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A STUDY ON CONSUMER PERCEPTION TOWARDS E-VEHICLE IN VADODARA CITY

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ABSTRACT

Purpose - This paper aims to map the consumer perception toward e-vehicle in Vadodara city. Every day we come across so many topics and articles which states the importance of E-Vehicles and how government around the world are implementing policies to promote E-Vehicles to reduce the dependences on oil, decrease greenhouse gasses and improve air quality. A major pollutant comes from Metropolitan cities and hence it is important for people living in these cities to understand and do their bit to reduce the consumption of life-threatening gasses and pollutants.

This paper is aimed to capture the views, sentiments and perception on the awareness and likeliness to buy the vehicles so that sustainability in environment can be maintained.

Design/methodology/approach - The research papers are analyzed on the basis of searching the keywords related to the topic on various published journals, working papers and some other published books. These papers are collected over a period of year's right from the time when the most introductory paper was published (2002) that contributed this area a basic foundation till the most recent papers (2019).

Findings - From the research, we can conclude here that we fail to reject null hypothesis, in chi-square test. It means that we have to accept the null hypothesis. Null hypothesis is that the significant are not more prefer as an E-vehicle. It means consumers are not more prefer as an E-vehicle. Overall, we can say that consumers are more prefer other than E-vehicle.

Originality/value - In this research we have applied descriptive research design. We used primary data to collect the data through Questionnaire. To conduct hypothesis testing we put statistical tool like Chi-square test to analyze the data effectively.

Keywords – Vadodara city, Sentiment analysis, Consumer perception, E-Vehicle.

Paper type - Research Paper

1. INTRODUCTION

The growth of air pollution in Indian urban areas was a cause for concern Manufacturers. There are more than 25 major Indian cities among the 100 most polluted urban areas in the country World-Nation. The cause for the production of air pollution in urban areas is associated with an array of Sources but the division of transport makes a crucial commitment. Transport discharges are critical division is minimal. The antagonistic influence of air quality on human health and the economy is well known and, in this sense, producers are dreaming about reducing the impact on earth on a couple of options.

Electric cars are seen as a potential choice for transportation, what is in addition, a few national governments have successfully revised innovation development plans. Indigenous governments are swift to advance electric vehicles as a green alternative for portability, moreover find it a realistic solution to the elimination of air emissions in urban areas.

There are a few foreign examples of how to tackle challenges and best practices. China for example, bigly took hybrid cars for cycling and commuting. Metropolitan areas in the UK, such as London are providing rewards. For example, for the procurement of new electric cars, except blocking charges and leave fees for electric cars in certain jurisdictions free or reduced.

In India, electric 3-wheelers have been relatively popular, but still very little distribution of electrical power. Vehicles existed between two wheelers, four wheelers and an armada for urban transport. Techno-funding anyway, tests show that electric bikes can be financially feasible by 2020 and by 2030 electric four wheelers will be a prominent option for innovation, if government offers incentive charging forces and underpinnings are available. The strong atmospheric approach to propel the reason electrical machines. The administration is excited about the advent of electric vehicles. Minister of defense power it has also set an ambitious goal of being 100% electric by 2030. Alternative programs, in particular, the Minister of Road Transport and Highways made a powerful proclamation to the society of Indians Automobile Manufactures (SIAM) annual custom that has terrified the car industry. Anyway, definition of strategies would require contributions to terms of dimension of help required, suggestions for spending plans of government, approach instruments required and utilizing the private part.

2. OBJECTIVES

- To test consumer awareness about e-vehicles.
- To spread awareness about e-vehicles.
- To research the factors driving customers to buy electric vehicles.
- To understand the various government e-transportation initiatives in India.

3. LITERATURE REVIEW

(Chan, 2002) Environmental challenges force the transportation sector to move to more eco-friendly technologies. Electric Vehicles (EVs) are regarded as a green transportation solution. The main focus of the paper is on batteries as it is the key component in making electric vehicles more environment-friendly, cost-effective and drives the EVs into use in day-to-day life.

(Hoyer, 2008) The technology behind Electric vehicles exists for more than a century. However, due to the availability and the ease of use of combustion engines, electric driving was put on hold. Today, different (pushing and pulling) factors recover the interest in Electric vehicles. On the pushing side, the limited oil supply and the rising awareness of the environmental footprint of conventional combustion engine vehicles lead the way to cleaner Electric vehicle. On the pulling side, recent developments in battery technology and electric motors make the Electric vehicle a valid contester for conventional cars.

(Neumann et al 2010) Environmental perspective, increase in high CO2-emissions and depletion of Fossil reserves, the roll out of Electric vehicle can be perceived as a safety measure and future security. Technology to be used in the upcoming EV is very mature and uptrend leading to high distance coverage with efficiency and comfort.

(M Pierre, C Jemelin, N Louvet - Energy Efficiency, 2011) Comparable cases have occurred during the last decades-probably more modest but full of learning: some local authorities have promoted innovations based on electric vehicles in the 1990s, and some people have chosen this kind of cars for their daily travels. Reporting studies carried out in 2006 and 2008, we intend to identify the reasons of this innovative modal choice, to show the difficulties that electric vehicle drivers then encountered and to analyse the patterns of use that governed their mobility and their use of electric vehicles.

(Rezvani, Jansson, and Bodin 2015) Give an overview of EV adoption studies; however, they only focus on individual-specific psychological factors which influence people's intention for Electric vehicle adoption and only select some representative studies. Our review complements it in the following ways: first, we review a wider range of influential factors in Electric Vehicle adoption other than psychological constructs only; second, we present a comprehensive picture of current research by collecting all the available academic Electric vehicle preference studies.

(Ghasri et al., 2019; Sierzchula et al., 2014) Demand studies have explored the financial, technical, essential and political concepts of EVs to help governments and car manufacturers evaluate consumer preferences (Liao et al., 2017). Driving range, refilling time and owning costs have been identified as some of the factors influencing EV purchasing decisions Some studies have used stated preference techniques to explore heterogeneity in consumer preferences when deciding to purchase an Electric vehicle.

4. RESEARCH METHODOLOGY

Research Design:

Secondary Research and Primary research will be descriptive survey research.

Sources of Data:

Secondary data sources from google scholar, google websites, government sites, company sites, magazines, textbooks, newspapers etc.

Primary survey from online digital survey through google form, or through offline survey by approaching

target consumer.

Data Collection Method:

Primary survey method.

Population:

Vadodara city target consumers age group 18 to 55.

Sampling Method:

Random Sampling, Convenience sampling, quota sampling.

Sampling Frame:

Vadodara City-Yellow pages for telephone survey for B2B research or Parul University is sampling frame-through google forms.

Data Collection Instrument:

Questionnaire having dichotomous, Likert scale, open ended, close ended quantifiable questions like rating scale and ranking scale.

5. SUMMARY OF DATA COLLECTION

Gender	Responses
Male	56
Female	42
Other	02
Grand Total	**100**

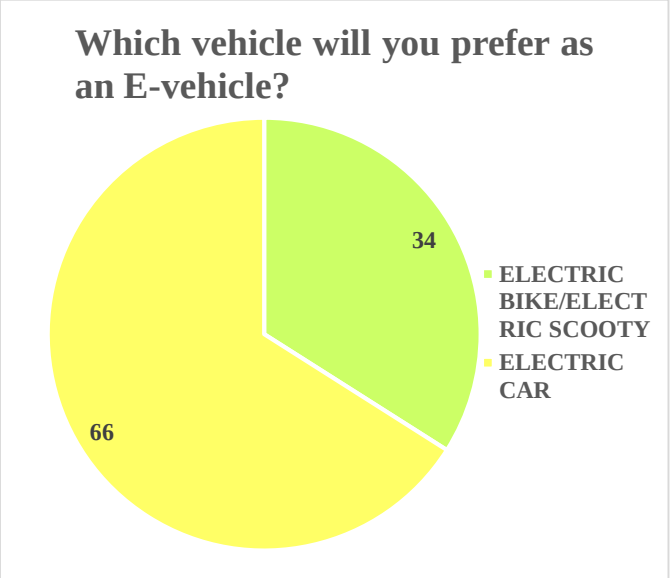
Age	Responses
20-30	82
30-40	14
40-50	02
More than 50	02
Grand Total	**100**

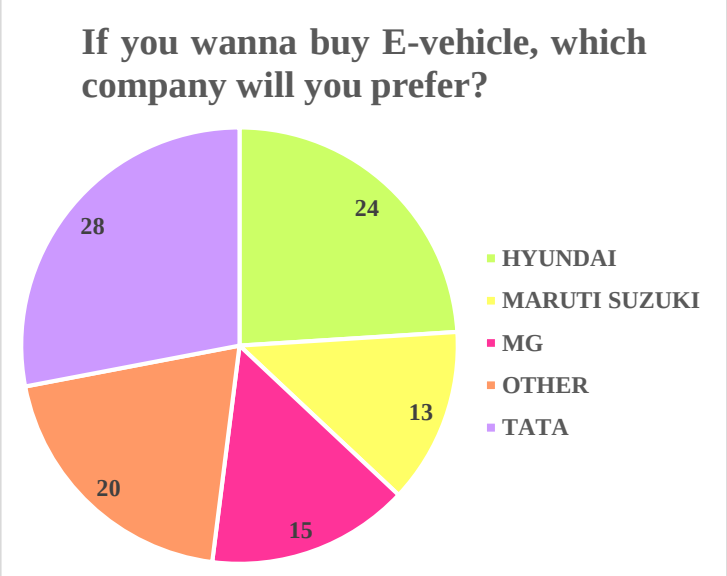
Occupation	Responses
Business	25
Employee	55
Household	06
Student	14
Grand Total	**100**

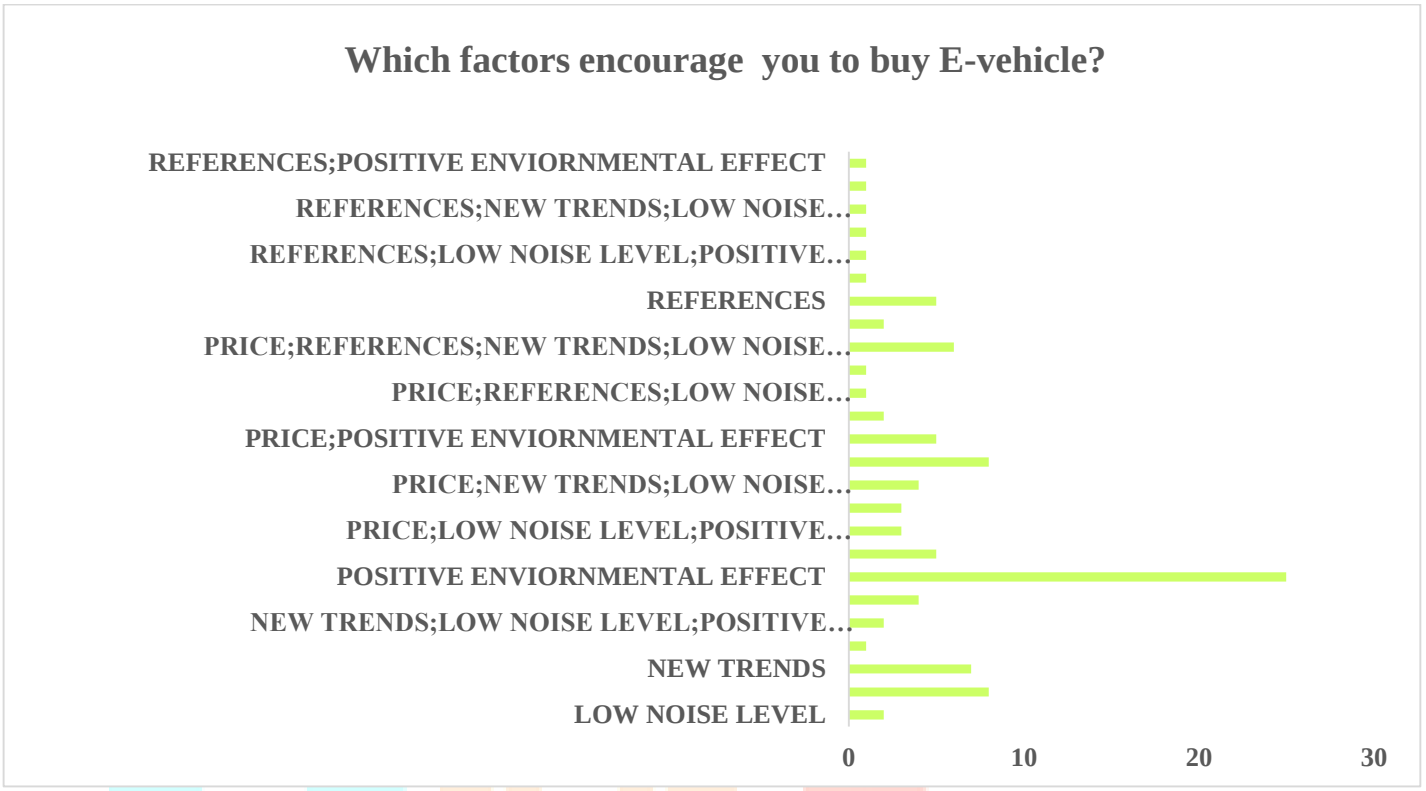
Income	Responses
Rs. 3,00,000 - Rs. 5,00,000	62
Rs. 5,00,000 - Rs. 10,00,000	26
More than Rs. 10,00,000	12
Grand Total	**100**

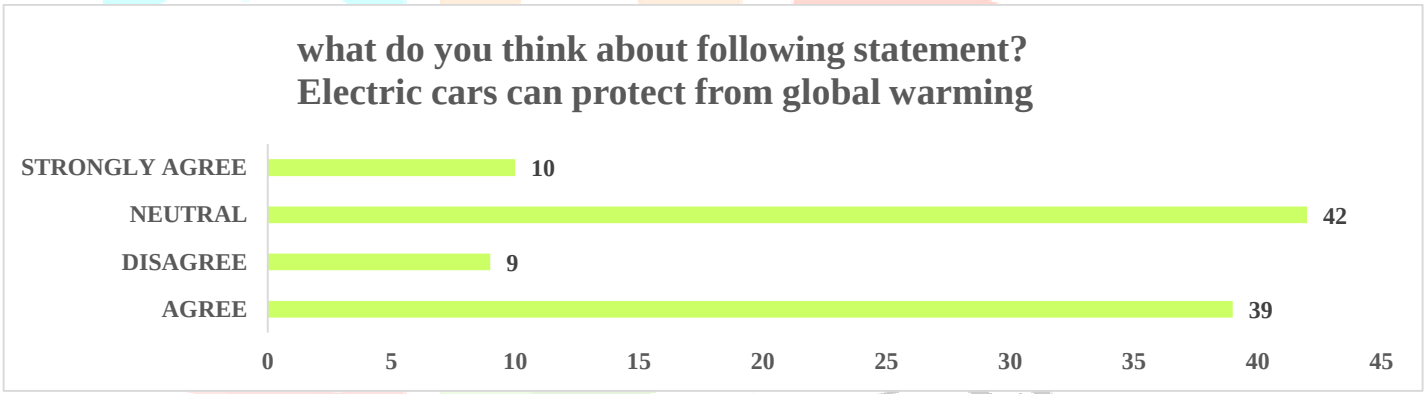
6. DATA ANALYSIS

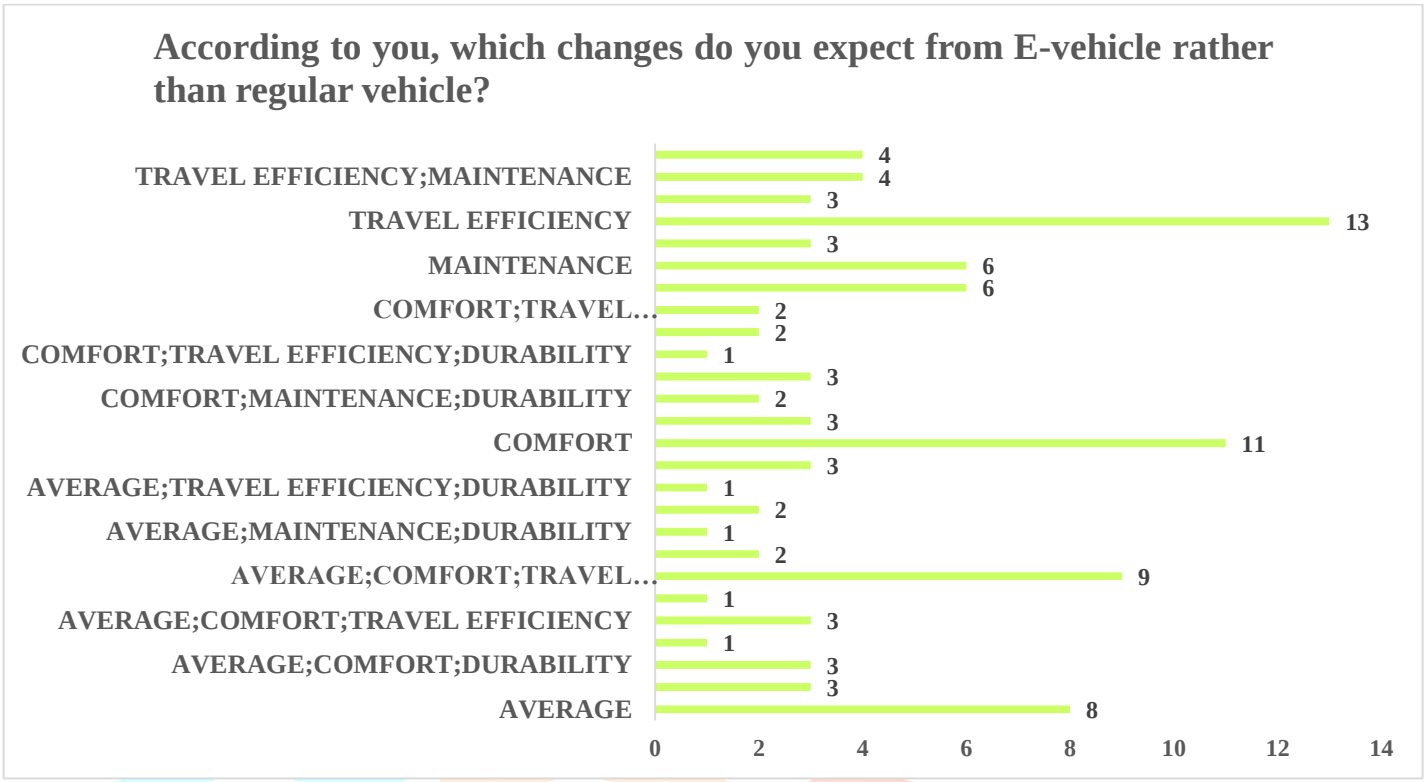
Following are the response of respondent on important question related to topic.






Which factors encourage you to buy E-vehicle?
REFERENCES;POSITIVE ENVIORNMENTAL EFFECT
REFERENCES;NEW TRENDS;LOW NOISE…
REFERENCES;LOW NOISE LEVEL;POSITIVE…
REFERENCES
PRICE;REFERENCES;NEW TRENDS;LOW NOISE…
PRICE;REFERENCES;LOW NOISE…
PRICE;POSITIVE ENVIORNMENTAL EFFECT
PRICE;NEW TRENDS;LOW NOISE…
PRICE;LOW NOISE LEVEL;POSITIVE…
POSITIVE ENVIORNMENTAL EFFECT
NEW TRENDS;LOW NOISE LEVEL;POSITIVE…
NEW TRENDS
LOW NOISE LEVEL
0
10
20
30


what do you think about following statement?
Electric cars can protect from global warming
STRONGLY AGREE
10
NEUTRAL
42
DISAGREE
9
AGREE
39
0
5
10
15
20
25
30
35
40
45


According to you, which changes do you expect from E-vehicle rather than regular vehicle?
TRAVEL EFFICIENCY;MAINTENANCE
TRAVEL EFFICIENCY
MAINTENANCE
COMFORT;TRAVEL...
COMFORT;TRAVEL EFFICIENCY;DURABILITY
COMFORT;MAINTENANCE;DURABILITY
COMFORT
AVERAGE;TRAVEL EFFICIENCY;DURABILITY
AVERAGE;MAINTENANCE;DURABILITY
AVERAGE;COMFORT;TRAVEL...
AVERAGE;COMFORT;TRAVEL EFFICIENCY
AVERAGE;COMFORT;DURABILITY
AVERAGE
4
4
3
13
3
6
6
2
2
1
3
2
3
11
3
1
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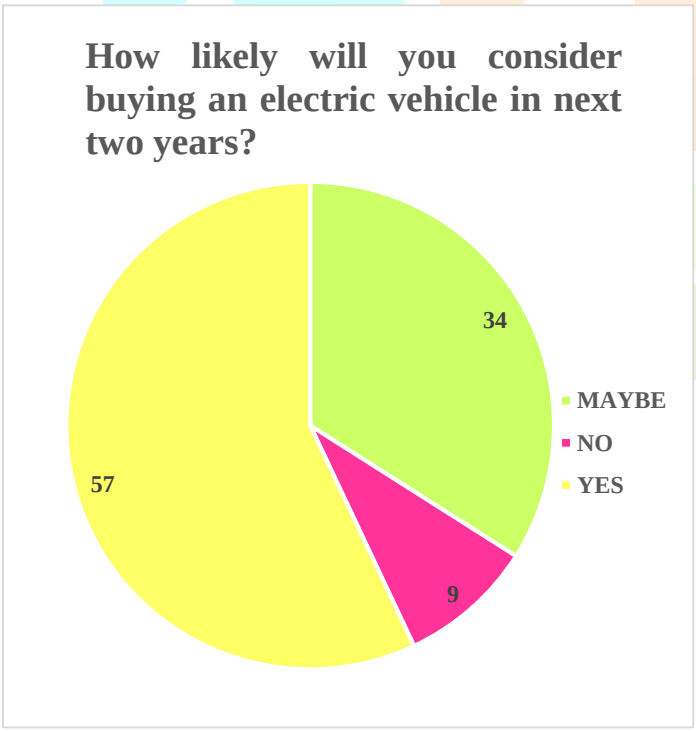
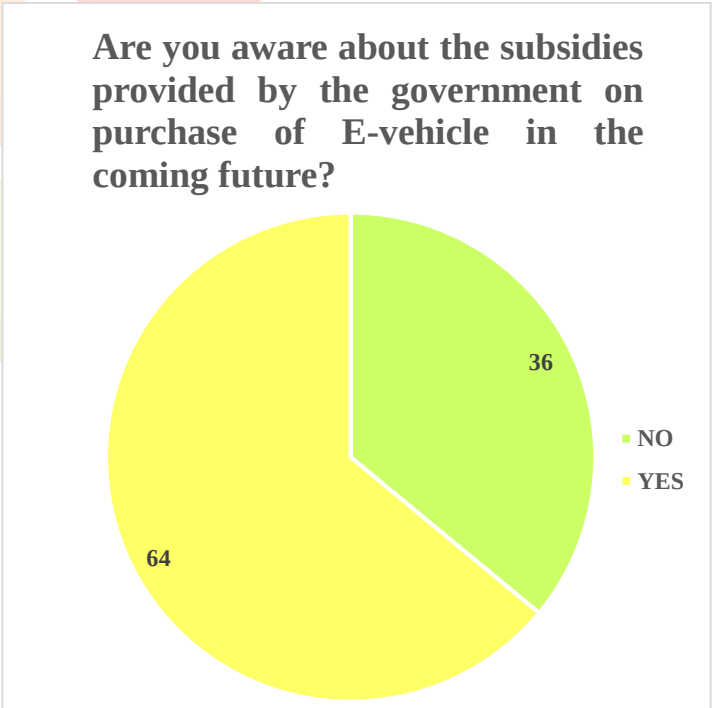

How likely will you consider buying an electric vehicle in next two years?
34
9
57
MAYBE
NO
YES


Are you aware about the subsidies provided by the government on purchase of E-vehicle in the coming future?
36
64
NO
YES

7. HYPOTHESIS TESTING

For the research we have conducted Chi-square test.

Chi-square Test

The Chi-square test aims to verify the probability that an observed distribution is due to chance. It is also known as the "goodness of fit" statistic because it measures how well the observed distribution of the data fitsthe expected distribution if the variables are independent. The chi-square statistic is determined by the level of significance.

H0: Significant are not more prefer as an E-vehicle.

H1: Significant are more prefer as an E-vehicle.

Table 1 *Calculation of observed data*

Observed (fo)	Maruti Suzuki	Hyundai	Tata	MG	Other	Total
Electric Car	06	16	21	10	13	66
Electric Bike	07	08	07	05	07	34
Total	13	24	28	15	20	100

Table 2 *Calculation of Expected data*

Expected (fe)	Maruti Suzuki	Hyundai	Tata	MG	Other	Total
Electric Car	8.58	15.84	18.48	9.9	13.2	66
Electric Bike	4.42	8.16	9.52	5.1	6.8	34
Total	13	24	28	15	20	100

Table 3 *Calculation of Observed & Expected data*

Chi-square	Maruti Suzuki	Hyundai	Tata	MG	Other	Total
Electric Car	0.775804196	0.001616162	0.34363636	0.0010101	0.003030303	1.125097125
Electric Bike	1.505972851	0.003137255	0.66705882	0.0019608	0.005882353	2.184012066
Total						3.309109191

Table 4 *Cal. of Df, CV, P-value*

Df = (r-1)(c-1)	**CV →**	9.487729037
Df = 4	**P-value →**	0.507490283

Conclusion:

Here Chi-Square value < Critical Value. Hence, we fail to reject H0. OR p value is 0.507490283 & alpha is 0.05. Since p value > 0.05. Hence, we fail to reject H0. So, the conclusion is that Significant are not more prefer as an E-vehicle.

8. FINDINGS

- Out of 100 people, 56 are male, 42 are female and 02 are others. That's mean the male have more knowledge

about E-vehicles & only working ladies having the knowledge about E-vehicles.

- Most of the respondents whose age under 20-30 years are interested towards E-vehicle.
- Most of the respondents are employee & business man.
- Based on analysis we find that 80% individuals are environmental conscious.
- The analysis shows that 66% peoples are prefers electronic car and 34% peoples are prefers electronic bike or electronic scooty.
- Most of the respondents prefers positive environmental effect, price, low noise level and new trends for buying E-vehicle.
- Based on analysis 26% individuals prefer internet sources, 14% prefers family and friends, 11% prefers television and other remaining individuals prefer newspaper and also outdoor advertisement for getting knowledge about E-vehicle.
- Based on analysis if consumer wants to buy E-vehicle, 28% consumers prefer Tata, 24% consumers prefer Hyundai, 20% consumers prefer other, 15% consumers prefer MG, and 13% consumers prefer Maruti Suzuki.
- Out of 100 respondents, 57% people will consider buying an electric vehicle, 34% people may buy and remaining 9% people will not consider buying an electric vehicle in next two years.
- Most of the respondents thinks that electric cars are very expensive.
- Most of the respondents are agree that electric cars can replace regular cars in terms of satisfying consumer needs.
- Most of the consumers expect changes like travel efficiency, comfort, maintenance, average and durability from E-vehicle rather than regular vehicle.
- Out of 100 respondents, 64% people are aware and 36% people are not aware about the subsidies provided by the government on purchase of E-vehicle in the coming future.
- Electric cars can save a lot of money of owner, for this statement respondents have responded neutral, agree and strongly agree by giving 46%, 35% and 19% respectively.
- Based on analysis most of the people are not more prefer as an E-vehicle.
- By applying statistical tool, we found that chi-square test is fail to reject null hypothesis. It means that we have to accept the null hypothesis. Null hypothesis is that the significant are not more prefer as an E-vehicle. It means consumers are not more prefer as an E-vehicle. Overall, we can say that consumers are more prefer other than E-vehicle.

9. PROBLEM STATEMENT

In present covid-19 scenario, lots of automobile company facing declining sales and we will try to address the problem – whether their preferences have changed for e-vehicles or they changed their mode of conveyance or transport? Or they are not still aware about e-vehicles and its benefits. We will try to spread awareness through this study.

10. LIMITATIONS

- Data was collected only from Vadodara and Parul University campus, result represents only small part of population.
- There was limitation of time.
- In future further research should be done with more varied samples and in detail with more geographically spread.
- As the data is collected through the questionnaire on online mode there may be possibility of they maynot fully loyal in answering the questions.

11. CONCLUSION

From the above chi-square test and above research, we can conclude here that we fail to reject null hypothesis. It means that we have to accept the null hypothesis. Null hypothesis is that the significant are not more prefer as an E-vehicle. It means consumers are not more prefer as an E-vehicle. Overall, we can say that consumers are more prefer other than E-vehicle. From the questionnaire's question we can also conclude that people more prefer electric car as compared with electric bike or electric scooty. People consider positive environmental effect, price, low noise level and new trends for buying E-vehicle. Most of the respondents thinks that electric cars are very expensive. Most of the respondents are agree that electric cars can replace regular cars in terms of satisfying consumer needs. Most of the consumers expect changes like travel efficiency, comfort, maintenance, average and durability from E-vehicle rather than regular vehicle. Overall, based on analysis we can say that the most of the people are not more prefer as an E-vehicle, they prefer other than E-vehicle.

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