iJRASET
International Journal For Research in Applied Science and Engineering Technology



INTERNATIONAL JOURNAL FOR RESEARCH

IN APPLIED SCIENCE & ENGINEERING TECHNOLOGY

Volume: 8 **Issue:** V **Month of publication:** May 2020

DOI: http://doi.org/10.22214/ijraset.2020.5098

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International Journal for Research in Applied Science & Engineering Technology (IJRASET)
ISSN: 2321-9653; IC Value: 45.98; SJ Impact Factor: 7.429
Volume 8 Issue V May 2020- Available at www.ijraset.com

Consumer Behavior towards Buying Electric Vehicles

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Abstract: ***The advancement of the global economy and technology has developed human civilization to a greater extent, it has also caused Massive damage to the global environment. solar energy, hydrogen fuel, and nuclear power are technically complex and cannot achieve mass production in a short period of time. Electric energy is a feasible energy solution at present, can solve the country's dependence on oil resources to a certain extent. As environment concern increases day by day and introduction of the new BS6 engines in India shows a great step in moving towards creating environment-friendly vehicles. But the problem of moving forwards at this pace in India is about the customer perceptive towards electric vehicles in India. As people are not much aware of the technology is and what is the change that it would bring in to there life and environment around them. We can it can be the lack of knowledge about electric vehicles or the trust that they have on the traditional fossil fuel vehicles. As India is a country with people having different lifestyles, habits, cultures etc…its a tough thing for the government here to quickly shift to electric vehicles. This paper talks exactly about the perceptions and buying behavior of the customer when an electric vehicle is launched in the market. this paper will show us a brief understanding of how people in India have their opinion about owning an electric vehicle and difficulties that they feel which concerns them over buying an electric vehicle over traditional diesel and petrol engine vehicles. So after going through the data that's been collected on this study I was able to find quite a few interesting things that have been affecting consumers buying decision towards electric vehicles not that they are not ready to embrace the new technology that's coming but it's more about the doubtfulness that the people have that can they have this in there society and how much will it impact their society positively and negatively. The study also shows that people are more concerned about its long-lasting feature such limited range as people in India love travelling in there own vehicles and the safety of the car as it runs on a battery which is quite new for the people and its durability. The factors that influences customers in purchasing of electric vehicles are not only about the design and development of electric vehicles that suits customer demands but it also serve as a theoretical idea in which Electric Vehicles can be Maximized and provide a choice for Customers purchase. the government and Automobile manufacturers need to focus on increasing the awareness and give publicity of there electric vehicles and Start launching more attractive battery, infrastructure and charging schemes to attract customers and promote the sustainable Energy development of the automobile industry.***

Keywords: Electric vehicles, customer behavior, green technology, Environmental concern

I. INTRODUCTION

During the last few decades, the environmental impact of the petroleum-based transportation infrastructure, along with the fear of the rising price of oil has led to renewed interest in electric transportation infrastructure.

The automobile industry has been one of the fastest-growing industries in India as well as in the world, and in recent times the automobile industry has been going through significant changes in its technology as they focus in moving towards better eco-friendly vehicles bringing in battery vehicles and also producing combustion engine vehicles which produce less pollution. And the phases where we can see major changes are in connectivity, autonomous driving, the sharing economy, yearly updating of vehicles and the start of BS6 engine vehicles.

According to the 'National Electric Mobility Mission Plan (NEMMP), 2020' which was introduced India on 2013 has the plan to make a major shift to electric vehicles and focuses on the issues of national energy security, vehicle pollution and the growth in domestic manufacturing sectors. Pollution associated with the automobile industry in India is one of the responsible factors for such a drastic change in the automobile industry. As most of the cities in India have high pollution and noise level rates in the world. According to WHO report 2019 for most polluted cities, 14 out of the top 20 cities in the world are from India. People in India are very much concern about there health and there surrounding. Some are very much aware of such vehicles in the market and some don't. that is where the automobile industry must bridge the gap.people in India mostly don't know more about the electric vehicles so the government along with the automobile industry Heads must take necessary steps to make people aware of such technology.

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Make them understand about owning an electric vehicle and what benefit it brings. Which can bring a change in the minds of the people in shifting to an electric vehicle? This can only be done if the right facility and infrastructure are provided by the government. Therefore seeing this I would consider that we start shifting towards the use of electric vehicles. Even though electric vehicles have started to go under production in India for a couple of years now, but the market of electric vehicles haven't kicked up in India that fast. So what are we dealing herewith, is it the technology or the buying behaviour of the customers in India. This paper will try to explain what are the reasons that customers talk and think about before buying an electric vehicle at home.

II. RESEARCH PURPOSE

When customers make there purchase decisions, many factors come into count such as exchange of information among family and friends, internet sources, newspapers, magazine etc…Although the popularity of electric vehicles is increasing, the market ratio of electric vehicles is quite low. This study aims to investigate the factors influencing consumers purchase of electric vehicles to provide a reference for the design and development of electric vehicles and offer suggestions for companies regarding future consumer purchase of electric vehicles and show them what are key features that a customer needs if they wish to buy an electric vehicle.

III. RESEARCH PROBLEM

The problem here is that are the people aware of the new technological changes happening in the automobile industry. Those have to do with there geographical factors or the source of information that they get. This research paper tries to cover all those areas where the people are concern about replacing the traditional combustion engine vehicles to an electric vehicle.

IV. OBJECTIVE

A. To understand whether the customers are aware of the electric vehicles in the market.
B. To understand are they willing to pay to buy a electric vehicle.
C. To understand what are the factors that is influencing them to buy or not to buy electric vehicles.
D. Understand whats the sources of there information.
E. Who are more interested in buying an electric vehicle.

V. RESEARCH METHODOLOGY

This study employs a descriptive and exploratory research approach and has adopted the survey method for data collection to understand the buying approach towards Electric vehicles in line with demographic variables of the respondents. The present study is the primary data and secondary information. The primary data has been collected through a structured questionnaire from 60 respondents in India to understand what the the people think about electric vehicles. Secondary data is used from e-journals, books, and report. Data obtained through the survey were analyzed using suitable statistical tools and techniques based on demographic parameters such as gender, age and education and level of income of the respondents.

VI. SIGNIFICANCE OF STUDY

This study will be helpful to understand the level of awareness and willingness of consumers to buy Electric vehicles. It will provide a thorough analysis of factors that are encouraging and discouraging customers to buy Electric vehicles as well as the expectation of customers from manufacturers and government with respect to electric vehicles. In short, this study helps us to understand the market potential of electric vehicles and consumers expectation from producers and government.

VII. LITERATURE REVIEW

Dr Prathap B, Prof. Praveen Kumar and Prof. Savanth S (2020) Studied how the electric vehicle market is involving and how people are getting aware of these technologies. They did there study by taking various countries around the world and comparing how they have adapted the use of electric vehicles in their countries and developed a model based on that.

Dr Shivkumar L. Randar Miss. Vaishali R. (2020) studied about consumer behaviour in Solapur city. They tried to understand what is that encourages and discourages customers towards buying electric vehicles, what is the requirement they prefer based on which they gave their assumption on what the government and automobile industry can do to increase the market of electric vehicles in Solapur city.

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Rachana Vidhi and Prasanna Shrivastava (2018) they studied that Electric vehicles reduce pollution only if a high percentage of the electricity mix comes from renewable sources and suggested that vehicle battery manufacturing should be taken place away from vehicle use area. Their paper also has reviewed that different steps in the life cycle of an electric vehicle, their impact on environmental emissions and has recommended certain policies suitable for a different social-economic group that suits the Indian market.

Jui-Che Tu and Chung Yang (2019) they studied about understanding how consumers are more interested in knowing about the new technology and how the plan upon buying electric vehicles by making certain theoretical frameworks.it also serve us a theoretical basis for the increasing the popularity of electric vehicles, and provide reference for customers choice and purchase.the government and Automobile manufacturers should consider increasing the publicity of electric vehicles and launch more attractive battery and charging schemes to attract customers and promote the sustainable energy development process of the automobile industry.

V.V Ravikumar and Anil Khurana (2019) Talks about that the environment pollution is becoming a big concern for living beings. Fossil fuels internal combustion engines are the major contributors. Therefore many countries around the world are moving towards electric vehicles. They examine the different factors that could affect the transition to electric vehicles based on the literature available from previous studies globally and builds a conceptual model.

Gallagher and Muehlegger (2018) contemplated the customer reception of hybrid electric vehicles in the USA and found that gatherings with solid importance for environmentalism and energy-conserving toward hybrid electric vehicles. Their outcomes demonstrate that rising fuel costs and certain social inclinations bring about the greatest sales.

Fanchao Liao, Eric Molin and Bert van Wee (2016) there study talks about widespread adoption of electric vehicles which may contribute to the alleviation of problems such as environmental pollution, global warming and oil dependency. However, the current market penetration of electric vehicles is relatively low in spite of many governments implementing strong promotion policies. Their paper presents a comprehensive review of studies on consume.

Ona Egbue and Suzanna Long (2012) there paper talks about how better policies can bring in electric vehicles and gives insight for the policymakers how they can go about this. It will guide policymakers in making energy and transportation policy for there countries. It can also provide guidance to electric vehicle engineers decision in incorporating consumer preference into electric vehicles design making. preferences for Electric vehicles, aiming to better inform policy-makers and give direction to automobile industry to how to make more aware of this among the people.

VIII. DATA ANALYSIS AND DISCUSSION

A. Demo Graphical Profile of the Respondent

Table 1.1

What is your Age?	What is your gender?	What is your Education level?	What is your Monthly Income?	Marital status?
26 - 30	Male	Bachelors Degree	300000-400000	Unmarried
< 25	Female	Bachelors Degree	10000-20000	Unmarried
< 25	Male	Bachelors Degree	less than 10000	Unmarried
< 25	Female	Masters Degree	less than 10000	Unmarried
< 25	Male	Bachelors Degree	40000-50000	Unmarried
< 25	Male	Bachelors Degree	10000-20000	Unmarried
< 25	Female	Bachelors Degree	10000-20000	Unmarried
< 25	Male	Bachelors Degree	less than 10000	Unmarried
< 25	Male	Bachelors Degree	less than 10000	Unmarried
< 25	Male	Bachelors Degree	30000-40000	Unmarried
31-40	Male	Bachelors Degree	More than 50000	Married
31-40	Female	Masters Degree	less than 10000	Married
< 25	Male	Bachelors Degree	less than 10000	Unmarried
< 25	Male	Masters Degree	10000-20000	Unmarried
31-40	Male	Masters Degree	More than 50000	Unmarried
< 25	Female	Masters Degree	less than 10000	Unmarried

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< 25	Male	Masters Degree	less than 10000	Unmarried
< 25	Male	Bachelors Degree	less than 10000	Unmarried
< 25	Male	Bachelors Degree	30000-40000	Married
< 25	Female	Masters Degree	less than 10000	Unmarried
31-40	Female	Masters Degree	less than 10000	Married
< 25	Female	Masters Degree	less than 10000	Unmarried
< 25	Male	Masters Degree	10000-20000	Unmarried
< 25	Female	High School	less than 10000	Unmarried
< 25	Female	Bachelors Degree	More than 50000	Married
41-60	Male	Masters Degree	More than 50000	Married
< 25	Male	Masters Degree	30000-40000	Unmarried
< 25	Female	Bachelors Degree	30000-40000	Unmarried
< 25	Female	Masters Degree	less than 10000	Unmarried
< 25	Male	Masters Degree	less than 10000	Unmarried
< 25	Female	Bachelors Degree	less than 10000	Unmarried
26 - 30	Female	Masters Degree	30000-40000	Unmarried
61 or above	Male	Bachelors Degree	More than 50000	Married
41-60	Female	Bachelors Degree	10000-20000	Married
41-60	Male	Bachelors Degree	More than 50000	Married
26 - 30	Male	Masters Degree	10000-20000	Unmarried
31-40	Female	Masters Degree	30000-40000	Married

< 25	Male	Masters Degree	10000-20000	Unmarried
26 - 30	Female	Masters Degree	40000-50000	Married
61 or above	Male	Bachelors Degree	40000-50000	Married
< 25	Male	Masters Degree	10000-20000	Unmarried
< 25	Female	Masters Degree	10000-20000	Unmarried
< 25	Female	Masters Degree	10000-20000	Unmarried
31-40	Female	Masters Degree	less than 10000	Married
< 25	Female	Masters Degree	30000-40000	Unmarried
26 - 30	Male	Bachelors Degree	less than 10000	Unmarried
41-60	Male	Masters Degree	More than 50000	Married
61 or above	Male	Bachelors Degree	40000-50000	Married
26 - 30	Female	Masters Degree	More than 50000	Married
31-40	Male	Masters Degree	40000-50000	Married
26 - 30	Female	Bachelors Degree	30000-40000	Unmarried
31-40	Female	Masters Degree	40000-50000	Married
31-40	Female	Masters Degree	More than 50000	Married
26 - 30	Male	Masters Degree	10000-20000	Unmarried
26 - 30	Male	Masters Degree	40000-50000	Married
< 25	Male	Masters Degree	less than 10000	Unmarried
26 - 30	Male	Bachelors Degree	10000-20000	Unmarried
41-60	Female	Masters Degree	40000-50000	Married
26 - 30	Male	Masters Degree	30000-40000	Unmarried
26 - 30	Male	Masters Degree	10000-20000	Unmarried

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TABLE 1.2

Gender	Total no: of respondents	Percentage
Male	34	56.70%
Female	26	43.30%
Other	0	0
total	60	

TABLE 1.3

AGE	Total no: of respondents	Percentage
< 25	31	51.70%
26-30	12	20.00%
31-40	9	15.00%
41-60	5	8.30%
60 & above	3	5.00%
Total	60	

Source: Primary data

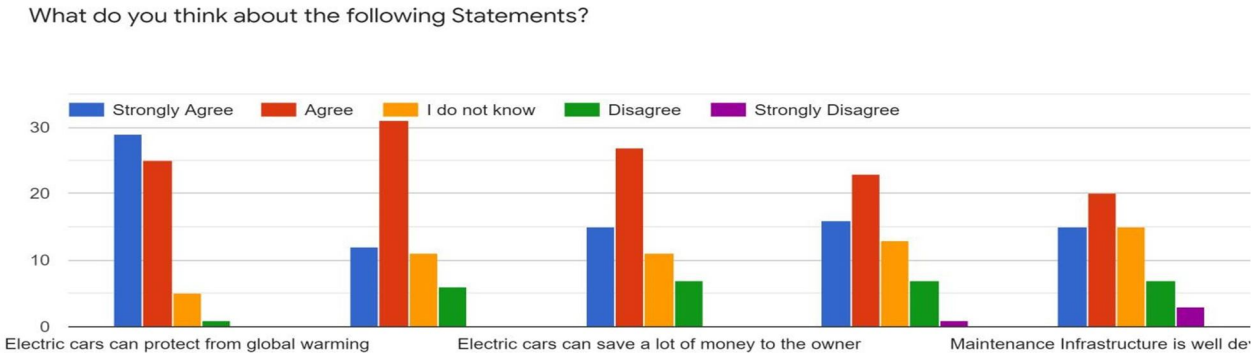
TABLE 1.4

Monthly income	Respondents	Percentage
Less than 20000	19	31.70%
20000-30000	14	23.30%
30000-40000	1	2%
40000-50000	8	13.30%
50000-60000	9	15%
more than 60000	9	15%
Total	60	

Source : Primary Data

The data that has been collected here is with respect to primary data through a well-designed questionnaire. Total of 60 respondents data has been collected and the questionnaire was mainly focused on what the people out there understand about the electric vehicles and what are they looking for in electric vehicles, what are the things that lack because of which the Electric vehicles market in India is still low and understanding are this the reasons why people hesitate in buying electric vehicles over there traditional combustion engine vehicles. First, we will look into the demographical profile of the respondent. Table 1.1 shows the complete list of the respondents and their demographical profile. Table1.2 shows the total no of male and female respondents in percentage where the male is 53.7% and female are 43.3%. Table1.3 shows us the percentage of no of respondents in different age groups and highest been recorded who 25 and less. This paper is more focused on the people who between the age group of 18 to 40 as they are the ones that will be more aware of this technology and understand what's best for the environment people at these age group are quite cautious about there choice.

IX. WHAT THEY THINK ABOUT HAVING AN ELECTRIC VEHICLE GRAPH 1



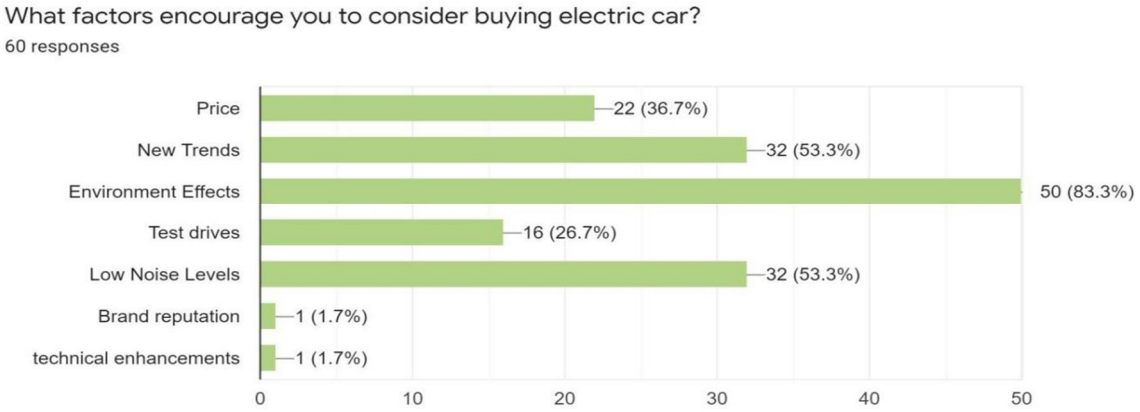
Source: Primary Data

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The above graph shows us the details about what people think about having an electric vehicle. the question was based on the Likert's scale. From the graph, we can understand that people are very much concern about the environment and most of them prefer to buy an electric vehicle because they say that it can protect from global warming and they believe that electric vehicles can replace the traditional car to satisfy customer needs. and 3rd reason that found from this data is that they feel it can save a lot of money for the owner and which I too believe that it will because there is less of moving parts but most of the parts are of electronics circuits if a fault occurs the replacement of that could be costly as a result there a few who doesn't agree upon this.

3rd highest the respondents most agree upon is that the vehicle could be quiet expensive that's what some of them even disagreed that it could save money for the owner and reason is quite the same for both. The last was about the infrastructure that's been developed, where we can find that there is a bit of balanced answer to this question. Some people believe that the right infrastructure has been developed and some consider that there is a lot more to be done. What I could feel that this could be one reason among a few others that consumers are confused about whether to buy electric vehicles. Infrastructure plays an important role in increasing the market of Electric vehicles.

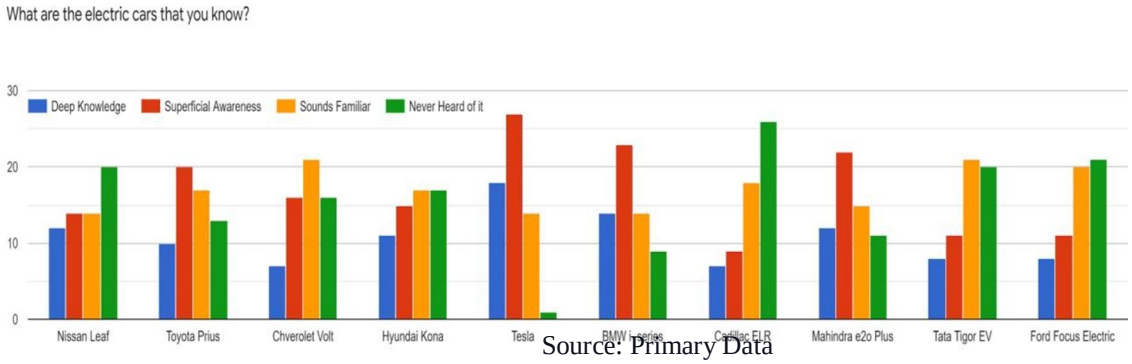
X. FACTORS THAT ENCOURAGED CUSTOMERS TO BUY ELECTRIC VEHICLES GRAPH 2



Source: Primary Data

The above Graph is the major part in this research paper. It shows us what are the factors that encourage people to buy an electric vehicle. And it has been quite an interesting analysis that when it comes to having an electric vehicle there is no brand loyalty much involved in this and we can see the brand reputation is just of 1.7%. people don't care much about the brand in buying an electric vehicle. People understand the concept that having an electric vehicle means they are doing there part in protecting the environment as 83.3% people say that it can bring a change in the environment and even 53.3% say that it will even bring low noise level. And when asked to 26.7% who have chosen test drive as they want to feel what it's like having an electric vehicle what's the difference between this and regular combustion engine vehicles and when asked about the price they said that its a varying factor and soon won't much be of an encouraging factor as they feel that Electric vehicles are going to be the future of Automobile industry. New trends have 53.3% and most of the respondents that have to choose this option are more at the age 25 or below which they feel that electric vehicles are going to be the new trend in the Automobile market.

A. Peoples Awareness of Electric Vehicles in the Market Graph 3

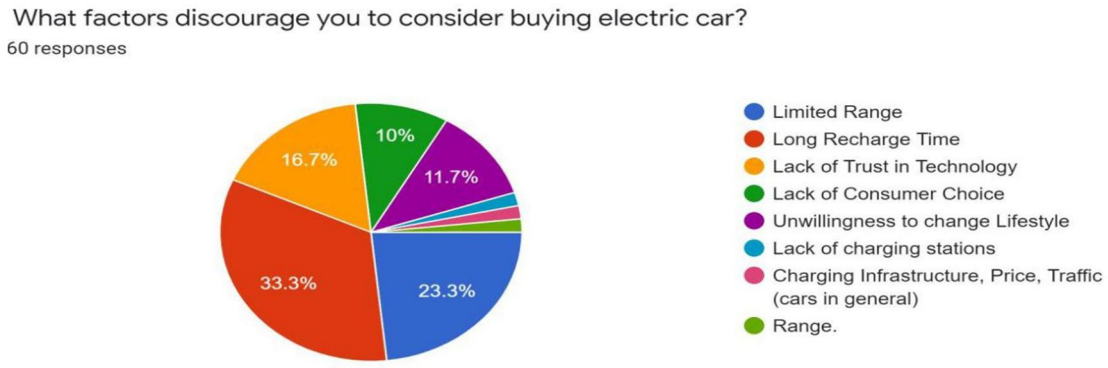


Source: Primary Data

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This question was a general one to understand how much people are aware of the electric vehicles in the market. Surprisingly by looking into this Data, there has been quite a few interesting findings. People are very much aware of the brand Tesla and BMW I-series which are very less popular in India. Why is that? Are companies in India not trying to bring in awareness or its just the mindset of the people towards there traditional vehicles or is this the problem of the government that they are not trying to promote this more. In this primary data and even going through the secondary data this is one point that highlights the most. People are more aware of the international brand which running electric vehicles successfully in other countries, but people over here in India are not much aware of this. Looking into the data from this graph people are not at all aware about there own parent brand Tata has launched 2 electric vehicles the Tata Tigor EV and Tata Altron. But most of them are aware of the Mahindra e2o Plus, but still fewer people have deep knowledge about it even though its almost 4 years now since the release of Mahindra e2o Plus. The only conclusion that can be found from here is that are the Indian Automobile Industry not Marketing their Electric vehicles Effectively?

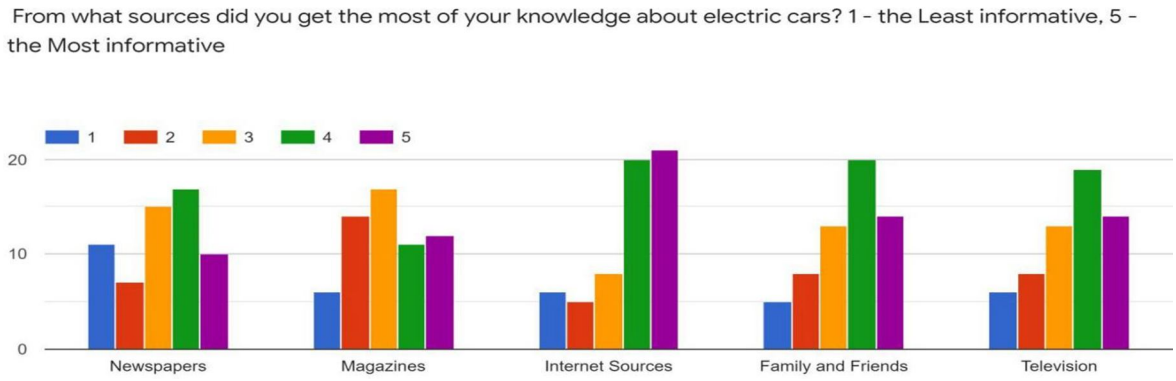
B. Factors that Discourage them in Buying Electric Vehicles



Source: Primary Data

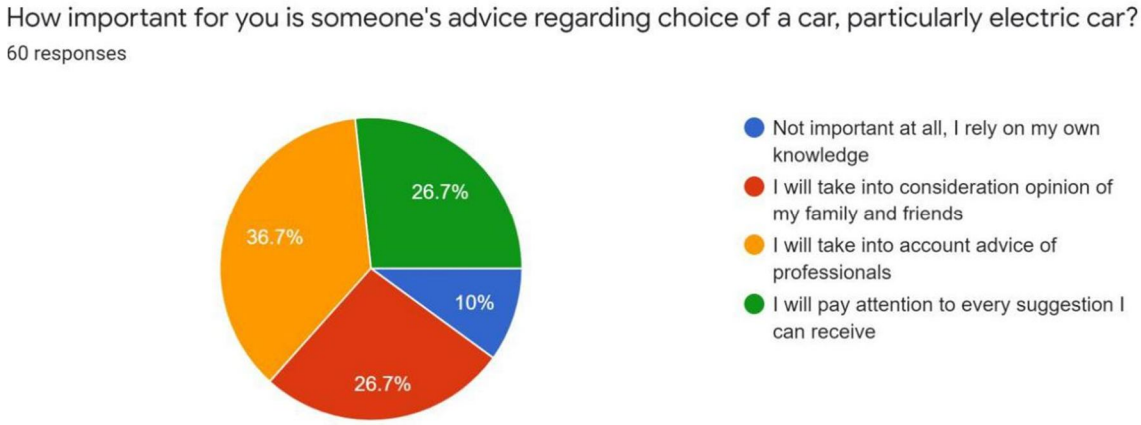
Now 2nd most important part of this research paper is what are the factors that discourage people from buying electric vehicles. And the above pie chart exactly shows us what are those. People who are used to driving traditional combustion engine vehicles and when they are asked will u buy an electric vehicle over the current combustion engine vehicles. There are these 2 common questions that come into the mind of the people those are what is the maximum range it can run and how long does it take for full charging of the battery. And from the above pie chart, we can exactly see that 33.3% respondents choose long charging time, 33.3% choose Limited range, 16.7% choose lack of trust in technology, 11.7% choose Unwillingness to change lifestyle and 10%choose Lack of consumer choice. This is where we see 2 major consumer behaviour that's there Trust and Belief. People are still doubtful about the electric vehicles just because of this and they feel they are very much comfortable with there traditional vehicles as electric vehicles haven't brought in that trust and belief to the customer that they can satisfy the required needs of the customer and have the right infrastructure to do so.

C. Source of Information About Electric Vehicles



Source: Primary Data

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Source: Primary Data

The above Data shows us the source of information and with whom customers approach or take advice from before buying an Electric vehicle. The graph shows us that people find more information from the internet sources and people who don't have much access to the internet source prefer Television and newspaper. Whereas overall after Internet source people get more information from their family and friends. But as we see in the pie chart that 36.7% people prefer much of the advice from the professionals in buying an electric vehicle.these are the ways through which people try to get information about the electric vehicles and to those are thinking of buying one. As we are living in the world of internet it wasn't much of a surprise that people get their information from internet sources. But in my opinion, I would have gone with the magazines much often as a lot of Automobile magazines such as TopGear, AutoCars, Autoweek etc…which provide us depth knowledge of all the current and new vehicles that are going to come in the market.

XI. FINDINGS

A. Level of awareness about electric vehicles, availability of different models of vehicles and government incentives for Electric vehicles are found to be Average. People perceive that eco friendly is the most encouraging factor to buy electric vehicles. It means most of the people think and are aware that the use of Electric Vehicles will have less emission carbon and they are eco friendly. The high purchase price, lack of charging stations, limited driving range and long recharging time are considered most discouraging factors to buy Electric vehicles.

B. Most of the respondents are in the opinion that electric vehicles are not convenient for a long journey, because of its long charging time, the limit of the driving range and lack of charging infrastructure.

C. Even though people are very much aware of the environmental effects that the traditional combustion engines vehicles do they are still in doubt of moving towards an electric vehicle as they are not provided with in-depth knowledge and the right infrastructure is not set up yet.

XII. CONCLUSION

It is the need of the time to adopt Electric vehicles as a positive action towards climate change. Use of Electric vehicle is important to maintain the condition of the environment. To create the level of awareness about Eco-friendly government and Automobile industries must launch a campaign giving people the awareness of using electric vehicles and its benefits. It is also required to create adequate quality infrastructure for fast charging stations for easy use and maintenance of Electric vehicles in India.

XIII. SUGGESTIONS

A. Electric vehicle manufacturers should take awareness of the environmental safety as there advantage to promote electric vehicles.

B. Lack of charging infrastructure is one of the major factors for creating negative perception of Electric Vehicles among consumers and manufacturers. So the government's major focus should be on the development of charging infrastructure.

C. Fast charging batteries must be brought in as people don't like waiting for a long period of time which is a major reason why that don't prefer Electric vehicles.

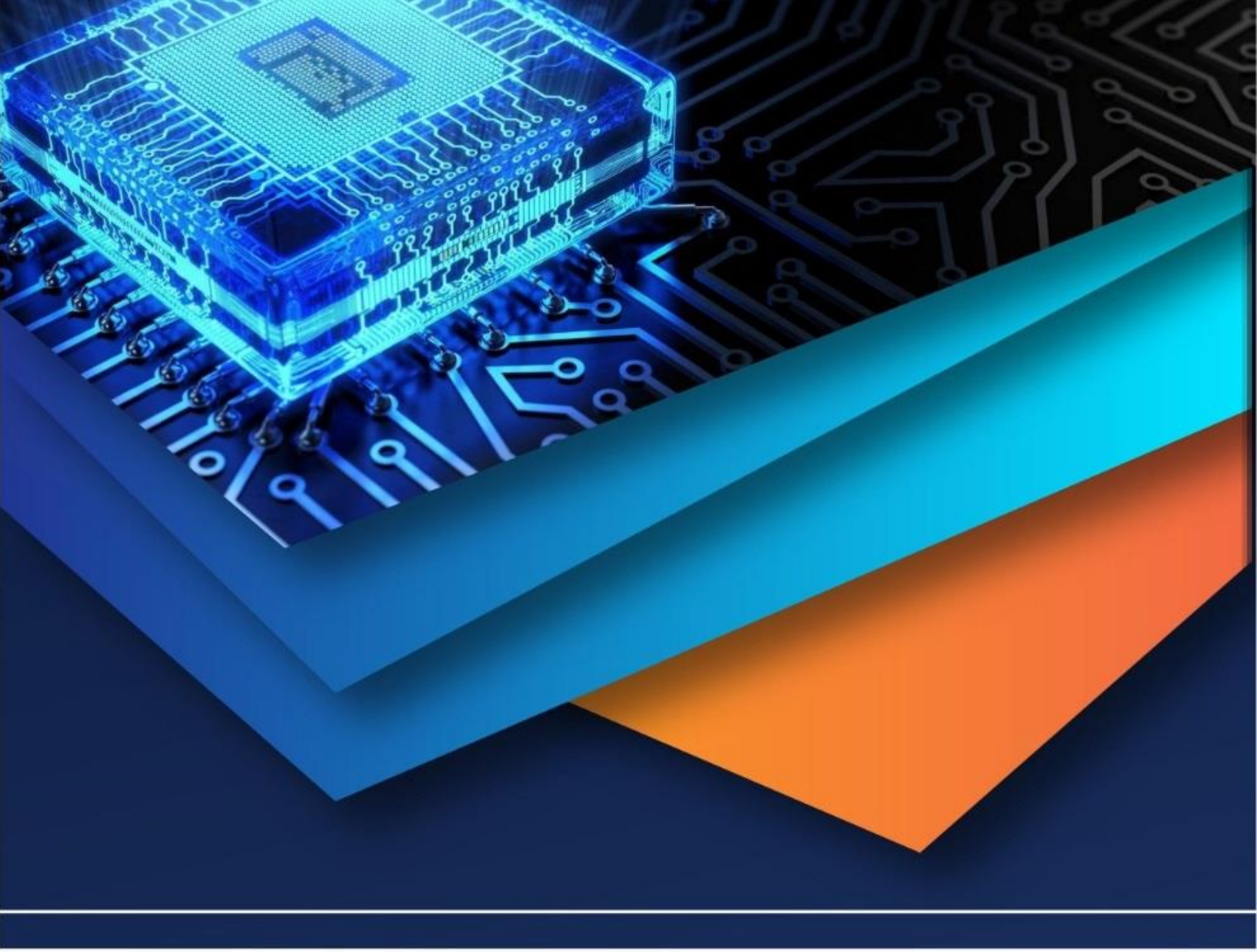
D. Should design vehicles which are having similar power and performance levels to that of combustion engine vehicles.

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REFERENCE

[1] Jui-Che Tu and Chun Yang " Key Factors Influencing Consumers' Purchase of Electric Vehicles**"**MDPI 16TH July 2019.
[2] V. V. Ravi Kumar and Anil Khurana "Transitioning from Fuel Based Automobiles to Electric Vehicles: A Conceptual Model for India" SIBM Pune Research Journal, Vol XVIII, (Special Issue), 121-125, September 2019.
[3] Rachana Vidhi and Prasanna Shrivastava " A Review of Electric Vehicle Life cycle Emissions and Policy Recommendations to Increase EV Penetration in India" MDPI, 25th February 2018
[4] Dr. Shivkumar L. Biradar Miss. Vaishali R. Akka "Consumer Buying Behaviour of Electric Vehicles: An Empirical Study" Studies in Indian Place Names (UGC Care Journal) Vol-40-Issue-27-February-2020
[5] Dr. Prathap B N Prof. Praveen Kumar Prof. Savanth S T "Factors Influencing Purchase of Electric Motor Vehicle" Science, Technology and Development Volume IX Issue I JANUARY 2020 ISSN : 0950-0707
[6] Kelly Sims Gallaghera and Erich Muehlegger "Giving green to get green? Incentives and consumer adoption of hybrid vehicle technology" Journal of Environmental Economics and Management Volume 61, Issue 1, January 2011, Pages 1-15
[7] Ona Egbue and Suzanna Long "Barriers to widespread adoption of electric vehicles: An analysis of consumer attitudes and perceptions" Energy Policy Volume 48, September 2012, Pages 717-729
[8] Fanchao Liao, Eric Molin & Bert van Wee (2017) "Consumer preferences for electric vehicles: a literature review", Transport Reviews, 37:3, 252-275, DOI: 10.1080/01441647.2016.1230794

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