strongly Agree	Agree	Disagree	Total
Respondents	18	30	2	50
Percentage	36	60	4	100



Willing to purchase an Electric Car	Yes	No	Total
Respondents	32	18	50
Percentage	64	36	100

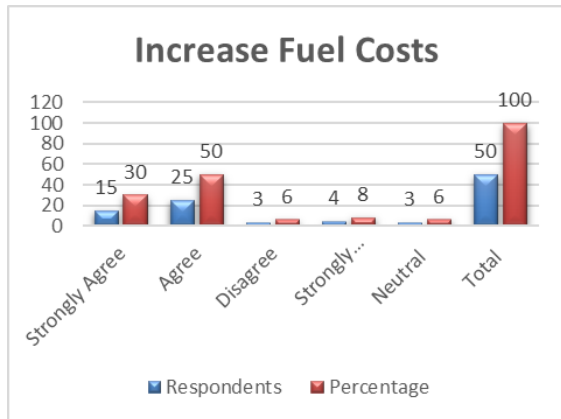
Interpretation: 60% customers Agree that Technological Advancements has major impact on

Availability of Electric Cars	Strongly Agree	Agree	Disagree	Neutral	Total
Respondents	7	31	3	9	50
Percentage	14	62	6	18	100

buying behaviour.

11)What is the percentage and respondents of Increased fuel costs?

Increase Fuel Costs	Strongly Agree	Agree	Disagree	Strongly Disagree	Neutral	Total
Respondents	15	25	3	4	3	50
Percentage	30	50	6	8	6	100

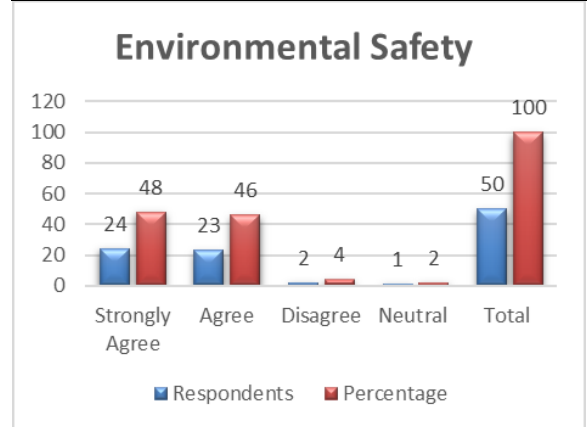


Interpretation: 50% customers Agree that the buying behaviour is increased based upon the fuel costs.

12)What is the respondents and percentage of environmental safety?

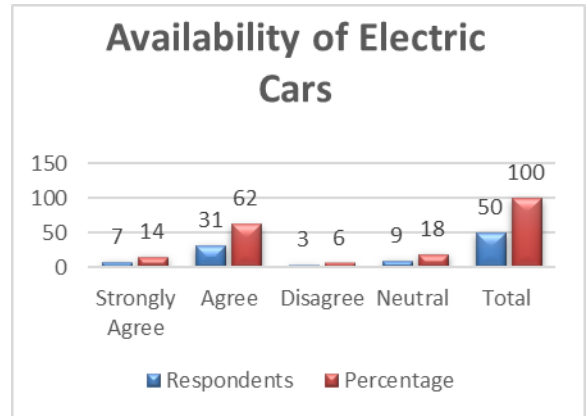
Environmental Safety	Strongly Agree	Agree	Disagree	Neutral	Total
Respondents	24	23	2	1	50

Percentage	48	46	4	2	100
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Interpretation: 48% customers strongly agree that Environmental Safety is the major factor that influence the consumer behaviour and also 46% Agree with it.

13)What is the respondents and percentage of availability of electric cars?



Interpretation: 62% customers Agree that Availability of electric cars as a major factor for influence.

VII. STATISTICAL TOOLS FOR ANALYSIS

H0- There is no relationship between factors and consumer behaviour.

H1- There is relationship between factors and consumer behaviour.

	Yes	No	Marginal Rows Total
Male	8 (11.44) [1.03]	14 (10.56) [1.12]	22

Female	18 (14.56) [0.81]	10 (13.44) [0.88]	28
Marginal Columns Total	26	24	50 (Grand Total)

The chi-square statistic is 3.8482. The p -value is .049798. Significant at $p < .05$.

Since p -value is less than 0.05, H_0 is Rejected and H_1 is Accepted. So, there is relationship between factors and consumer behaviour.

The chi-square statistic is 1.2882. The p -value is .525123. The result is not significant at $p < .05$.

VIII. FINDINGS

There are total 50 respondents out of which 44% are Male and 56% are Female.

The majority of the respondents are from the age Below 25 and then 26-35.

It has been observed that most of the respondents belong from PG with 62% and 28% are from UG.

Most of the respondents are Students with 64% and 22% are the employees.

The respondents Income level is Below 2 Lakhs and followed with Above 2lakhs- 4lakhs.

Out of 50 respondents 88% are Unmarried and 12% are Married.

The 94% of the respondents are aware about electric cars out of 50 respondents and 6% of them are unaware 90% of the respondents does not own an electric car and only 10% of them own an electric car.

It has been seen that 86% of the consumers think that Electric cars are important for Environmental Safety. Followed by features and conscious of health.

The 48% of the customers agree for Environmental Safety is major factor. And remaining 24% as product features and 14% with Customer satisfaction.

82% of the Customers influence by individual interest and 18% by motivation.

And 50% of the Customers influence from the Enhanced features and 28% by Advertisement, 14% by society

64% of the customers are willing to purchase an Electric car and 36% said no.

60% customers Agree that Technological Advancements has major impact on buying behaviour. 50% customers Agree that the buying behaviour is increased based upon the fuel costs.

48% customers strongly agree that Environmental Safety is the major factor that influence the consumer behaviour and also 46% Agree with it.

At last, 62% customers Agree that Availability of electric cars as a major factor for influence.

Finally, it has been found that most people are aware about electric cars and also it can be seen that the customers are aware about the factors that influence them to adapt electric cars. 82% of the Customers influence by individual interest, 60% customers Agree that Technological Advancements has major impact, 86% of the consumers think that Electric cars are important for Environmental Safety.

IX. SUGGESTIONS

It is important to create more constant efforts in order to adapt from combustion vehicles to electric cars.

- i. The Businesses as well as the Government should focus up on increasing the marketing campaigns and different policies to raise more customer awareness and its importance.
- ii. It has also been observed that customers are willing to purchase if there are significant improvements in Technology, charging stations and also the assurance.
- iii. And also the customers are willing to pay Higher prices if there are advancements, innovation and awareness.

- iv. It has been seen that people are not interested in adapting to electric cars due to lack of awareness, Trust and also the infrastructure.
- v. The businesses also must focus up on the important factors that influence consumer buying behaviour.
- vi. By understanding the consumer behaviour and patterns it will provide real time insights in to the customer data.

And also as in India there are many companies that are manufacturing electric vehicles. But still it is in growth stage.

So, it becomes important to use necessary information such as using of technology and AI which can help the firms to understand their target audience and create awareness.

It is also important to develop and enhance the product offerings which can provide competitive advantage and also customers will be attracted.

As the Environmental concerns are increasing it is utmost important to change the way of transportation.

CONCLUSION

According to the report, there are major factors that are influencing the customer behind adoption of electric cars.

Customers are now more interested in considering electric vehicles (EVs) as an alternative to vehicles that run on fuels like gasoline, diesel, and compressed natural gas (CNG) and also the environmental concerns like pollution etc.

An increasing number of electric cars has increased in the past few years. Numerous reasons, includes such as governmental regulations, infrastructures, technological advancements, and change in consumer requirements, are increasing the Electric vehicles revolution.

64% of the customers are willing to purchase an Electric car. 94% of the respondents are aware about electric cars out of 50 respondents.

Even customers are willing to pay higher prices to purchases the electric cars. And it has been seen that there are many factors that influence the customers to adapt from combustion vehicles to Electric cars (EV'S)

Hence, it can be said that there is a relation between the factors and consumer behaviour. And also these factors play a significant part which effect the consumer buying patterns.

Governmental regulations, infrastructures, technological advancements, product enhancements and change in consumer requirements, are increasing the Electric vehicles revolution.

And it can also be said as these above factors as well as the consumer preferences are considered as the major role that are influencing the customers to adapt the electric cars.

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