

Consumer Awareness and Perception towards Electric Vehicles with Specific Reference to Bengaluru City

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Abstract

In the current scenario of non-renewable energy resources especially the fossil fuels getting depleted rapidly together with rising prices, there is a need for another energy resource to run the vehicle. Environmental sustainability is one of the most important concerns as it decides the lifespan of our Earth. Transportation sector is one of the reasons for a large amount of carbon emission. That is where, the automobile industries are considering Electric Vehicles as a solution to the raising problem. In this regard, understanding and analyzing awareness level in the people and their perception towards Electric Vehicles are very crucial.

In this study we have considered Bangalore city, as major pollutants come from Metropolitan cities and hence it is important for people living in these cities to understand the importance of using electric vehicles and do their bit to reduce the consumption of life-threatening gasses and pollutants. The study concentrates on capturing the views, sentiments, awareness level, likeliness and perception towards purchasing of electric vehicles so that sustainability in the environment can be maintained.

Keywords: Electric Vehicles, Perception, Awareness, Choice of Vehicles and Environment

Introduction

In this chapter, the research discusses the background of the principal subject of the research: factors affecting the decision to purchasing electric vehicle (EV) in Bengaluru's population. The research aims to study factors that will affect the consumer to purchasing electric vehicle such as product appearance, the quality of material, notable of brand, price, worthiness, marketing promotion, research and development, quality of battery, complexity, charger station, and risk of battery, consumer behaviour and awareness, and government support policy. Additionally, the study of demographic and lifestyle factors that affecting the decision to purchasing electric vehicle.

The issues of climate change or global warming have been rigorously discussed by many governments since the early 21st century. A great number of relevant reports have revealed the negative impact of climate changes dominantly driven by human activities. With the globally increasing civilization and industrialization, a large number of fossil fuel

burning in industries have led to the acute problem of air pollution. Simultaneously, the large number of automobiles in use around the world has caused and continues to cause serious problems for the environment and human life. Air pollution, global warming, and the rapid depletion of the Earth's petroleum resources are now problems of paramount concern. Vehicle emissions, which mainly include CO₂, CO, NO_x and particulate matters, have been considered as the major contributors to the effect of greenhouse gases, also leading to the increase in different forms of cancers and other serious diseases for the humans.

Background

Transportation has extensively been acknowledged as a major contributing sector to global climate change and the key environmental issues that plague the world. Ninety-five per cent of the world's existing transportation systems operate predominately on petroleum-based products that generate harmful

emissions into the atmosphere (Intergovernmental Panel on Climate Change, 2007). In recent years, concerted efforts at a variety of scales have been made to better align the transport sector towards a pathway that embodies a futuristic, low-carbon vision, in turn promising long-term savings potential on fuel costs and the mitigation of climate change.

The over-a-century-old automobile industry is gearing up for transformation. The fossil fuel price spike and the impact of its emission on the environment have called for a change in individual transportation habits. The sector, propelled by internal combustion engines, is gravitating gradually towards electric vehicles (EVs).

Unprecedented changes in the climate and the rising awareness around this combined with the atmosphere for technical innovation in the world is challenging the status quo for several sectors. Example for the same is the advent and promotion of electrical mobility for transportation. In the long run, the electric vehicles which can help in bringing down the air pollution and emissions of greenhouse gases might prove to be threat for the oil and gas industry. Globally, the transportation sector is one of the major sectors that consume fossil fuels and its products. A green vehicle or environmentally friendly vehicle is a road motor vehicle that produces less harmful impacts to the environment than comparable conventional internal combustion engine vehicles running on gasoline or diesel, or one that uses certain alternative fuels. Green vehicles can be powered by alternative fuels and advanced vehicle technologies and include hybrid electric vehicles, plug-in hybrid electric vehicles, battery electric vehicles, compressed-air vehicles, hydrogen and fuel cell vehicles, neat ethanol vehicles, flexible-fuel vehicles, natural gas vehicles, clean diesel vehicles, and some sources also include vehicles using blends of bio diesel and ethanol fuel or gasohol. As part of their contribution to sustainable transport, these vehicles reduce air pollution and greenhouse gas emissions, and contribute to energy independence by reducing oil imports. The interest in commercial electric and hybrid vehicles, as the case for their light vehicle counterparts, is driven by the volatility of petroleum fuel costs, efforts to improve energy security, concerns about both toxic and

greenhouse emissions and an associated range of incentives that are now in place at national and local government levels. However, the barriers to mass-market uptake are numerous and significant. Although various incentive schemes can assist, the capital costs of the new technologies are high and, in some cases, fuel savings have not so far adequately off-set increased capital and operating costs. Furthermore, the electric-only operating range of electric and plug-in hybrid-electric vehicles remains a concern for consumers and the necessary recharging infrastructure is only in the early stages of development. Nevertheless, there are now many commercial electric and hybrid vehicles available in the market and the intense levels of research, development and investment in enabling technology and new vehicle production will no doubt result in many more during the next few years.

India's automobile industry is the sixth largest in the world and accounts for 22% of the country's total manufacturing output. In the last decade, India has been growing at a faster rate on the motorization curve. As a result, urban traffic congestion and the air quality gets affected in the all-major metropolitan cities and town. In India, the transport sector alone contributed around 18% in terms of carbon emission. Indian government is trying to move to alternative fuel-based vehicle technology. The Electric Vehicle (EV) is one of the most feasible alternative solutions to overcome the crises. Several automotive companies are slowly venturing into the EV space and are expanding their portfolio. Promoting Electric vehicles through innovative ways can help reduce fossil fuel dependence and pollution, and prove to be beneficial for both consumers and the nation in the long run. Electric vehicles can have a significant impact on the reduction of greenhouse and pollutant gas emissions associated to the transportation sector. The awareness about new products among the consumers has an impact on their behavior in the long term. The consumers with knowledge about products develop an attitude towards specific products. In this paper the awareness about environmental-friendly cars among automobile involvement consumers is discussed.

Greenhouse gas problem increases day by day and also the gasoline fuel rate increases nearly about 100 Rs/li. In daily life routine, public

transportation is very important but the fuel rate, some people avoid using bikes or cars. So, many automobiles manufacturer and new companies put their effort to convert the conventional vehicle into electric vehicle that provide reliable solution.

The Current Scenario in India:

The electric vehicle industry in India is a growing industry. The central and state governments have launched schemes and incentives to promote electric mobility in the country and some regulations and standards are also in place. While the country stands to benefit in a large way by switching its transport from IC engines to electric motor-powered, there are challenges like lack of charging infrastructure, high initial cost and lack of electricity produced from renewable energy. Still, e-commerce companies, car manufacturers, app-based transportation network companies and mobility solution providers have entered the sector and are slowly building up electric car capacity and visibility

“India is predicted to emerge as the one of the highest contributors to the consumption and growth of petroleum around the world by a non OECD (Organisation for Economic Co-operation and Development). As per a report by IBEF (India Brand Equity Foundation), the imports of oil in India rose sharply to US \$87.37 billion in 2019-2020 from US \$70.72 billion in 2018-2019. Both the private sector companies and the PSUs in the oil and gas sector have significant contributions to the Indian Economy. As per a report by Invest India, all activities along the petroleum sector value chain contribute around 15% towards India’s GDP in the early 2019, the Indian Government announced a scheme Faster Adoption and Manufacturing of Hybrid and Electric Vehicles (FAME) to promote electric mobility in India. The scheme comes with an outlay of 1,000crores. The push for electrical vehicles from the Government of India comes at a time when the automobile industry is going through an upgrade from Bharat Stage –IV (BS-IV) to Bharat Stage –VI (BS-VI) fuels. Niti Ayog, the major brain behind the policies of the Indian government, has suggested that electric vehicles especially with 3-wheelers and 2-wheelers and below 150 cc should ply on the Indian roads by

2025. India, being a net oil importer nation, spends a significant part on the oil imports, amounting to US \$112 billion or INR 7.83 lakh crores on importing oil from 2018-2019. As per the Federal think tank, the NITI Ayog, this large spending on the oil imports could be brought down with a complete switch and adoption to Electric Vehicles. Apart from the benefits from reduction in air pollution, a reduction in the oil imports is also one of the reasons for adoption of Electric Vehicles. To propel the massive adoption and usage of electric vehicles, an area requiring development is the battery manufacturing for these electric vehicles. As of now, India doesn’t have large scale or cost-effective battery manufacturing facilities. Another factor is the adequate presence of the charging stations and for that the infrastructure needs to be conducive.

The Global Scenario:

In 2018, the worldwide EV deals, which incorporate BEVs, PHEVs, and FCEVs, crossed 2 million units to arrive at a last figure of 2,218,490units. The expanding ubiquity of EVs features critical endeavours made together by different governments and car industry affiliations. Be that as it may, over 70% of EV deals worldwide in 2018 were in the US, Japan, and China.

Expanding contamination and danger of a dangerous atmospheric devotion have complemented the need to supplant oil energized vehicles with emanation free substitutes. Following quite a while of R&D, the business has seen EVs as the best reasonable substitute for generally filled vehicles, Which has brought about the development of electric vehicles advancement endeavours are expanding with persistent help from numerous administrations, car OEMs, and other government and non-government offices that are not just advancing the deals of zero-discharge vehicles yet in addition stepping toward a positive administrative system, charging foundation, and money related help? Yearning EV targets and strategy support from governments have brought about bringing down of EV costs.

The Electric Vehicles Initiative (EVI) a multi-government strategy discussion committed to quickening the presentation and appropriation of

electric vehicles around the world has set an objective of arriving at an electric vehicle armada of 20 million by 2020, all inclusive. The Paris Declaration on Electro Mobility and Climate Change has additionally set a comparative worldwide sending objective of 100 million electric vehicles by 2030. The development of the EV showcase is driven by government financing, appropriations, and motivating forces, developing interest for EVs, expanding Worries over natural contamination, and tremendous speculations from automakers in EVs. Be that as it may, factors, for example, significant expense, littler separation secured by EVs, and absence of normalization can limit the market development.

Environmental concern drives electric vehicles forward

Fast forward again, this time to the 1990s. In the 20 years since the long gas lines of the 1970s, interest in electric vehicles had mostly died down. But new federal and state regulations began to change things. The passage of the 1990 Clean Air Act Amendment and the 1992 Energy Policy Act, plus new transportation emissions regulations issued by the California Air Resources Board, helped create a renewed interest in electric vehicles in the U.S. The first turning point many have suggested was the introduction of the Toyota Prius. Released in Japan in 1997, the Prius became the world's first mass-produced hybrid electric vehicle. In 2000, the Prius was released worldwide, and it became an instant success with celebrities, helping to raise the profile of the car. To make the Prius a reality, Toyota used a nickel metal hydride battery, a technology that was supported by the Energy Department's research. Since then, rising gasoline prices and growing concern about carbon pollution have helped make the Prius the best-selling hybrid worldwide during the past decade.

Benefits of electric vehicles

- Electric vehicles are around 3-5 times more efficient than internal combustion vehicles in utilizing energy. Even if electric vehicles run on electricity produced from fossil fuels, the overall efficiency of electric vehicles is still higher and the pollution is less, because large

thermal power plants are much more efficient than IC engines, and it is easier to control emissions from power plants than vehicle engines.

- Electric vehicles save energy by regenerative braking. Around 30%-70% of the energy used for propulsion can be recovered, with higher percentages applicable to stop-and-go city driving.

- Air quality indices related to India indicate that the air in many cities of India is no longer healthy. Automobile related pollution has been one of the causes for this.

- Aspects related to global warming needs a shift to automobile solutions that reduce / do not produce greenhouse gas emissions. If electric vehicles run on electricity produced from non-polluting sources of energy like hydro, solar, wind, tidal and nuclear, they reduce emissions due to vehicles almost to zero.

- The need to reduce dependency on a fossil-fuel based economy. India's crude oil imports for 2014-15 was 112 billion dollars (approximately 7,00,000 crore rupees). For comparison, the allocation for the Mahatma Gandhi National Rural Employment Guarantee Scheme, in budget 2017-18, is 48,000 crore rupees.

- India can become a global provider for clean mobility solutions and processes that are affordable and scalable.

- People living in some Indian cities are being affected by noise pollution. Some of the Indian cities have the worst noise pollution levels in the world. Electric vehicles are much quieter and may contribute to a reduction in noise pollution levels in the cities.

- Energy efficiency and emission reduction has improved in automobiles. Yet, the growth in total number of vehicles on road, and the resulting total pollution and total energy consumption removed all gains made by betterment in energy efficiency and emission reduction by automobiles. Energy efficiency measures and pollution control measures did not keep pace with the sales growth in vehicles. The total number of vehicles registered in India has been 5.4 million, 11 million, 33 million, 40 million and 210 million in the years 1981, 1986, 1996, 2000 and 2015. This indicates 39 times

percentage growth in the total number of vehicles between 1981 and 2015. The total number of vehicles sold in India increased between 1,54,81,381 in 2010-11 and 2,04,69,385 in 2015-16 indicating a 30+ percentage growth in this five year period.

- Through smart charging, electric vehicles can help to balance the balance-supply variations in the electricity grid, and provide a buffer against electricity supply failures.
- Electric vehicles have much fewer moving parts as compared to vehicles with IC engines. Thus, being simpler, they are cheaper and easier to maintain
- Electric motors can deliver high torque at low speeds. As a result, electric vehicles deliver much better performance while starting off and on slopes than IC engine- powered vehicles.

Literature Review

1) Title: Consumer Awareness and Perception towards Hybrid Cars

Author: Akanksha Upadhyaya; Shikha Dua

Source: The Journal of Indian Management and Strategy; Vol 24, No 3, Sep 2019; PP: 46-53

Sustainable development is need of hour, aiming for survival of today's generation along with saving for future generation. Every sector is required to take various initiatives to go green thereby saving and protecting environment. As per Petroleum Federation of India and Ministry of Petroleum & Natural gas, 70% of petrol and 99% of diesel is consumed in transportation sector. In this regard transportation sector is moving towards green vehicles namely electric vehicles or vehicles using hybrid technology which will reduce harmful emissions and pollutants in the environment. The present study is inclined towards studying and analyzing the awareness and perception of individuals about the hybrid cars in Delhi/NCR. The sample size of 102 is taken into consideration and responses are collected using Convenience sampling technique. A structured questionnaire is designed for collection of responses. The questionnaire is based on factors identified through literature review. Hypothesis testing

using chi-square method in IBM SPSS 21 was performed to achieve the objectives of study.

2) Title: Perception towards electric vehicles and the impact on consumers' preference. Authors: Milad Ghasri, Ali Ardeshiri, Taha Rashidi,

Source: Transportation Research: Part D. Dec2019, Vol. 77, p271-291. 21p

Generation Y were found to perceive EVs to have better design with less impact on the environment. • For safety, generation Z were found to perceive EVs to be superior. • Technical features of commercially available EVs are no longer a major barrier towards EVs' adoption rate. • One-time financial incentives are more effective compared to discounts on operating costs or parking expenses. Relative advantage, or the degree to which a new technology is perceived to be better than an existing technology which is being replaced, has a significant impact on individuals' decisions on when, how and to what extent to adopt. An integrated choice and latent variable model are used, in this paper, to explicitly measure the perceived advantages in electric vehicles over the conventional internal combustion engine vehicles. The analyzed data is obtained from a stated preference survey including 1076 residents in New South Wales, Australia. According to the results, the latent component of the model disentangles the perceived advantages across three dimensions of vehicle design , impact on the environment , and safety. These latent variables are interacted with price, driving range and body type, respectively, to capture the impact of perception on preference. The developed model is then used to examine the effectiveness of different support schemes on Millennials (Gen Y), the generation before them (Gen X) and after them (Gen Z). The results show higher probability of adopting electric vehicles for Gen Y, compared to Gen X and Z. Gen Y is found to be the least sensitive cohort to purchase price, and Gen X to be the most sensitive cohort to this attribute. People are more sensitive to incentives for the initial price compared to ongoing incentives for operating costs. Also, offering financial incentives to consumers as a rebate on the purchase price is more effective than allocating the same incentive to manufacturers to reduce the

purchase price.

3) Title: Study on Electric Vehicles in India Opportunities and Challenges

Authors: Mohamed M, G Tamil Arasan, and G Sivakumar

Source: International Journal of Scientific Research in Environmental Science and Toxicology

The replacement of ICE (Internal Combustion Engine) with electric engines will reduce pollution to a great extent and be profitable to consumers. Many 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) Title: Electric vehicles and consumer choices

Authors: Mandys, F.

Source: Renewable and Sustainable Energy Reviews, Elsevier, vol. 142(C).

Electric vehicles (EVs) have many attractive features compared to conventional vehicles (CVs). Their main advantage lies in their significant economic benefits due to the much higher fuel efficiency, and substantial environmental benefit of lower greenhouse gas emissions. However, the market share of EVs in the UK remains low and their benefits will not be realized unless the government and the manufacturers can gain crucial information, necessary to effectively support and speed up the adoption of EVs. The main goals include: finding the characteristics of potential early adopters of EVs in the UK, the vehicle attributes that they consider important for their buying

decisions, and the key barriers that slow EV adoption. The results suggest that the propensity of being a potential EV early adopter increases with youth, education, being a student, living in the more southern parts of UK, being married and, to a lesser extent, income. Additionally, purchase cost, performance, maximum range and environmental friendliness are found to be important vehicle attributes for the potential buyers. Furthermore, two key barriers to wide EV adoption are identified – high purchase cost and low maximum range of the vehicle.

5) Title: Electric Vehicles in India: Market Analysis with Consumer Perspective, Policies and Issues

Author: Pritam K. Gujarathi, Varsha A. Shah, Makarand M. Lokhande

Source: Journal of Green Engineering, Vol, 8, issue 1, Pg No:17-36, year 2018

Early in the 21st century, new companies were formed to take advantage of the absence of the large car manufacturers in the EV market, such as Tesla Motors in the U.S, Think in Norway, BYD in China and REVA in India. Globally all these new manufacturers had released one or more EV models and changed the equation of Auto Industry. Looking into Indian Scenario, still, long way to go, the paper presents the current Indian EV market, market players in two and four-wheeler with recent developments along with the current status of Indian road transportation. Policies and initiatives of government are discussed. A case study is presented with consumer's perspective to understand ground reality. Tariff for EV charging is discussed. Challenges for Indian market growth, policies, and promotions required are discussed with feasible options along with global scenario.

6) Title: Potential Need for Electric Vehicles, Charging Station Infrastructure and its Challenges for the Indian Market

Author: Praveen Kumar and Kalyan Dash.

Source: Advance in Electronic and Electric Engineering, 471- 476

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.

7) Title: Indian Electric Vehicles Storm in a tea cup

Author: Yogesh Aggarwal, Vivek Gedda and Kushan Parikh,

Source: The Scientific World Journal, 11.

Users of scooters, who need only to travel short distances, may consider an EV, but those, who need to travel longer distances and already own bikes like a Hero Splendor, may find it difficult to move to an e- 2W. For cars, it is relatively simple to improve the range with increased battery size. For electric 2Ws though, every increase in kWh may provide an extra 30km in range, but the increase in weight is around 10kg, approximately a 10% increase in the total weight of the bike. This weight issue is even more pronounced in smaller bikes (less than 150cc).

8) Title: Electric Vehicles in India: Market Analysis with Consumer Perspective, Policies and Issues

Author: Pritam K. Gujarathi, Varsha A. Shah, Makarand M. Lokhande.

Source: Electric Vehicles in India: Market Analysis with Consumer Perspective, Policies and Issues. Journal of Green Engineering.

Indian Scenario is different because the current market share of EV/PHEV is around 0.1%. Presently almost all vehicles consider fossil fuel-based transportation. These pollute the atmosphere by the emission of greenhouse gases & causes global warming. The gap between domestic petroleum production and

consumption is widening. India imports around 70% of oil required per annum. Hence there's an urgent need to investigate factors and challenges for sustainable and cleaner alternatives.

9) Title: International Council on Clean Transportation

Author: Lingzhi Jin, Peter Slowik

Source: Electric Vehicles: A Synthesis of the Current Literature with a Focus on Economic and Environmental Viability.

The early market growth for electric vehicles continues, but a number of barriers prevent their widespread uptake. These barriers include the additional cost of the new technology, relative inconvenience of technology considering range and charge times, and consumer understanding about the availability and viability of the technology. This last point, typically referred to as "consumer awareness," is crucial.

Objectives of the research:

- To understand the awareness levels and perception of consumers on E-Vehicles
- To study the factors that influence customers in purchasing E-Vehicles

Sample population and Sample size:

In this study, the sample population are these selected citizens of Bangalore City. A sample of 103 respondents were considered for this study.

Results- Demographic details:

<p>Age Group</p> <p>From the analysis it is observed that the majority of people of age 18-28 and 28-38 years has shown the interest on EV as there has been a growing concern towards the environment by the conventional vehicles.</p> <p>The older generations often prefer the personal and conventional automobile as they are not aware of the technological advancement in EV.</p>	<p style="text-align: center;">Age segmentation of the respondents</p> <table border="1"> <thead> <tr> <th>Age Group</th> <th>Percentage</th> </tr> </thead> <tbody> <tr> <td>48&AB</td> <td>3.8</td> </tr> <tr> <td>38-</td> <td>24.2</td> </tr> <tr> <td>28-</td> <td>~18.0</td> </tr> <tr> <td>18-</td> <td>~10.0</td> </tr> </tbody> </table>	Age Group	Percentage	48&AB	3.8	38-	24.2	28-	~18.0	18-	~10.0
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<p>Occupation</p> <p>The survey reflects the working-class section of the respondents. It is evident that most of them are employed and among which the occupation varies. Since, most of the respondents are working. Car ownership is predictably highest among those employed and especially the private sector.</p>	<p style="text-align: center;">Occupation of the respondents</p> <table border="1"> <thead> <tr> <th>Occupation</th> <th>Percentage</th> </tr> </thead> <tbody> <tr> <td>STUDENT</td> <td>48.50%</td> </tr> <tr> <td>EMPLOYED</td> <td>44.70%</td> </tr> </tbody> </table>	Occupation	Percentage	STUDENT	48.50%	EMPLOYED	44.70%				
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<p>Qualification</p> <p>From the analysis it can be interpreted that the majority of the respondents are at least high minimum graduate level of education. And hence they have good knowledge regarding the survey questions and have answered properly.</p>	<p style="text-align: center;">Qualification of the respondents</p> <table border="1"> <thead> <tr> <th>Qualification</th> <th>Percentage</th> </tr> </thead> <tbody> <tr> <td>HIGH SCHOOL</td> <td>~2.00%</td> </tr> <tr> <td>UNDER GRADUATION</td> <td>35.90%</td> </tr> <tr> <td>POST GRADUATION</td> <td>56.31%</td> </tr> </tbody> </table>	Qualification	Percentage	HIGH SCHOOL	~2.00%	UNDER GRADUATION	35.90%	POST GRADUATION	56.31%		
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<p>Income level</p> <p>From the survey it is seen that the income level of the respondents are equally distributed and most of them belong to the middle-class economic section who can afford economical range of EV. With rising income levels, the purchasing power of the people increases as they have more disposable income and they tend to buy the luxury and premium range of EV which matches their lifestyle.</p>	<table border="1"> <caption>Income level of the respondents</caption> <thead> <tr> <th>Income Level</th> <th>Percentage</th> </tr> </thead> <tbody> <tr> <td><25K</td> <td>48.50%</td> </tr> <tr> <td>25K-50K</td> <td>25.20%</td> </tr> <tr> <td>50K-75K</td> <td>17.50%</td> </tr> </tbody> </table>	Income Level	Percentage	<25K	48.50%	25K-50K	25.20%	50K-75K	17.50%
Income Level	Percentage								
<25K	48.50%								
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<p>Family size</p> <p>From the analysis it is seen that the family size of 2 prefer to own an electric scooter or bike as their mode of transportation. And the family size 3 and 4 prefer four-seater vehicles which can accommodate the family members, and the family size of 5 or more members in the house prefer buying the large SUV that will give room to accommodate the family members.</p>	<table border="1"> <caption>Family size of the respondents</caption> <thead> <tr> <th>Family Size</th> <th>Percentage</th> </tr> </thead> <tbody> <tr> <td>2</td> <td>5.80%</td> </tr> <tr> <td>3</td> <td>18.40%</td> </tr> <tr> <td>4</td> <td>57.30%</td> </tr> </tbody> </table>	Family Size	Percentage	2	5.80%	3	18.40%	4	57.30%
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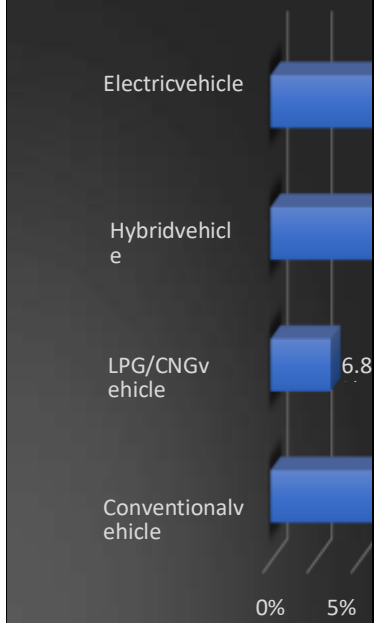
Results- Awareness Level and consumer perception:

<p>Purchase of electric vehicle in future</p> <p>From the analysis it is evident that the majority of the respondents would consider buying the EV in the future as people are getting awareness about the environment hazard caused by the conventional vehicles.</p>	<table border="1"> <caption>Purchase of electric vehicle in future</caption> <thead> <tr> <th>Response</th> <th>Percentage</th> </tr> </thead> <tbody> <tr> <td>Would purchase</td> <td>85.4%</td> </tr> <tr> <td>Would not purchase</td> <td>14.6%</td> </tr> </tbody> </table>	Response	Percentage	Would purchase	85.4%	Would not purchase	14.6%
Response	Percentage						
Would purchase	85.4%						
Would not purchase	14.6%						

Preference in buying type of vehicle

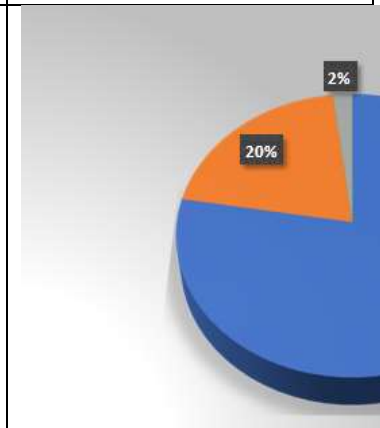
From the analysis it is clear that most of the respondents are preferring the hybrid vehicle that utilizes both fuel and electricity to run the vehicle. Then comes the EV as the price of the petroleum has constantly been increasing which has made the people to look into alternative ways and prefer to buy EV. And also, some people prefer to buy conventional vehicles because the infrastructure ecosystem is well established and convenient. And very few people prefer to buy CNG or LPG powered vehicle as the cost is cheap compared to fuel.

Preference in buying type



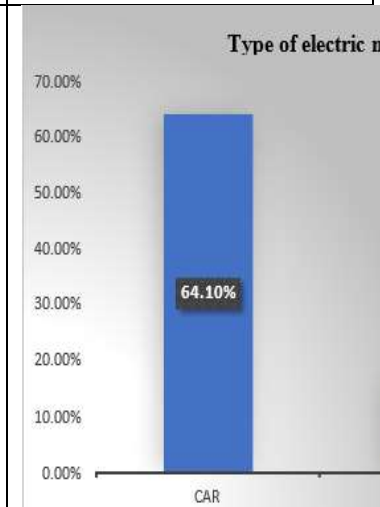
Environmental conscious

From the analysis it is evident that majority of the respondents are environmental conscious and they care for the environment degradation by the emissions from the fuel vehicles. And few are less concerned about the environmental ecosystem.



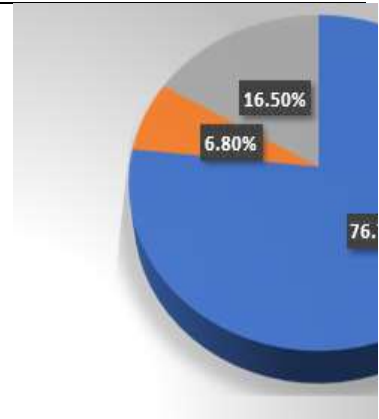
Type of electric model preferred

From the analysis it is seen that majority of the respondents prefer to buy electric car as it is safe and convenient mode of transportation. And few of the respondents prefer to buy electric bike or electric scooter as the mode of transportation as it offers the flexibility for daily commuting.



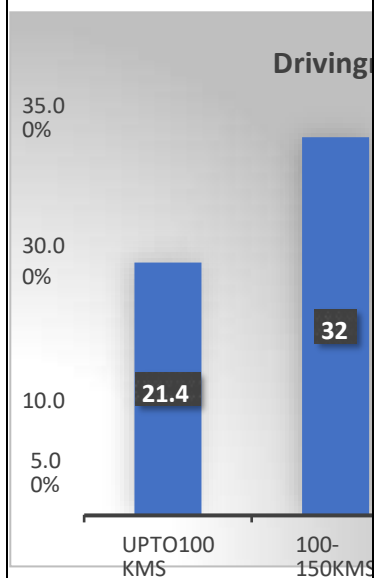
Electric Vehicles are a viable alternative to petrol/diesel cars

From the analysis it is clear that the majority of the people believe that the EV can replace the conventional vehicles. Other respondents consider that it is early for EVs to launch in India.



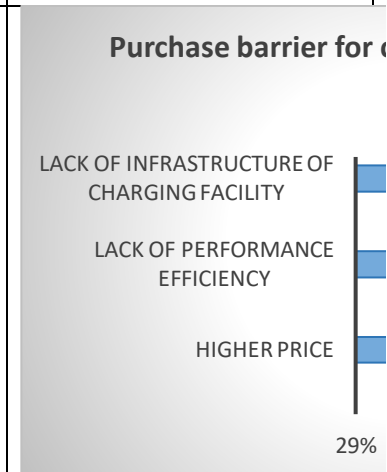
Driving range preference

From the above analysis, many people are comfortable with the electric vehicle giving 100 to 150 kms for single charge, these are the peoples who use daily to commute, but due to lack of infrastructure for the charging point in Bengaluru majority of the people prefer the electric vehicles if the driving range of the electric vehicle per single charge is more than 150 kms



Purchase barrier for choosing the electric car

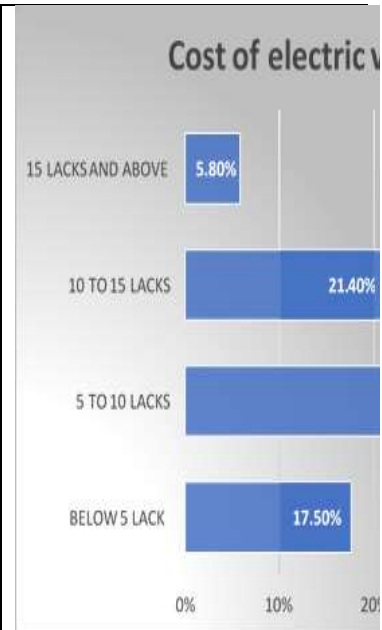
From the analysis, it is seen that there is a mixed opinion regarding the barriers in choosing EV. The major barriers are lack of infrastructure, lack of performance efficiency and higher price.



<p>Changes to be brought in the EV ecosystem</p> <p>From the analysis there is a mixed opinion from the respondents regarding the changes that implemented in EV Ecosystem. Major concern is to increase the number of charging station in the city. Next concern is that the charging time taken to charge the EV has to be reduced and few think that there has to be more models of the EV in the market.</p>	<p>Changes to be brought in the EV ecosystem</p> <table border="1"> <caption>Changes to be brought in the EV ecosystem</caption> <thead> <tr> <th>Change</th> <th>Percentage</th> </tr> </thead> <tbody> <tr> <td>More number of models</td> <td>~10%</td> </tr> <tr> <td>Make charging station available everywhere</td> <td>~15%</td> </tr> <tr> <td>Improve the range</td> <td>~10%</td> </tr> <tr> <td>Reduce the charging time</td> <td>~10%</td> </tr> <tr> <td>Reduce the initial cost of the vehicle</td> <td>~10%</td> </tr> </tbody> </table>	Change	Percentage	More number of models	~10%	Make charging station available everywhere	~15%	Improve the range	~10%	Reduce the charging time	~10%	Reduce the initial cost of the vehicle	~10%
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<p>Source of awareness about EV</p> <p>From the analysis it is evident that the majority of the respondents got to know about the EV through the internet and website. And also the television ads published by the EV Manufacturing companies have significantly impacted to create the awareness. Auto expo and magazine are also helpful to know about the latest technology employed in EV.</p>	<p>Source of awareness about EV</p> <table border="1"> <caption>Source of awareness about EV</caption> <thead> <tr> <th>Source</th> <th>Percentage</th> </tr> </thead> <tbody> <tr> <td>Internet website</td> <td>~15%</td> </tr> <tr> <td>Auto expo</td> <td>16.5%</td> </tr> <tr> <td>Magazine</td> <td>12.8%</td> </tr> <tr> <td>Television ad</td> <td>~10%</td> </tr> </tbody> </table>	Source	Percentage	Internet website	~15%	Auto expo	16.5%	Magazine	12.8%	Television ad	~10%		
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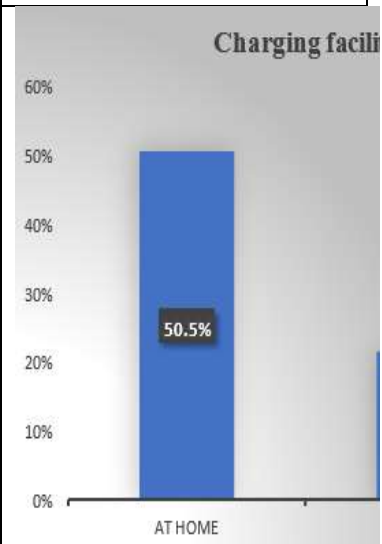
Cost of EV preference

From the analysis, majority of the respondents prefer the electric vehicle cost to be between 5 to 10 lacks which signifies that the people want the vehicle to be in economical range without compromising on the features offered, few respondents look into the value that the vehicle brings in the price range and choose the below 5 lack EV and prefer electric scooter or bike. Few respondents having the high-income level are willing to spent more than 15 lack on EVs.



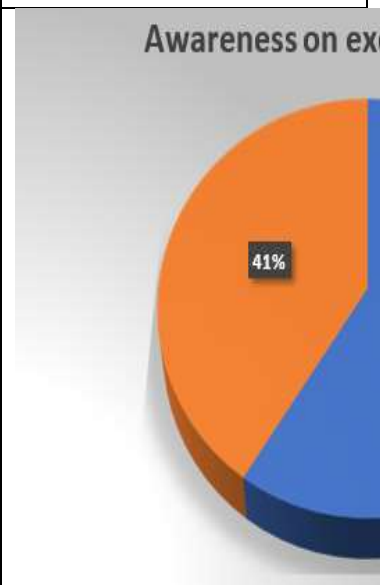
Charging facility preferences for EV

From the analysis it is seen that, majority of the people would like to charge their EV at their home, some respondent prefer to charge their EV in the office they work, few prefer to charge their electric vehicle in the charging station but this can waste their time in the charging the vehicle.



Awareness on exemption of road tax

The government has imposed the road tax of 17% to 18% of the ex-showroom price of the convention vehicle. As the initiative by the government to promote the use of products which are less harmful for the environment road tax is exempted for the EVs. In the analysis it is observed that half of the respondents are unaware of this fact.



Conclusion

For a new technology to be adopted, the consumers should be aware of it and perceive it to have more value than the existing technology.

Electric Vehicles and Hybrid Electric Vehicles have their own opportunities and obstacles, but it all comes down to us as to how we choose to see it, therefore through this study we want to know and comprehend what proceeds in the minds of the consumers and whether or not they are willing to do their bit in maintaining a sustainable environment.

Electric vehicle manufacturers and Government of India have to invest more on social acceptance of the vehicle by creating more infrastructural facilities, putting more thrust on technology that can create trust in electric vehicles. The result clearly depicts that the population is well aware of the environmental benefits. Now responsibility lies on shoulders of Government and manufacturer that parallel to investing in manufacturing of vehicles, Consumer perception has to be created by providing the above said facilities so that dream can be converted to reality, people start adopting electric vehicles and safeguard the future from several respiratory problems including asthma, lung cancer and other deadly diseases.

It is also recommended that the Government should try to penetrate the positive perception of EV among potential customers and also promote electric vehicles as they are the future.

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