



THE FUTURE OF ELECTRIC CARS IN INDIA

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Abstract - The need for shift to Electric Vehicles of all types emerged when the people around the world came into acceptance with the fact that conventional source of fuel for motors that have been used since the dawn of time are running out and the polluting effects it have on the atmosphere aren't worth what it offers to trade and commerce for people. With the development in technology, through the invention of renewable electric motors for vehicles, we have achieved what was once thought to be impossible, to have a vehicle that runs on a fuel source that isn't a conventional fuel source. However, the new problem in society has emerged, to enable the complete shift from conventional source of energy to EV run motors. The method of harnessing electricity as the source of fuel isn't a cheap task. It takes all out of technology and infrastructure to support it as the primary source, the very infrastructure that is not available even in developed nations, something what centuries of complete dependence on conventional fuel does to a nation and its economy. Nations have to accept it aint a cheap and easy, but if they put out the herculean feat, it enables the future generations to enjoy a self sustaining society, for a nation like India, complete shift to EV motor is more of luxury it certainly afford at the present, however, if it initiates the process now, it may certainly see itself among a membership of nations running a clearer source of fuel and electricity.

Keywords: Electric Vehicle, Electricity, Cleaner Fuel, Nuclear Power, Hybrids

I. INTRODUCTION

Electric cars are vehicles that use electric motors or a motor that runs purely on traction for propulsion of wheels. These vehicles are powered through a self contained battery, solar panels or through electric generators for bigger vehicles. The very nature of electric vehicles convert electricity into fuel for motors without the actual need for fuel, unlike the conventional energy sources in the market today. The need for a renewable energy source in the early 19th century resulted in the search for an energy source that had the same comfort zone and operated with ease as the conventional energy sources then. Electric sources of fuel for motor vehicles are indeed clean or at least it is when one compares its environmental cost in lines with conventional fuel sources as fossil fuels. Such motors take the upper hand in the category of non polluting and noiseless motor, an engineering feat that is rather impossible to achieve through conventional run motors

The world as of present times needs the extensive use of electric motor run vehicles in comparison with conventional fuel vehicles we use. The fossil fuel depletion is an imminent thing of the day, however what the global community can do would be reduce the exhaustive stress upon the conventional source and slowly shift its need to electric motor (EV) vehicles to ensure that the future generations can enjoy the fruits of our labour, sometimes exploitative labour at times. To achieve a complete cleaner fuel source, electric is the way to go. Norway has recognised it, reigning at the top with the highest market source for such motors with 2014 being its entry year. Soon the European Union followed the steps of Norway and set its goal with 2022 as the year where all vehicles in European continent shall be either EV or Hybrid of the two. The failure of several other nations to recognise the need for such is paving its way to complete dependence on fossil fuels as the primary source of energy or even the only source of energy

With the developments in technology, these electric vehicles have reached the horizons where conventional energy sources are mandatory and without any alternate energy source. During the many previous decades, the ever increasing population impact the conventional sources had upon the environment forced the people

to venture into the unknown. Moreover, the fuel source that we have been using ever since motor vehicles have been a thing is not a renewable source of energy, the constant fear of energy sources drying up to become extinct too and the accelerated search for electric sources of fuel. The essence of electric motors is electricity being the source of propulsion and not conventional source of energy. This electricity is usually produced through burning up of fossil fuels or even nuclear power plants on a massive scale, in terms of renewable energy sources, windmill farms, solar power panels, tidal energy harnessed through rough seas. Hydropower plants or at times a combination of all. For a developing nation, generation through renewable energy sources is quite a challenge, with high cost of setting it up, lack of human resource and technology to effectively run it to an extent that it would meet the demands of the locals. Thus, such nations resort to conventional energy sources out of lack of affordable and effective alternative energy sources.

Objectives of the study

The objective of the present paper is

1. To know the probability Electric Vehicles being the primary fuel source of vehicles in India,
2. To measure the probability of an individuals having a priority of electric over conventional and
3. To analyse the probability of individuals being satisfied with having an electric source as a complete source of fuel.

II. REVIEW OF LITERATURE

Fossil Fuels are the primary source of energy for operation of vehicles and machineries in the present times. There exists tremendous environmental impact on using such fossils to generate electricity (Khazaei 2019). By burning up of such fossils, it emits massive amounts of carbon dioxide and other moderately significant greenhouse gases, which results in warming up the temperature of the atmosphere (Hamilton 1978). Such an effect of the fossil fuel cannot be overlooked and at the same time cannot be avoided, since all lives that are run behind the steering wheel are dependent upon fossil fuel. To ensure that the future generation does get to enjoy the uses of the fossils, we ought to start to plan how to enable sustainable usage of the fossil and how to reduce the immediate dependence on it, and that's where the need to shift to electric vehicles come into picture (Geurtsen and Wilford 2009). By running vehicles through electricity as the primary source of fuel, we eliminate the need for fossils, the need, reduce the global market pressure that we put on fossils and perhaps revolutionise the way people think about fuel (Williander and Stalstad 2013). EV motors are much cleaner by a large margin than the conventional fuel types, with the high price and sustainability as the sole fuel source, but that's the price we ought to be burdened with for an cleaner and alternative source of fuel (Hamilton 1978).

However, that being said, an electric energy source as fuel for vehicles isn't an absolute clean source of energy as many may perceive. To produce electricity, fossil fuels are indeed burned to produce heat to produce electricity (Figenbaum 2020). No matter that's the nature of the energy source, burning of fossil fuel is imminent and absolutely unavoidable so as to speak. With the current depletion rate of the fossils, by the year of 2040, there is a possibility that they may not exist as fossil fuel for the future generation (Contestabile 2020). Researches have been going on how to accelerate the process of decomposition of organic matter to generate the fossils, but the closest time one has arrived as of now is the period of 10 years, which is quite low when compared to the rate of consumption of the fossil and the rate of creation of fossil (Tal et al. 2020). It is estimated that 73% of the electricity we have produced as a source for EV has come from fossil as of the year 2019. It would rather be a sustainable choice to switch to the dependence on renewable sources of energy that is found in abundance around the world (Durney 2012). However, those renewable energy sources do pose a series of dangers to those who consume electricity through such energy sources. The primary source of renewable source of energy, power harnessed through wind mills, pose a serious threat to the environment, something that is often overlooked in the pursuit of a cleaner source of energy (Anderson and Anderson 2005).

When these windmills are isolated from their primary power grid, they tend to generate negligible quantities of Carbon Dioxide, Carbon Monoxide, Mercury and Radioactive material due to continuous running of the power wheel (Westbrook 2001). Such an issue can be indeed overlooked since it is in negligible amount, However, such wind mills are built on lands that are already affected by land clearing required for the construction. Its construction affects the peatland hydrology around the mill in a considerably larger radius of area (Nehls 2016). Since the land used could have been used for livestock grazing, the presence of grazing land is diminished. Several Studies have also identified that livestock growing near windmills have shown to grow with lesser weight and more cortisol in blood, the stress hormone (Burton 2013). The true environmental victims of such energy sources are birds. These windmills do interfere with the birds' navigation senses, which uses Earth's Magnetic field, resulting in an alarming number of deaths of birds through mills (Fletcher 2011). The electric power grid cables are also the cause of deaths of birds. Thus to say power harnessed through a windmill isn't clearer as one may perceive without having blood on one's hand (Pääkkönen and Korpinen 2019).

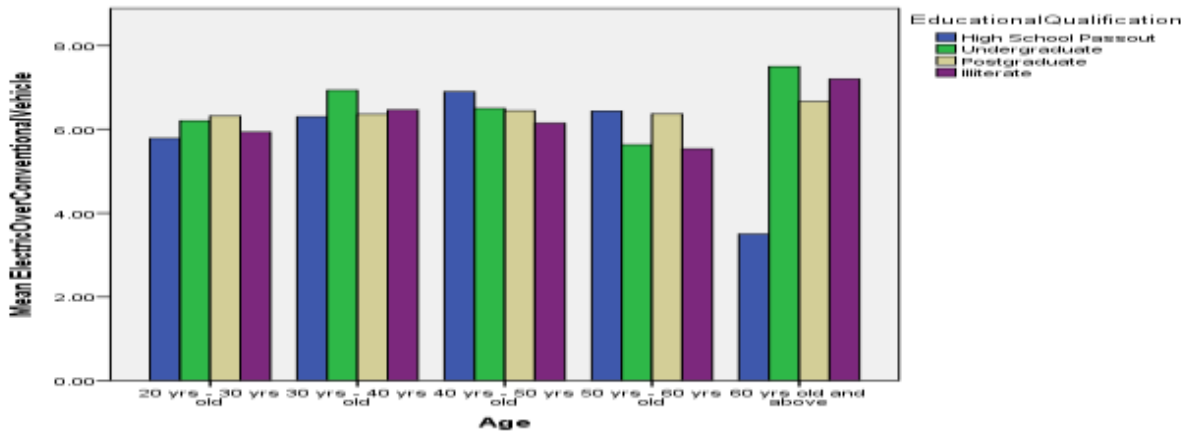
Solar energy sources also possess the same environmental dangers like that of the power harnessed through wind mills, however, solar panels do contribute to global warming emission in the instances installation, maintenance and decommissioning of the panels, but the value of the emission is negligible (Larminie and Lowry 2012). These panels do pose a threat to birds but not as in the magnitude enough to pose a threat to their lives as a whole. Tidal source of power is a common choice of energy in nations which have numerous points of free flowing currents in the coastal lines (Wakefield 1994). However, the primary danger in using such energy would be that the continuous harness of energy through waves will change the course of stream both upstream and downstream resulting in damming bays and estuary, thus causing an impact on those who live their lives depended on such water bodies (Weiss et al. 2015). Beyond the humane issues, the new and changed tidal course will have a negative impact on aquatic organisms and shoreline ecosystems (Jing et al. 2020). The changed course of water will affect the navigation senses of such ecosystems. Newborns are separated by their mothers as the part of behavior and reunited in later stages of life. With the interference with their navigation senses, such reunion is almost impossible, resulting in deaths of those organisms which are dependent on their mothers for survival in the ecosystems (Westbrook 2001).

III. MATERIALS AND METHODS

The present study is based on primary data collected by the researcher and the secondary data collected from books, journals and online sources. The present study used a simple random sampling method for selection of samples because the population is too high. A total number of 514 sample respondents in the age group of 18-60 years were selected randomly from Chennai, one of the four metropolitan cities in India. The study used percentage, Pearson Chi-Square test and frequency for meaningful analysis of the results of the study.

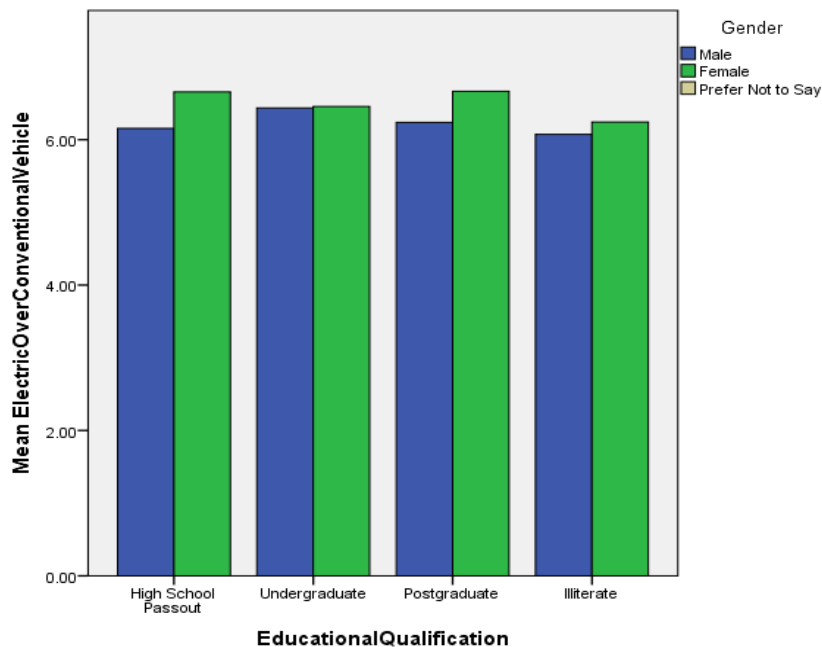
IV. ANALYSIS AND DISCUSSION

Table 1 - Mean for the Electric Cars being prioritized over conventional with Age in X axis and Educational Qualification in cluster axis



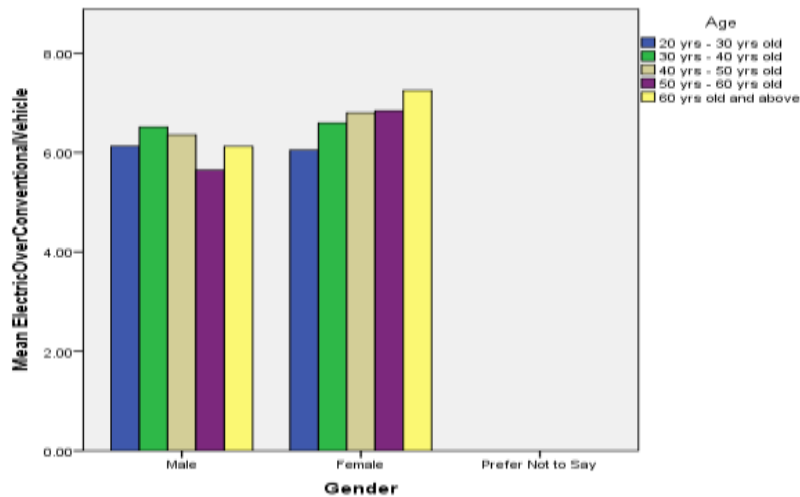
In the question on a scale of 1-10 on whether the individual would prioritize electric vehicle over conventional source one with age in the X-axis and the educational qualification on the cluster axis, a large majority of the respondents in the age group of 60 years and above agreed on a scale of 7 and more that they would prioritize electric over conventional source in the future. In comparison with the educational qualification of the respondents, it is the undergraduates and illiterates who have such an opinion on censorship, rather High School Passouts and postgraduates.

Table 2 - Mean for the Electric Cars being prioritized over conventional with Educational Qualification in X axis and Gender in cluster axis



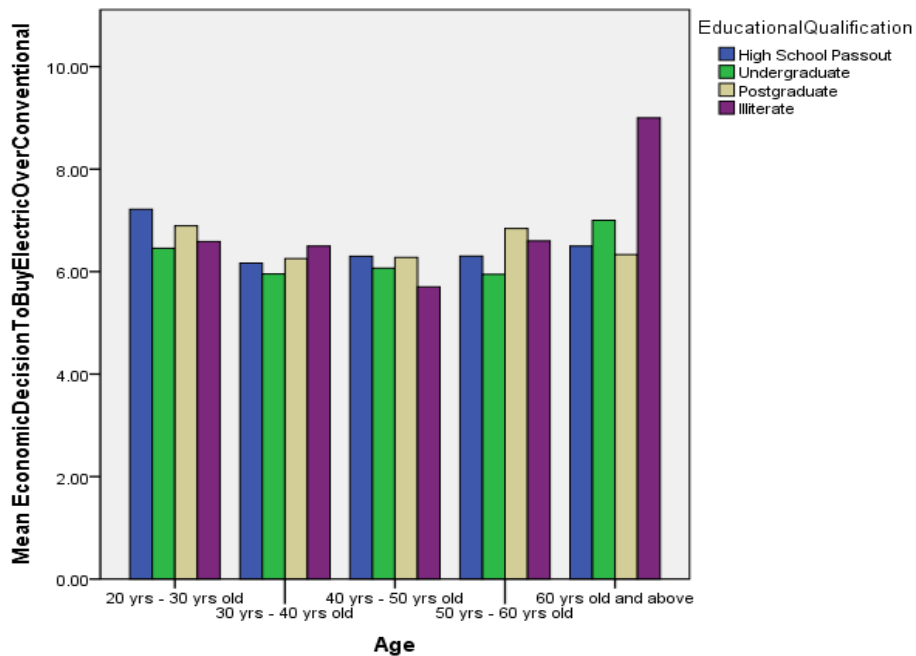
In the question on a scale of 1-10 on whether the individual would prioritize electric vehicle over conventional source with educational qualification in the X-axis and the gender in the cluster axis, there is similarity in the opinion on the scale of 6 among the High School Passouts and postgraduates that they would prioritize electric over conventional source in the future. In comparison with the gender of the respondents, it is the males who prioritized electric over conventional, rather than females and people who prefer not to say their gender.

Table 3 - Mean for the Electric Cars being prioritized over conventional with Gender in X axis and Age in cluster axis



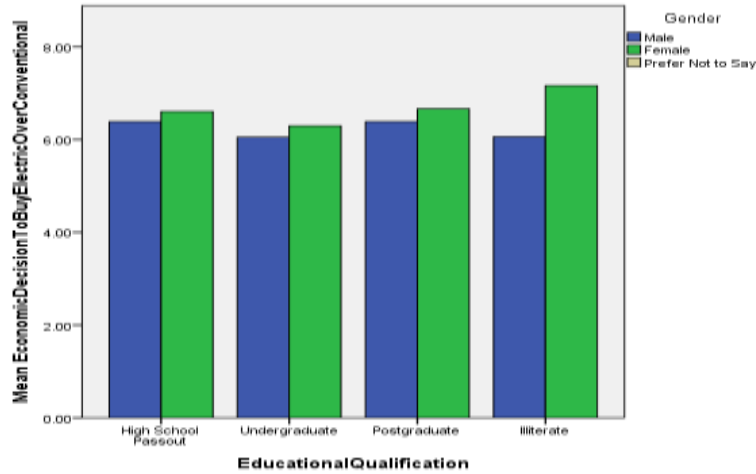
In the question on a scale of 1-10 on whether the individual would prioritize electric vehicle over conventional source with gender in the X-axis and the age on the cluster axis, there is an opinion on the scale of 7 and above seen among the female respondents that they would prioritize electric over conventional source in the future. In the comparison with the age of the respondents, respondents of the age of 40 years to 50 years and those of the 50 years to 60 years, rather than the young minds in the population.

Table 4 - Mean for the Economic Decision to buy Electric Vehicles over Conventional Vehicles with Age in X axis and Educational Qualification in cluster axis



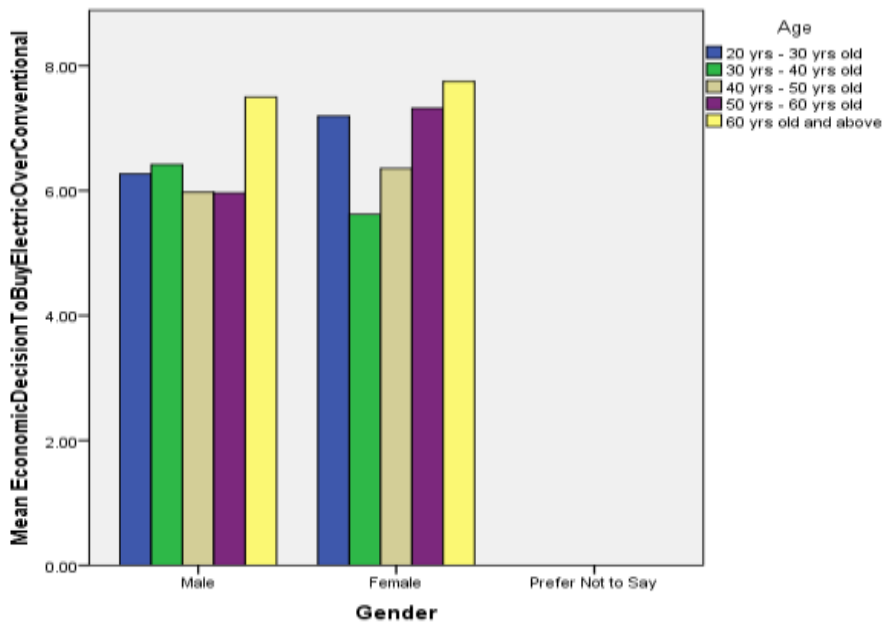
In the question on a scale of 1-10 on whether it is regarded an economic decision to shift to electric vehicle in the long run with age in the X-axis and the educational qualification on the cluster axis, there is seen a mean opinion on the scale of 7 and below among 20 yrs - 30 yrs, 30 yrs -40 yrs, 40 yrs - 50 yrs age group that it would be indeed regarded economic decision to shift to electric over conventional. In comparison with educational qualification of the respondents, the undergraduates and the postgraduates have the similar opinion, rather than the high school pass outs and the illiterates.

Table 5 - Mean for the Economic Decision to buy Electric Vehicles over Conventional Vehicles with Educational Qualification in X axis and Gender in cluster axis



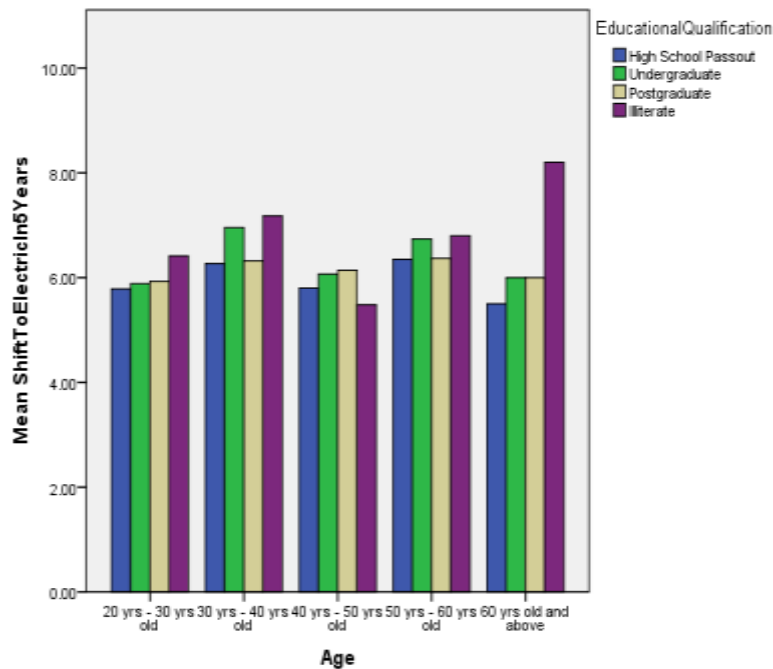
In the question on a scale of 1-10 on whether it is regarded an economic decision to shift to electric vehicle in the long run with educational qualification in the X-axis and the gender in the cluster axis, there is similar opinion on the scale of 6 seen among the undergraduates and postgraduates that it would be indeed regarded economic decision to shift to electric over conventional. In comparison with the gender of the respondents, the females who have such opinion of shift being economic in nature, rather use conventional in the future, rather than males and those who prefer not to say their gender.

Table 6 - Mean for the Economic Decision to buy Electric Vehicles over Conventional Vehicles with Gender in X axis and Age in cluster axis



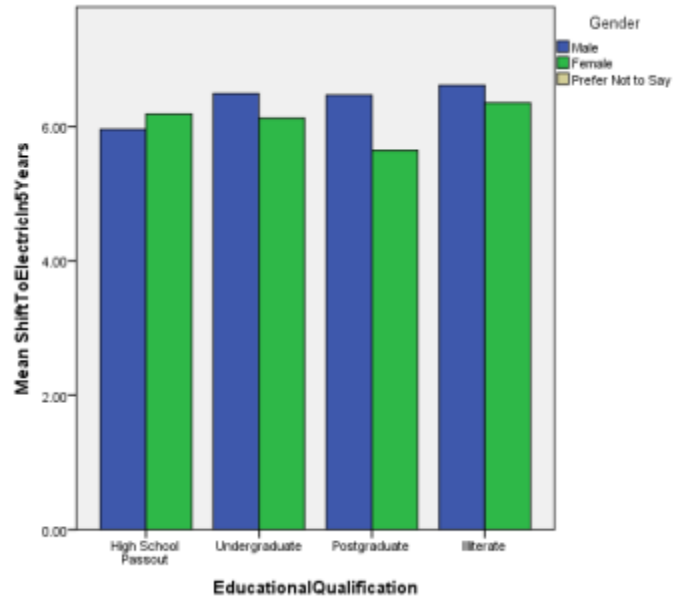
In the question on a scale of 1-10 on whether it is regarded an economic decision to shift to electric vehicle in the long run with gender in the X-axis and the age on the cluster axis, there is a mean opinion on the scale of 6 and less among the males that it would be indeed regarded economic decision to shift to electric over conventional. In comparison with the age of the respondents, the 20 yrs - 30 yrs, 30 yrs -40 yrs, 40 yrs - 50 yrs age group have an opinion that such shift to Electric is economic, rather use conventional in the future.

Table 7 - Mean for the Customer's shift to electric vehicles with Age in X axis and Educational Qualification in cluster axis



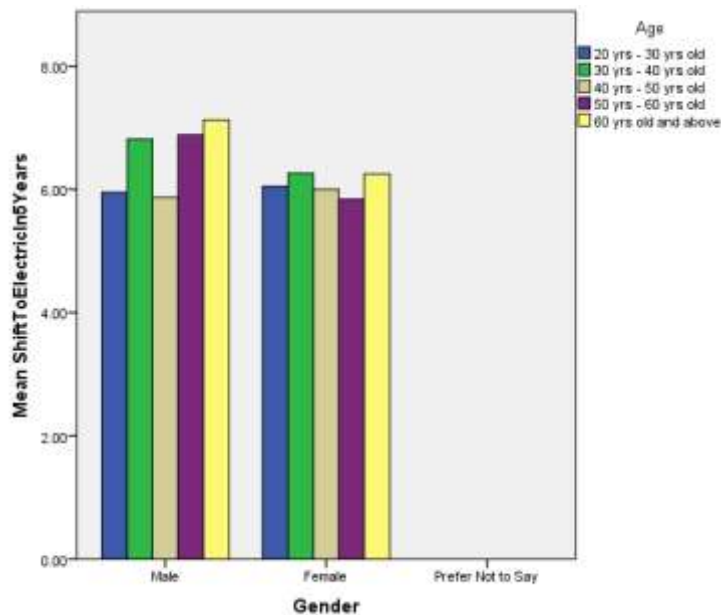
In the question on a scale of 1-10 on whether the shift from electric to conventional in India in the next 5 years with age in the X-axis and the educational qualification on the cluster axis, there is an opinion on the scale of 6 and above prevailing among the 20 yrs - 30 yrs, 30 yrs -40 yrs, 40 yrs - 50 yrs age groups that shift to electric is not possible in India. In comparison with the educational qualification of the respondents, it is the High School Passouts, Undergraduates and Postgraduates that have such an opinion that such a shift is rather impossible to achieve due to other pressing issues India faces, rather than the illiterates.

Table 8 - Mean for the Customer's shift to electric vehicles with Educational Qualification in X axis and gender in cluster axis



In the question on a scale of 1-10 on whether the shift from electric to conventional in India in the next 5 years with educational qualification in the X-axis and the gender in the cluster axis, there is a mean opinion among the undergraduates and postgraduates on a scale of 6 and above that shift to electric is not possible in India. In comparison with the gender of the respondents, it is the males that have an opinion that such a shift is impossible to achieve, rather than females and the people who preferred not to say their gender.

Table 9 - Mean for the Customer's shift to electric vehicles with Gender in X axis and Age in cluster axis



In the question on a scale of 1-10 on whether the shift from electric to conventional in India in the next 5 years with gender in the X-axis and the age on the cluster axis, there mean opinion on the scale of 6 and below among females that shift to electric is not possible in India. In comparison with the age of the respondents, people in the 20 yrs - 30 yrs and 40 yrs - 50 yrs age groups have an opinion of shift to electric in India in the next 5 years being an impossible task to achieve, rather than the ones in the 30 yrs - 40 yrs, 50 yrs - 60 yrs and the ones in the 60 yrs old and above age group.

V. CONCLUSION

The shift to complete EV motor cycle comes with a price which nations cannot afford at the moment of such massive revolution. To enable sustainable development, the shift is inevitable but far away in the future for a nation like India. Such a shift in technology is not on the top of the agenda for the nation right now. The technology is borrowed from other nations to use in India. Thus there exists a barrier in the process of change. It would take years for India to create the technology required to effectively shift the source of vehicles in India, as the nation currently lacks the human resource and funds to allocate for the proper development of technology. It shall be a burden with additional societal issues India faces at the moment. The Legislatives ought to take the environmental effects of conventional sources of fuel and consider the shift somewhere near future to enjoy the sustainable use of renewable resources and ensure that the future generations do not live and suffer for the mistakes of the past ones.

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