A study on

CONSUMERS PREFERENCE TOWARDS ELECTRIC VEHICLES WITH SPECIAL REFERENCE TO COCHIN CORPORATION

Project Report

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Under the guidance of

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ST. TERESA'S COLLEGE (AUTONOMOUS), ERNAKULAM

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CERTIFICATE

This is to certify that the project titled **"A STUDY ON THE CONSUMERS PREFERENCE TOWARDS ELECTRIC VEHICLES WITH SPECIAL REFERENCE TO COCHIN CORPORATION "** submitted to Mahatma Gandhi University in partial fulfillment of the requirement for the award of Degree of Bachelor in Commerce is a record of the original work done by **Ms. Dintu Cleetus, Ms. Athulya Vinod, Ms. Jeffy Patrick**, under my supervision and guidance during the academic year 2020-23.

Project Guide

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DECLARATION

We Ms. Dintu Cleetus, Ms. Athulya Vinod, Ms. Jeffy Patrick, final year B.Com students, Department of Commerce (SF), St. Teresa's College (Autonomous) do hereby declare that the project report entitled A STUDY ON THE CONSUMERS PREFERENCE TOWARDS ELECTRIC VEHICLES WITH SPECIAL REFERENCE TO COCHIN CORPORATION submitted to Mahatma Gandhi University is a bonafide record of the work done under the supervision and guidance of Ms. Sneha Abraham, Assistant Professor of Department of Commerce (SF), St. Teresa's College (Autonomous) and this work has not previously formed the basis for the award of any academic qualification, fellowship, or other similar title of any other university or board.

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1.1 INTRODUCTION

Electric vehicle is defined as a vehicle that can be powered by an electric motor that draws electricity from a battery and is capable of being charged from an external source. An Electric vehicle is a shortened acronym for an electric vehicle. EVs are vehicles that are either partially or fully powered on electric power. Electric vehicles (EVs) use electricity as their primary fuel or to improve the efficiency of conventional vehicle designs. EVs include all-electric vehicles, also referred to as battery electric vehicles (BEVS), and plug-in hybrid electric vehicles (PHEVs). In colloquial references, these vehicles are called electric cars, or simply EVs, even though some of these vehicles still use liquid fuels in conjunction with electricity. EVs are known for providing instant torque and a quiet driver experience

India's government is pushing for a faster adoption of electric vehicles-hoping at least 15% of all vehicles on the road will be electric in five years starting 2018-to deal with the deadly air pollution in its cities and curb carbon emission from fossil fuels.

Wide spread adoption of electric vehicles (EVs)may contribute to the alleviation of problems such as environmental pollution, global warming and oil dependency. However, the current market penetration of IV relatively low in spite of many governments implementing strong promotion policies. This paper presents a comprehensive review of studies on consumer preferences for EV, aiming to better inform policy-makers and give direction to further research. First, we compare the economic and psychological approach cowards this topic, followed by conceptual framework of EV preferences which is then implemented to organize our review. We also briefly review the modelling techniques applied in the selected studies Estimates of consumer references for financial, technical, infrastructure and policy attributes a then reviewed. A categorization of influential factors for consumer preferences into groups such as socio-economic variables, psychological factors, mobility condition, social influential, etc. is then made and their effects are elaborated.

1.2 STATEMENT OF THE PROBLEM

The depletion of fossil fuels and constant hike in fuel prices, there is a need for energy transition in vehicles in India. Govt has taken initiative to fight pollution levels by promoting EVs and giving subsidies on purchase. The Government and manufacturers should join their hands to build the infrastructure and create positive environment for EVs.

The consumers are aware of global climate conditions and are ready to change their preference from conventional to eco-friendly vehicles. Cost is an important factor while considering the purchase of EV. Consumers are willing to consider EVs as their future purchase option, if proper infrastructure is available. Initial cost of purchase, a smaller number of charging stations and the time required to recharge the battery is creating limitation in boosting consumer confidence.

In this study we intend to study the factors that influence the customers in purchasing the e vehicles. We are trying to analyse the satisfaction level of the customers and the level of awareness regarding the initiative or schemes provided by the government for promoting e vehicles in the economy.

1.3 SIGNIFICANCE OF THE STUDY

The aim of the study to find the possible factors that can influence the adoption of EV's and provide the Government to come out with the policies and to help the automakers to understand the needs and wants of the customer. The study's goal was to identify potential influences on EV adoption in order to help the government develop policies and assist automakers in comprehending consumer needs and desires. This country now confronts one disadvantage, which is the requirement to undertake a sufficient market assessment in order to attain the objective. The study also analyses the extent of customer satisfaction towards electric vehicles which greatly helps the electric vehicle industry in the production process by customizing the vehicle as per consumer's interest. This study also helps to promote the use of cutting-edge technology through adoption, modification, and R&D. The study also helps the prospective consumers in making the right choice as to the purchase of electric vehicles as the study includes a detailed assessment of e vehicles. Our study can also be benefited to the future researchers as it can be used as a source of primary data for future reference on the importance of e vehicles

1.4 OBJECTIVES OF THE STUDY

The objectives of the study are:

- To analyse the awareness of consumers about the E-vehicles
- To identify the factors driving customers to purchase E-vehicles
- To analyse the level of satisfaction of consumers towards E-vehicles.

- To analyse the level of awareness of customers towards various Government E-transportation initiatives.
- To know whether the consumer preference has changed from fuel vehicles or e-vehicles

1.5 RESEARCH METHODOLOGY

1.5.1 Research Design

The study is conducted among youth aging to infer their attitude towards electric vehicles. Study is conducted through distribution of questionnaires and a total of 50 responses were collected

Research Instrument: Questionnaire is a research instrument consisting of a series of a series of question and other prompts for the purpose of gathering information from respondents.

1.5.2 Data collection: Both primary and secondary data were used for data collection

- **Primary data**: The primary data has been collected through snowball sampling, from the sample respondents through the schedule with the help of the questionnaire which was distributed online.
- **Secondary data**: Secondary data has been collected from standard reference book, magazines, newspapers and various websites.

1.5.3 Sampling Design

Sampling is a process used in the statistical analysis in which a predetermined number of observation are taken from a larger group. The sampling technique used in this study is snow ball techniques.

1.5.3 Sample size

The sample size is limited to 100 users.

1.6 Tools used for analysis

The data collection tools refer to the devices or instruments used to collect the data. The success of any research depends solely on the data which drives it. In this study data is collected through charts, graphs, percentages, tables.

1.6 SCOPE OF THE STUDY

Kochi is one of the most rushed regions in Kerala. At a time when rising pollution levels in Cochin corporation are causing concerns, city to authorities have started taking measures to step up the push for electric vehicles (EV).

The Cochin corporation will also promote the use of e-autos in the city. Grants given by international agencies for reducing carbon emission will be allotted to a society formed by autorickshaw owners. E-cargo vehicles launched in Kochi. Electric cargo vehicles will now be used to deliver goods, including vegetables, food, and cooking gas in the city. Eighteen e-vehicles, including 12 pick-up autorickshaws, were launched at a function organized by the Kochi Corporation. The sample of the study is collected from customers focused mainly in Kochi Corporation.The demand for EVs is rising in the rural areas of in and around Kochi as well. Vehicle dealers say people started to switch to EVs now realizing that the future of the vehicle industry belongs to EVs.

1.7 LIMITATIONS

- The study is time bound
- The area of study is limited to Cochin Corporation
- Study is limited to 50 respondents of which are youth. So, findings and suggestions given on the basis of the study cannot be extrapolated to the entire population.
- The primary data collected may be biased.

Yogesh Aggarwal, Vivek Gedda and Kushan Parikh, (2019) Users of scooters who only need to travel short distances may want to consider an EV, while those who need to travel longer distances and currently possess motorcycles like the Hero Splendor may find switching to an e-2W challenging. It is relatively straightforward to enhance the range of an automobile by increasing the battery size. However, with electric 2Ws, every increase in kWh may provide an additional 30km of range, but the weight gain is roughly the same. 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.

Bennett, R, & Vijay Gopal, R. (2018). Based on the posited influences of a specific stereotype of EV owners possibly held by people without experience with EVs, and the latter's self-image congruence regarding EV ownership, this research developed an integrated model of potential determinants of consumer attitude toward electric vehicles. Both product user SIC and stereotype negativity were proposed as determinants of both product user SIC and stereotype negativity, as well as exerting direct impacts on consumer attitude. The association between attitude and willingness to purchase, as well as interrelationships among the variables, were investigated. Before and after study participants played a game in which they took the position of an electric vehicle driver, the model was estimated.

Pretty Bhalla, InassSalamah Ali, Afroze Nazneen,(2018) Environmental concerns, cost, comfort, trust, technology, societal acceptance, and infrastructural availability all influence car selection. These arguments both conventional cars and electric vehicles have been tested. They believe that these elements have a direct impact on an individual's vehicle choice. They discovered that EV producers and governments must invest more in social acceptability of the car by expanding infrastructure and emphasising technology to build trust. According to the findings, the general public is fully aware of the environmental benefits. The government and manufacturers share responsibility for investing in car manufacturing

Masurali.A, Surya P, (2018) In terms of carbon emissions, India is responsible for over 18% of them in the transportation sector alone. One of the most viable alternative answers to the issues is the electric vehicle (EV). Several automakers are introducing electric vehicles and diversifying their product lines. Promoting electric vehicles (EVs) can help reduce fuel reliance

and pollution, which is good for both customers and the country. People's levels of awareness of EVs are substantially influenced by their education. Apart from manufacturers, the government should make a concerted effort to raise awareness and generate favourable perceptions among potential buyers.

Pritam K. Gujarathi, Varsha A. Shah, Makarand M. Lokhande, (2018) The Indian scenario is unique in that the present market share of electric and plug-in hybrid vehicles is under 0.1 percent. Almost all cars today rely on fossil fuels for propulsion. These damage the atmosphere and contribute to global warming by emitting greenhouse gases. The disparity between petroleum production and demand in the United States is increasing. India imports almost 70% of the oil it needs each year. As a result, there is a pressing need to look at the elements and obstacles that could lead to more sustainable and cleaner alternatives.

John Matias and T.C. Yalcin (2017) "Consumer Perceptions of Electric Vehicles: An Exploratory Study". This study used a survey to explore consumer perceptions of EVs in the United States. The study found that consumers had mixed perceptions of EVs, with concerns about range anxiety, charging infrastructure, and the high cost of EVs identified as key barriers to adoption.

Liao, (2017)"Impact of Government Policies on the Adoption of Electric Vehicles in India". Political concepts of EVs to help governments and car manufacturers evaluate consumer preferences Driving range, refilling time and owning costs have been identified as some of the factors influencing EV purchasing decisions Some studies have used stated preference techniques to explore heterogeneity in consumer preferences when deciding to purchase an Electric vehicle.

David Layzell and Sara Hastings-Simon, (2016) "The Role of Government Incentives in Supporting the Adoption of Electric Vehicles: Insights from a Canadian Study". This study analyzed the impact of government incentives on consumer preferences for EVs in Canada. The study found that financial incentives, such as tax credits and rebates, are an important factor in motivating consumers to purchase EVs.

Anthony Perl and Yehua Dennis Wei (2016) "Predicting Electric Vehicle Adoption in the United States: The Role of Income, Social Influence, and Perceived Infrastructure". This study used a survey to predict EV adoption rates in the United States. The study found that income,

social influence, and perceived infrastructure were key predictors of EV adoption. Specifically, the study found that consumers with higher incomes, who were influenced by friends and family, and who perceived a greater availability of charging infrastructure were more likely adopt EVs.

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

Philippe Lebeau, Cedric De Cauwer, Joeri Van Mierlo, Cathy Macharis (2015) The impact of freight transportation on urban migration is significant. The possibility of integratingelectric vehicles into urban logistical operations was investigated by researchers. A fleet with a variety of technologies has the potential to lower last-mile expenses. A fleet size and mix vehicle routing problem with time windows for EVs was provided by the researcher. The authors' key contribution was to take into account the unpredictability of the EV range. EVs are often the most competitive technology in the small van segment. In the segment of large vans, diesel has proven to be the most cost-effective alternative, as electric cars would need totravel a greater distance to be cost competitive. Hybrid vehicles are preferred in the truck category due to their lower operating costs.

Benjamin K. Sovacool, Sabine Hielscher, and Johannes Kester, (2015) "Investigating the Role of Social Influence on the Adoption of Electric Vehicles: Evidence from a Stated Preference Study in Germany". This study investigated the role of social influence on consumer preferences for EVs in Germany. The study found that social norms and peer influence can play a significant role in shaping consumer preferences for EVs.

Sudhir Kumar and R.K. Kumar, (2015) "Challenges and Opportunities for Electric Vehicles in India: A Review". The authors analyze the key challenges and opportunities for electric vehicle adoption in India, including infrastructure development, battery technology, and government policies.

Karen Vancluysen and Philippe Crist, (2013) "Consumer Preferences for Electric Vehicles: A Literature Review". This literature review summarizes the findings from various studies on consumer preferences for EVs. The study found that consumers are primarily motivated by environmental concerns and the potential cost savings associated with EV ownership. However, the limited driving range of EVs and the lack of charging infrastructure were identified as key barriers to adoption.

S. A. Bhat and B. Subhash, (2013) "The Impact of Government Policies on Electric Vehicle Adoption in India". The authors examine the role of government policies in promoting the adoption of electric vehicles in India including incentives, regulations, and funding programs.

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

R. Sridhar and P. Raj Kumar, (2011) "The Electric Vehicle Market in India". This study provides an a-depth analysis of the Indian EV market, including trends, consumer preferences, and future projections.

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

Hoyer (2008)"Electric Vehicle Adoption in India: Challenges and Opportunities". The technology behind Electric vehicles exists for more than a century. However, due to the availability and the ease of use of combustion engines, electric driving was put on hold. Today, different (pushing and pulling) factors recover the interest in Electric vehicles. On the pushing side, the limited oil supply, and the rising awareness of the environmental footprint of conventional combustion engine vehicles lead the way to cleaner Electric vehicle. On the

pulling side, recent developments in battery technology and electric motors make the Electric vehicle a valid contester for conventional cars.

Jayashree S and B.G. Fernandez, (2007) "An Overview of Electric Vehicles and Their Charging Infrastructure in India". In this paper, the authors review the current status of electric vehicles in India, including their adoption rate, market size, and regulatory policies.

R. K. Jain, S. K. Dhankhar, and H. S. Bhatia, (2005) "Assessment of Electric Vehicle Charging Infrastructure in India". The authors evaluate the current state of electric vehicle charging infrastructure in India, including the availability and accessibility of charging stations.

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

3.1 Introduction of Electric vehicles

A vehicle that is powered by one or more electric motors or traction motors is known as an electric vehicle (EV). An electric vehicle can be self-contained, with a battery, solar panels, fuel cells, or an electric generator to convert gasoline to energy, or it can be fueled by electricity from off-vehicle sources via a collector system. Road and rail vehicles, surface and underwater watercraft, electric airplanes, and electric spacecraft are all examples of electric vehicles. Electric vehicles (EVs) originally appeared in the mid-19th century, when electricity was one of the favoured means for motor vehicle propulsion, providing a degree of comfort and ease of operation that gasoline cars could not match. For nearly a century, internal combustion engines were the primary propulsion system for cars and trucks, while electric power remained prevalent in other vehicle types, such as trains and smaller vehicles of all types.

3.2 History of Electric vehicles

•1800's Inventors in a number of nations have begun testing battery-powered automobiles. In 1832, Robert Anderson of the United Kingdom is credited with inventing the first electric vehicle. Camille Jenatzy, a Belgian race car driver, breaks the 100 km/h barrier in 1899 in the La Jamais Contente, an electric vehicle he designed. On September 13, 1899, in New York, an electric cab was involved in the first reported US motor vehicle death.

•1900's-1960's 21 EVs are targeted at women, with luxurious upholstery, flower bouquets, clocks, and even beauty kits. They are said to be quieter, cleaner, and easier to run than gasoline-powered vehicles. Henry Ford and Thomas Edison collaborate on a "affordable and practical" electric car that can travel 100 miles. They do, however, abandon the endeavour in the end. Ferdinand Porsche creates the P1, an electric automobile. The demand for Ford's mass-produced Model T and other gasoline-fueled automobiles is reducing the popularity of electric vehicles. National Union Electric Corp converts 100 Renault Dauphine automobiles to operate on batteries in 1959. Henney Kilowatts is the name given to the latest versions. In response to growing worries about air pollution, several corporations begin developing prototype vehicles.

•1970-1990's

The globe sees NASA's electric Lunar Roving Vehicle bounce around on the moon in 1971 and 1972, giving battery power a promotional boost. Late in the decade, rising gasoline prices prompted automakers and the US Department of Energy to investigate alternate fuels, with GM constructing a prototype urban electric car in 1973 and SebringVanguard releasing its CitiCar.

However, a restricted range and performance concerns prevent wider adoption. Auto manufacturers are increasingly focusing on alternative-fuel vehicles as emission regulations tighten. GM debuted the EV1 in 1997, producing over 1,000 of the sleek twoseaters and leasing them to customers as part of a market study. The first mass produced hybrids are also available for purchase. Toyota's Prius and Honda's Insight, as well as Nissan's Altra EV minivan, are all electric vehicles powered by lithium-ion batteries.

•2000's-2010's

The majority of the EV1s are destroyed by GM. Marc Tarpenning and Martin Eberhard founded Tesla Motors in 2003. Elon Musk, a cofounder of PayPal, leads a $7.5 million 22 initial investment and is named chairman in 2004. Tesla produced roadster sports car (the first production EV to use lithium-ion battery cells) in 2008. Nissan's Leaf has become the best-selling electric vehicle in the world. Tesla continues to expand its product line. Musk reveals ambitions to develop an electric semi-truck to compete with Daimler and BYD, a Chinese company financed by Warren Buffett. China is the world's largest EV market, because to its focus on reducing smog and oil imports, which has prompted hundreds of local manufacturers and startups to compete for market share.

•The future

According to Bloomberg New Energy Finance, more than 230 battery-powered automobiles will be available globally by 2021. SUVs and pickup trucks, such as Audi's e-tron and Jaguar's I-Pace, will be among them. By 2024, electric vehicle sales in the United States will surpass 1 million, up from 104,000 in 2017, and deliveries in China will surpass 3 million. And to think that it all began with Robert Anderson's electric carriage in 1832.

3.3 Electric vehicle development in India

The United Kingdom (UK) recently announced that new petrol and diesel cars will no longer be sold after 2030. In addition, as part of its green strategy, the United Kingdom is working to provide the necessary infrastructure for electric vehicles (EVs). Such a significant step could have ramifications for the global green movement. The Indian government is likewise interested in replacing fossil-fuel-powered automobiles with electric vehicles. In 2017, the government set a lofty goal of having all cars be electric by 2030. However, the government was obliged to cut the aim due to opposition from the car industry and fears of job losses. Will

be difficult to overhaul the mobility sector unless the government supports upfront investment in EV infrastructure rather than shifting the buck to the automotive industry and customers.

3.4 Advantages of electric vehicle

• Electric vehicles save energy: - The amount of energy from a fuel source that is transformed into actual energy for driving a vehicle's wheels is referred to as energy efficiency. Compared to traditional gas-powered vehicles, AEVs are significantly more efficient: AEV batteries convert 59 to 62 percent of their energy into vehicle movement, compared to 17 to 21 percent for gas-powered vehicles. This means that charging an AEV's battery contributes more to actual vehicle power than filling up at a gas station.

• Electric cars reduce emissions: -Emission reduction, including reduced usage of fuel, is another pro for all-electric vehicles. Because they rely on a rechargeable battery, driving an electric car does not create any tailpipe emissions which are a major source of pollution in the United States. In addition, the rechargeable battery means much less money spent on fuel, which means all energy can be sourced domestically.

• Electric vehicles are high-performance and low-maintenance vehicles: - All electric vehicles are high-performance vehicles with quiet, smooth motors that require less maintenance than internal combustion engines. The driving experience can also be enjoyable because AEV motors are responsive and have good torque. AEVs are generally newer than their gasoline-powered counterparts, and they are frequently more digitally connected with charging stations, allowing for charging control via an app.

3.5 India's necessity for EV's

India is in need of a transportation revolution.

• The current trajectory of adding ever more cars running on expensive imported fuel and cluttering up already overcrowded cities suffering from infrastructure bottlenecks and intense air pollution is unfeasible.

• The transition to electric mobility is a promising global strategy for decarbonising the transport sector.

3.6 India's Support to EVs:

Need for Electric Vehicles: India needs a transportation revolution.

The current trajectory of loading already overcrowded cities with infrastructure constraints and high levels of air pollution with ever more cars relying on expensive imported fuel is unsustainable.

Electric mobility is a promising global method for reducing carbon emissions in the transportation industry.

India's Electric Vehicle Support: India is one of only a few countries to back the global EV30@30 initiative, which aims for at least 30% new electric vehicle sales by 2030.

At the COP26 in Glasgow, India's promotion of five factors for climate change — "Panchamrit" — is a commitment to the same.

At the Glasgow summit, India proposed a number of initiatives, including using renewable energy to meet 50% of India's energy demands and cutting carbon emissions by 1 billion tonnes by 2030 and achieving net zero by 2070.

The government of India has taken various measures to develop and promote the EV ecosystem in the country such as:

The remodeled Faster Adoption and Manufacturing of Electric Vehicles (FAME II) scheme Production-Linked Incentive (PLI) scheme for Advanced Chemistry Cell (ACC) for the supplier side

The recently launched PLI scheme for Auto and Automotive Components for manufacturers of electric vehicles.

3.6.1 Major Players in EV Market

1. Tesla

Founded in 2003 and headquartered in California, US, Tesla is one of the leading players in the electric vehicle market. Tesla creates high-performance completely electric automobiles as well as energy generation and storage solutions, which it designs, develops, manufactures, and sells. The business just released the Model 3, which has quickly become one of the best-selling vehicles in the United States. The company has demonstrated that it has the ability to produce highly creative automobiles over time. With the construction of a new production factory in Shanghai, China, the company plans to establish a strong presence in the Asia Pacific region.

2. BMW

BMW, a multinational vehicle manufacturing corporation, was founded in 1916 and is based in Munich, Germany. Automotive, financial services, motorcycles, and other businesses are the company's four business segments. The company sells cars and SUVs in the automobile industry. BMW also sells electric vehicles such as the BMW i3 and BMW i8, both of which are plug-in hybrids. The company intends to offer 25 electrified vehicles by 2025, with 12 of them being entirely electric.

3. Nissan Motors

Nissan Motor was formed in 1933 and is headquartered in Yokohama, Japan. Nissan Motor Company is a global automaker known for its Nissan, Infiniti, and Datsun brands. Its best-selling Nissan Leaf model has dominated the market for a long time, selling over 200,000 units in 2016. Vehicles and vehicle parts, engines, manual transmission, specifically equipped vehicles, industrial equipment engines, and so on are all available from the company. For its customers, the company also makes electric cars 26 (BEVs). Nissan introduced the Nissan Leaf Plus model in 2019 with better new features such as a larger battery and a 160-kW electric motor, increased range (up to 363 km), and increased power (214 hp).

4. Volkswagen

Volkswagen is a well-known automobile manufacturer based in Wolfsburg, Germany, that was founded in 1937. Volkswagen Passenger Cars, Audi, SEAT, KODA, Bentley, Bugatti, Lamborghini, Porsche, Ducati, Volkswagen Commercial Vehicles, Scania, and MAN are among the company's 12 brands. Sedans, minicars, SUVs, premium cars, supercars, and commercial vehicles are all sold by the corporation. It sells automobiles with various propulsion systems, including diesel, gasoline, and electric vehicles. The e-Golf and e-Up are the company's most popular electric automobiles. Volkswagen announced pre-orders for the first model of its next full-electric car, the ID.3, in Europe in May 2019. It quickly drew 15,000 registrations, accounting for more than half of the total 30,000 pre-bookings. Volkswagen intends to launch over 70 all-electric vehicles worldwide by 2028.

5. BYD GROUP

BYD is one of the few businesses that specialises in commercial electric car manufacture. Its headquarters are in Guangdong, China, and it was founded in 1995. Automobiles, handset and assembly services, and rechargeable battery and photovoltaic are the company's three main

business segments. BYD is a company that specialises in the design, manufacture, and assembly of a wide range of goods. China, the United States, Europe, and India are among places where the company has a presence. The organisation has placed a strong emphasis on partnerships and has built them all over the world. For example, Nobina, Sweden's and the Nordic region's largest bus operator, added another 20 e-buses to its growing order book from BYD in 2019.

3.6.2 Different types of E-Vehicles

Generally there are three main types of electric vehicles: hybrid electric vehicles (HEV), plug-in hybrid electric vehicles (PHEV) and battery electric vehicles (BEV).

Hybrid electric vehicles (HEV)

- A hybrid electric vehicle (HEV) combines a conventional internal combustion engine (ICE) with an electric motor and battery pack to reduce fuel consumption.
- HEVs achieve this by using an electric motor to drive the car during conditions when an ICE is especially inefficient, like when accelerating from a stop. Hybrids can also favour the ICE unit when it is more efficient to do so, such as cruising at highway speeds.
- Hybrid vehicles are most similar to drive to normal ICE vehicles, as owners can only top them up with traditional fuels (usually petrol).
- HEV technology automatically charges the battery through what's known as 'regenerative braking' and activates the electric motor system when conditions are suitable, meaning drivers do not have to monitor charge or plug the cars into power outlets.

Plug-in hybrid electric vehicles (PHEV)

- A plug-in hybrid electric vehicle (PHEV) combines an ICE with an electric motor and battery pack similarly to a hybrid, however comes with distinct differences.
- PHEVs generally have larger battery packs and more powerful electric motors than hybrids, as the electric system does a lot of the heavy lifting while driving. This means PHEVs can be driven in electric-only mode, switching the ICE off entirely.

- Driving a plug-in hybrid is similar to driving a hybrid, as the car will automatically recharge the battery and switch between ICE and electric power based on conditions. However, drivers have the choice of topping up PHEVs with both fuel and electricity.

- A PHEV can run on just petrol if all battery charge is used up, and battery charge alone if all fuel is used up.

Battery electric vehicle (BEV)

- A battery electric vehicle (BEV) is considered to be an 'all-electric' or 'full-electric' car. BEVs are powered exclusively by electricity, with their electric motors drawing current from onboard battery packs. BEVs do not have any form of ICE.

- Given that BEVs rely solely on electricity, they tend to have much larger capacity batteries and kilowatt-hour (kWh) outputs than comparable hybrid and plug-in hybrid electric vehicles. This extra battery tech typically results in BEVs costing more than other types of EVs.

- BEVs need charge to be driven. This can be done through either a home charger or fast charging station, or energy recouped by regenerative braking.

Mild-hybrid electric vehicles (MHEV) and fuel cell electric vehicles (FCEV)

- Mild-hybrid electric vehicles (MHEV) and fuel cell electric vehicles (FCEV) are two other variants of electric vehicle also available in Australia.
- A mild-hybrid electric vehicle uses a 48-volt starter motor, known as an integrated starter generator (ISG) to supplement the ICE. Contention remains about whether MHEV can be considered a 'true EV', as the ISG only aids the ICE, but cannot accelerate the vehicle by itself.
- Fuel cell electric vehicles (FCEV) are similar to BEV in that they only use electrical energy to drive, however the way they store energy is very different.
- Unlike BEVs, which store electrical energy taken from a charger, FCEVs create their own electrical charge through a chemical reaction generally involving hydrogen. This means FCEVs can be filled with hydrogen and don't require 'charging' from the grid.

Some of the Charging stations in cochin corporation

- EESL Charging Station
- KSEB Charging Station
- KEL PulsePower Charging station
- Porsche Destination Charging station
- Porsche Destination Charging station
- Tata Charging Station
- Kazam Charging Station
- Ather Grid Charging Station
- Celltric Energy - EV Charging station
- GOEC Charging Station

3.6.3 EVs Vs ICEVs

Petrol and diesel prices have increased the number of digits and could soon hurt pockets.As this article is being written, it is pretty evident that there is much talk about how every stock market trader should consider investing in stocks relevant to the electric vehicle (EV) sector.

For those uninitiated with the EV industry, here is some background. EVs seemed too far into the future a decade ago, but the Internal Combustion Vehicles (ICEVs) face a market share blow from the electrified competition. The common diesel and petrol vehicles come under the category of an ICEV.

Since EVs are currently feasible only in the metros or cities, we consider only these areas as a bottom line for comparison purposes. In most cities, petrol prices have hit the century mark whereas diesel is only less than Rs 10 short of the mark.

The higher end of price per unit of electricity for residential consumers can range between Rs 7 and Rs 9. Depending on the state and previous consumption billing, the price could lower even further.

Since the comparison is between the types of vehicles and not the features, the comparison will focus on the basic variants of the vehicle available in both electric and ICE versions. Having considered the RTO, insurance, warranty, AMC charges along with the ex-

showroom price, the base model of the ICEV (The Tata Nexon) in diesel is approximately Rs 11,30,000. In contrast, the same is Rs 8,60,000 with a petrol engine. The Nexon EV version starts at approximately Rs 14,70,000.

The EV variant has a battery capacity of 30 kWh, or in other words, the charging capacity is 30 units of electricity. A full charge is expected to provide an ideal driving range of 312 kilometres. At this rate, the fuel cost is approximately Rs 0.8 per kilometre.

The fuel costs for the ICEVs are at least three times (if not five times) greater than the EV. However, assuming that the petrol and diesel rates remain steady, the nearly Rs 4 -5 Lakh difference between the on-road price of the vehicles is expected to be made up within 1,25,000 kilometres (approximately 10 years, considering an average of 10,000 km driven per year).

This means after 1,25,000 kilometres your EV would essentially cost five times less than an ICEV to operate, including maintenance

As seen from the graph, owing to low electricity prices, the overall operational life costs of an EV remain fairly lower than a petrol or diesel engine vehicle. Around the 1,00,000 kilometers mark, an EV should operate at a much more viable cost than ICEVs.

Fueling and Charging Infrastructure

The charging infrastructure required for enabling mass EV adoption is still in the process of construction. However, driving the EV out of the garage requires more thought on the schedule, distance to be travelled, charging station availability, and battery charge status.

The 2030 Electric Mobility targets set up by the Government of India depends on public and private involvement in ramping up the number of charging stations. By the end of 2019, India had over 78,000 fuelling stations, of which 32 per cent were in rural areas and the remaining across urban areas and highways.

The Society of Manufacturers of Electric Vehicles, an EV industry body, reported that as of March 2021, India had only 1,800 charging stations for some 16,000 electric cars. The Grant Thornton Bharat-FICCI report further added that for India to reach a market target of 2 million EVs by 2026, the number of charging stations would need to range above 4,00,000.

The Centre is also pushing the EV adoption rate by earmarking Rs 1,000 crore under the Rs 10,000 crore FAME II Scheme for building the charging infrastructure. Under FAME II, 1633 fast chargers and 1003 slow chargers have already been sanctioned. The EESL, which is at the forefront of scaling up the charging infrastructure, has confidence that demand aggregation can bring down the per-unit cost of the charging equipment by 15-20 percent.

Batteries

Like a fuel tank, batteries are essential to the adoption of EVs. Though it has made great strides, technology still has a way to go. The batteries used in modern electric vehicles (EVs) are smaller and more energy dense than those used in earlier models. Lithium-ion, a material that is very explosive by nature, was initially used to make EV batteries. Lithium polymer-based chemicals are currently being used in this. They have fast charging capabilities and are less explosive. They continue to be among the most expensive parts included in an EV.

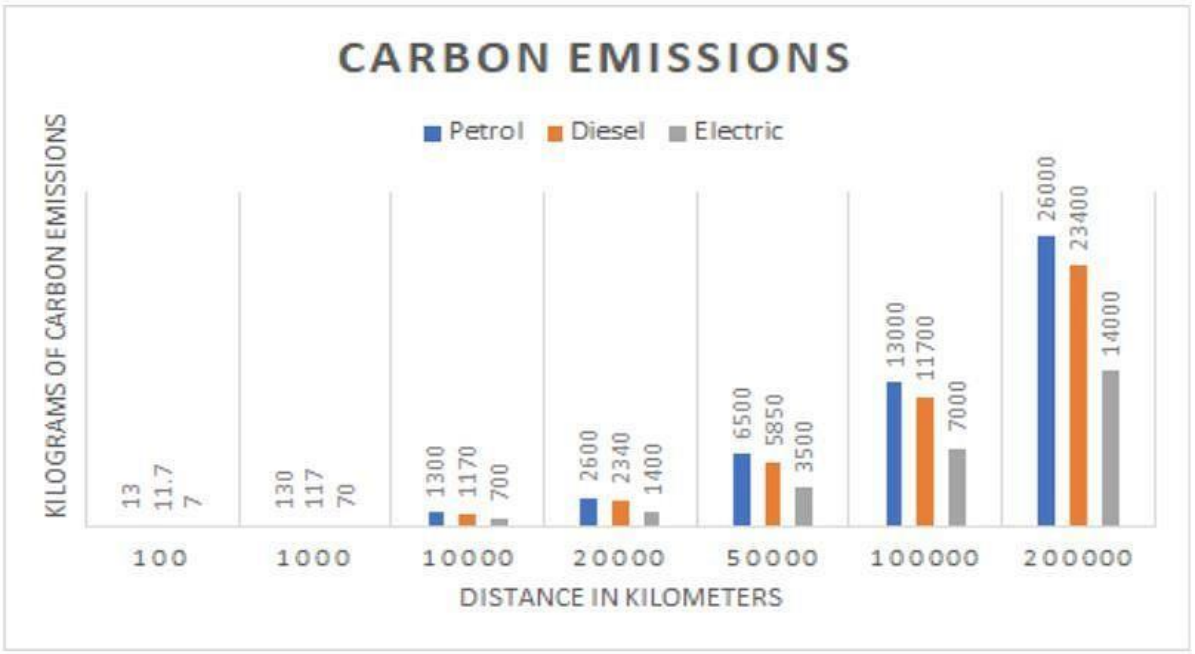
Although batteries have substantial input costs for the manufacturer, they also affect the vehicle's range and charging speed. Some batteries permit quick charging up to 80% or so.

3.6.4 Environmental Impact

The real environmental impact can only be assessed on the data available. For example, upto 2018, the Carbon Emissions factor for the Indian Power sector stood at 0.82 kg/kWh, which implies that 0.82 kilograms of Carbon Dioxide were emitted for every unit of electricity produced.

With specifics mentioned earlier, a 30kWh battery capacity and a range of 312 kilometres should result in 0.07 kg/km or 0.07 kilograms of carbon dioxide is emitted per kilometre.

While comparing the same with the GHG emissions for road transport report published by the Shakti Foundation, a petrol engine of less than 1400 cc has an emission factor between 0.130 and 0.140 kg/km. In contrast, a diesel engine of the same size has a factor in the range of 0.117 kg/km.



As observed in the graph, the carbon emissions over the operational life are vast. The EV emissions are nearly half of the ICEVs.

Ride Experience

Have you heard the noise made by an EV? It is practically silent. There are rumours that many EV manufacturers incorporate sound in the engines to let pedestrians know that a vehicle is approaching. Electric cars can give you the experience of high torque on accelerating from standing still. It is evidently a thrilling experience to receive high torque when you put the pedal to the mettle. Other than that, you have the chance to listen to music without having to listen to the engine roar.

Electric cars generally come with more IoT features compared to their counterparts. Some even allow the user to enable a dog mode and others allow you to stream Netflix while charging. Ever had to wait while your significant other goes shopping and takes forever? Time to get an electric car and chill in the parking lot, catching up on some movies and shows you have been waiting to watch.

On purchasing electric vehicle, you are significantly contributing to many aspects — one, the growth of the national market and two, to the environment. Being an EV consumer, you ensure that the Indian Vehicle market is moving towards being a global competitor. At the moment, China holds the largest market share when it comes to EV manufacturing. Owing to many recent developments, many global firms are looking to move their base to India. This will create employment opportunities and shift labour skills from a conventional sector to a new and future-ready sector.

On the other hand, the contribution towards the betterment of the environment is significant. Although there is much effort to decarbonise the Indian Power sector, the ambitious renewable energy targets have shown that there is a roadmap to ensure that electricity production in India will be carbon neutral soon. Running your vehicle on a cleaner form of energy can bring much relief to an environment that is fast showing signsof disasters. With a huge population that relies heavily on road transport, being a part of the change can mean doing much for the environment and future generations.

Purchasing an electric vehicle is costlier than buying an internal combustion engine vehicle, but that is only because of the higher upfront cost. Effective cost over the lifetime for electric vehicles is still less. The government offers different types of financial incentives to make electric vehicles more affordable. The key mechanisms for getting incentives are:

- Purchase Incentives**:** Direct discount provided to the user on the cost of the electric vehicle
- Coupons**:** Financial incentive where the amount is reimbursed later
- Interest Subventions**:** Discount offered on the interest rate while availing loan
- Road tax exemption**:** Road tax at the time of purchase is waived off
- Registration fee exemption**:** One-time registration fee applicable on new vehicle purchase is waived off
- Income tax benefit**:** Provided as a deduction on the tax amount payable by an individual to the government
- Scrapping incentives**:** Provided upon de-registering old Petrol and Diesel Vehicles
- Others: Incentives such as interest-free loans, top-up subsidies, special incentives on electric three-wheelers, etc. can also be availed

3.6.4 National Incentives:

FAME, or Faster Adoption and Manufacturing of (Hybrid and) Electric vehicles, is currently India's flagship scheme for promoting electric mobility. Currently in its 2nd phase of implementation, FAME-II is being implemented for a period of 3 years, eff. 1st April 2019 with a budget allocation of 10,000 Cr. The incentives offered in the scheme are:

Total approximate incentives	Approximate size of battery
Two wheelers: Rs 15000/- per kWh up to 40% of the cost of Vehicles	**Two wheelers:** 2 kWh
Three wheelers: Rs 10000/- per kWh	**Three wheelers:** 5 kWh
Four wheelers: Rs 10000/- per kWh	**Four wheelers:** 15 kWh
E Buses: Rs 20000/- per kWh	**E Buses:** 250 kWh
E Trucks: Rs 20000/- per kWh	

3.6.5 State EV policies

To assist national initiatives relating to electric mobility numerous states have implemented their own EV regulations to enhance a sustainable future. State policies exist in 50% of the states. The state EV policies include:

- Financial incentives for EV purchases, exemption from road taxes and car registration fees, and low loan interest rates for EV purchases.
- Initiatives to buy more electric vehicles are also included for last-mile delivery services and public transportation.
- Infrastructures for producing batteries for EVs and accompanying charging infrastructures are being built.

Vision of Kerala EV Policy

1. Support the national commitment to reduce GHG emissions
2. Improving the air quality, especially in the cities
3. Promoting shared mobility and clean in transportation
4. Balancing of peak and off-peak power demand for the electric utility
5. Operational efficiency and savings for the transport utility (KSRTC) as well as the transport sector
6. Strategic intent to boost hardware and software manufacturers in the State

The policy outlines special incentives and concessions to attract investments in EV manufacturing and infrastructure, which includes:
Kerala has targeted an EV plan which aims at rolling 1 million electric vehicles by 2022 including:

- 3,000 buses
- 2 lakh two-wheelers
- 50.000 three-wheelers
- 1.000 goods carriers
- 100 ferries as part of the pilot fleet.
- The government will build the charging infrastructure with the NTPC and Energy Efficient Services Ltd (EESL)

- Besides the plan of launching electric vehicle fleet, Kerala Government is also planning to create E-mobility zones in tourist spots including Kovalam, Munnar and Bekal alongside the Secretariat. Technopark and Infopark

3.7 Government planned phases to make e-mobility a reality in the state

1. Pilot phase
- KSRTC buses on pilot routes.
- Aggressive procurement of EVs for the State Govt. use
- identify electric four-wheeler fleets-CIAL taxis, Govt. fleets
- Kochi metro Feeder vehicles go electric
- Establish a nucleus of charging and swapping stations
- Charging and swapping stations for pilot bus routes
- Launch awareness campaign
- Set up EV Mission
- Set up EV promotion fund
- Set up 'Directorate of Mobility' & 'State Mobility Fund
2. Scale-up phase:
    - Bouquet of incentives for market-based action
    - Expand routes for e-Buses
    - Promote electrification of all paratransit,2-wheeler delivery vehicles and small freight vehicles
3. Self-propelled phase:
    - Withdraw bouquet of incentives and tighten regulations for only EV registration and operation

3.8 Customer satisfaction

On this subject, numerous studies have been conducted. Customer satisfaction is defined as a response to a specific issue that occurs at a certain time. Satisfaction can be achieved in a variety of ways. Post-purchase satisfaction is most typically measured. It’s a general assessment of the buy. It is described as an emotion experienced through the acquisition and use of a product. In measure, there are primarily two notions. Specific or cumulative effects are possible. According to a specific method, contentment is a measure of a user’s experience

when using a product or receiving services. When making a satisfaction judgement, cumulative measurement refers to how an individual analyses his or her earlier experience and purchases with the company. The majority of the authors consider contentment to be an emotional reaction. The intensity of an emotional reaction is determined by the circumstances. Satisfaction elicits a wide range of emotions, from strong ones like enthusiasm to milder ones like indifference or relief. It is the buyer's cognitive state that determines satisfaction in the case of cognition. Satisfaction can be a combination of cognitive and emotional factors. This response is frequently focused on one's contentment, and the object is usually compared to some standard to arrive at a satisfaction judgement. There is no customer who knows if satisfaction is an outcome or a process. In the context of the outcome, satisfaction is defined as a reaction to an event. Satisfaction is defined as an evaluative process from the process standpoint.

3.9 Consumer Perception

According to the Business Dictionary, consumer perception or customer perception is a "Marketing concept that encompasses a customer's impression, awareness, or consciousness about a company or its offerings."

Customer perception is a "Process during which an individual acquires knowledge about the environment and interprets the information according to his/her needs, requirements and attitudes." – as defined by F.G. Crane and T.K. Klarke (1994), G.D. Harrell, G.L. Frazier (1998). Customer perception is a process where a customer collects information about a product and interprets the information to make a meaningful image about a particular product.When a customer sees advertisements, promotions, customer reviews, social media feedback, etc. relating to a product, they develop an impression about the product. The entire process of customer perception starts when a consumer sees or gets information about a particular product. This process continues until the consumer starts to build an opinion about the product. Everything that a company does will affect customer perception. The way the products are positioned in a retail store, the colors and shapes in the logo, the advertisements, the discounts, everything impacts the customer perception.

3.9.1 Factors influencing customer perception.

In general, customer perception can be influence by a lot of factors. Some of the major factors are,

• Consistency of performance – How has the brand performed in the past and how it is performing currently.

• Emotional connect – Superb brands know that emotional connection with the customer is critical to brand development.

• Marketing communications – How the brand communicates with the customers using the various media vehicles.

• Holistic marketing – A brand cannot be excellent if it has good sales staff but pathetic support staff. A brand has to be a good all rounder and satisfy customers from all its touch points.

• Personal experience – Personal experience is one of the most important influencers that can easily have a direct impact on customer perception. Our personal experiences matter most. When a customer experiences a good service or purchases a great product, the quality of goods and services matter.

• Advertising – Promotional campaigns are an integral part of any organization. It takes important steps to create advertisements that can change the perception about a brand easily.

• Influencers – We all are surrounded by several influencers that have a direct and indirect impact on your mindset. It can change customer perception at the drop of a hat.

• Social media platforms – This is the age of technology where most people are on one or the other social media portal browsing to their heart's content. When you read reviews or comments about particular products services of a brand, your subconscious mind automatically takes a decision.

3.9.2 Four distinct stages of consumer perception

Sensation

Sensation describes what happens when a person's senses are initially exposed to the external stimulus of a product. Through sight, sound, smell, taste and texture the sensory receptors of a consumer are engaged by product or brand cues. For example, Starbucks engages all the senses in its sensory brand marketing. A customer who enters a Starbucks coffee shop may hear the sounds and smell the aroma of the grinding of fresh coffee in the store with background music and a unique store design round out the experience of the taste of hot or cold coffee and food products that can be enjoyed in-store at quaint cafe tables.

Attention

To the external stimulus from a product or brand in consumer information processing, attention occurs when a person lingers and gives mental processing capacity. Selective perception is when a consumer pays attention to messages that are consistent with her attitudes, beliefs and needs. The consumer will withdraw attention when a product is inconsistent with these factors.

Interpretation

From a product or brand marketing interpretation occurs when a person assigns a meaning to the sensory stimulus. Comprehension is aided by expectations and familiarity. To retrieve previous experiences with the brand or a similar brand a consumer scans his memory. Stage when product packaging design contains logos, colours and other elements that are similar to national brands that consumers are generally more familiar with storebrand marketing frequently capitalizes on the interpretation.

Retention

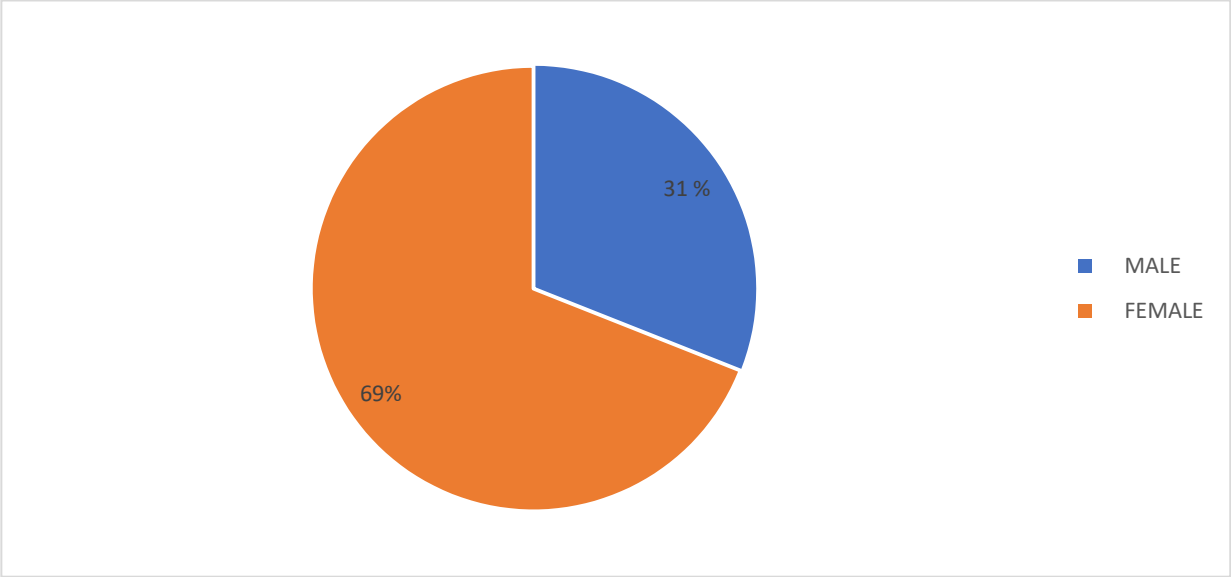
The conclusion of the consumer perception process is the retention stage and it marked by the storage of product or brand information in short-term and long-term memory. The information about the product or brand into long-term memory is the marketer's goal to provide positive stimuli in the proceeding stages that translate into consumers storing.

TABLE 4.1 GENDER OF THE RESPONDENT

GENDER	RESPONSES	PERCENTAGE
MALE	31	31
FEMALE	69	69
TOTAL	100	100

(Source: Primary Data)

FIGURE 4.1 GENDER OF THE RESPONDENTS



Inference:

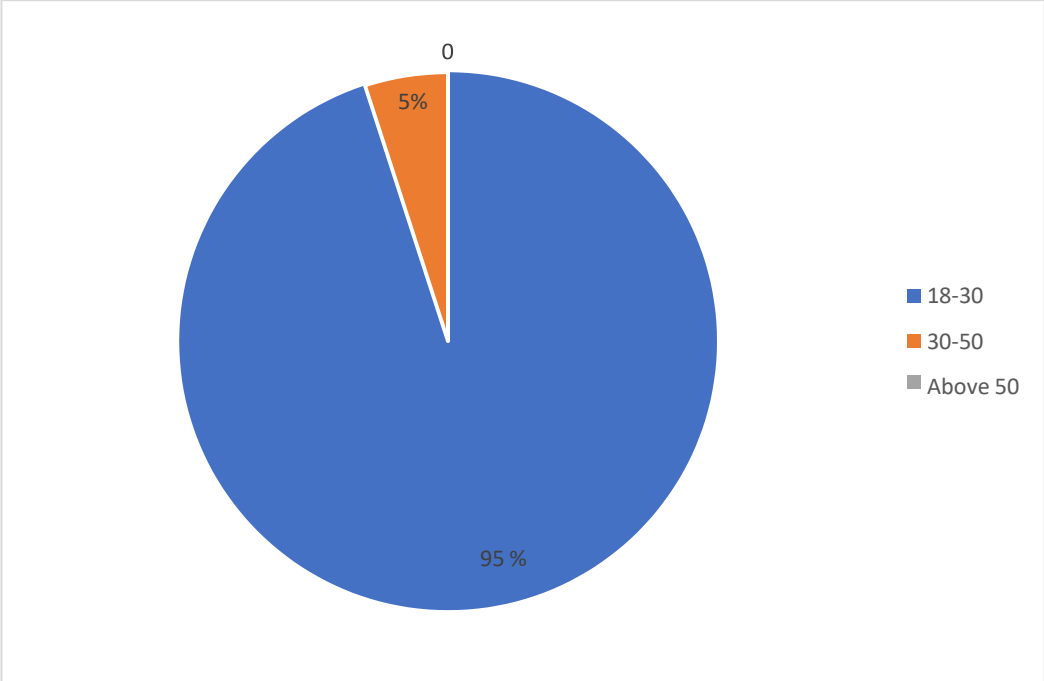
Fig 4.1 shows, that majority of the respondents are female. They accounted for 69% of the total respondents. It was found that 31% of the respondents are male. It is clear from the table that majority of the respondents are female.

TABLE 4.2 AGE OF THE RESPONDENT

AGE	NUMBER OF RESPONDENTS	PERCENTAGE
18-30	95	95
30-50	5	5
Above 50	0	0
TOTAL	100	100

(Source: Primary Data)

FIGURE 4.2 AGE OF THE RESPONDENTS



Inference

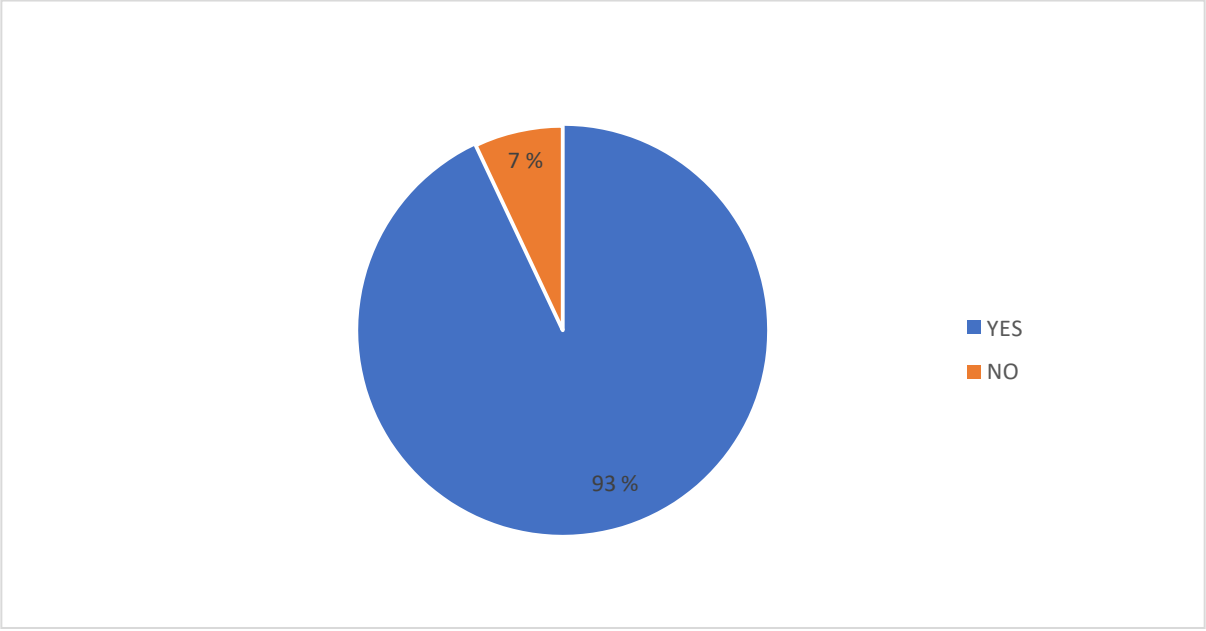
Fig 4.2 reveals that, majority of the respondents are in the age between 18-30. They accounted for 95% of the total respondents. It is shown that 5% of the respondents are in the age group of 30-50. No respondents come above the age of 50. From this table it is clear that majority of the respondents are in the age group of 18-30.

TABLE 4.3 AWARENESS OF RESPONDENTS TOWARDS ELECTRIC VEHICLES

AWARENESS	NUMBER OF RESPONDENTS	PERCENTAGE
AWARE	93	93
NOT AWARE	7	7
TOTAL	100	100

(Source: Primary Data)

FIGURE 4.3 AWARENESS OF RESPONDENTS TOWARDS ELECTRIC VEHICLES



Inference:

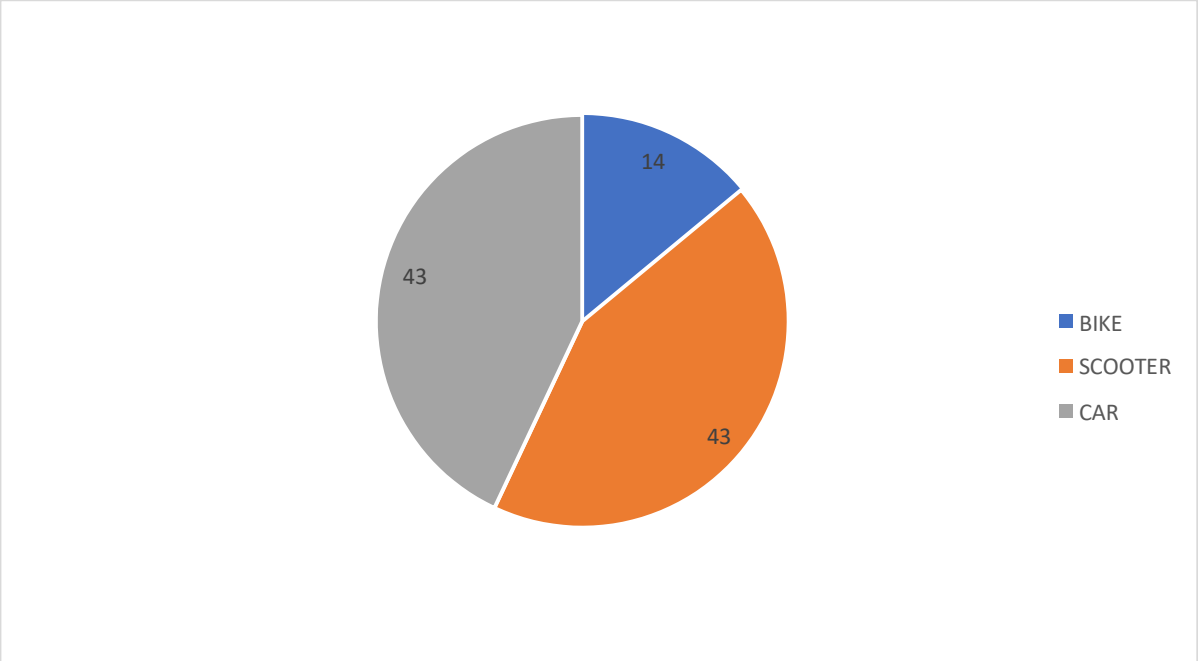
Fig 4.3 shows, majority of the respondents are aware about electric vehicles, about 93% of the total respondents are aware about e-vehicles. Only 7% of the respondents are not aware of E-vehicles.

TABLE 4.4 TYPES OF E- VEHICLES PREFERRED

TYPE OF VEHICLE	NUMBER OF RESPONDENTS	PERCENTAGE
BIKE	14	14
SCOOTER	43	43
CAR	43	43
TOTAL	100	100

(Source: Primary Data)

FIGURE 4.4 TYPES OF E- VEHICLES PREFERRED



Inference:

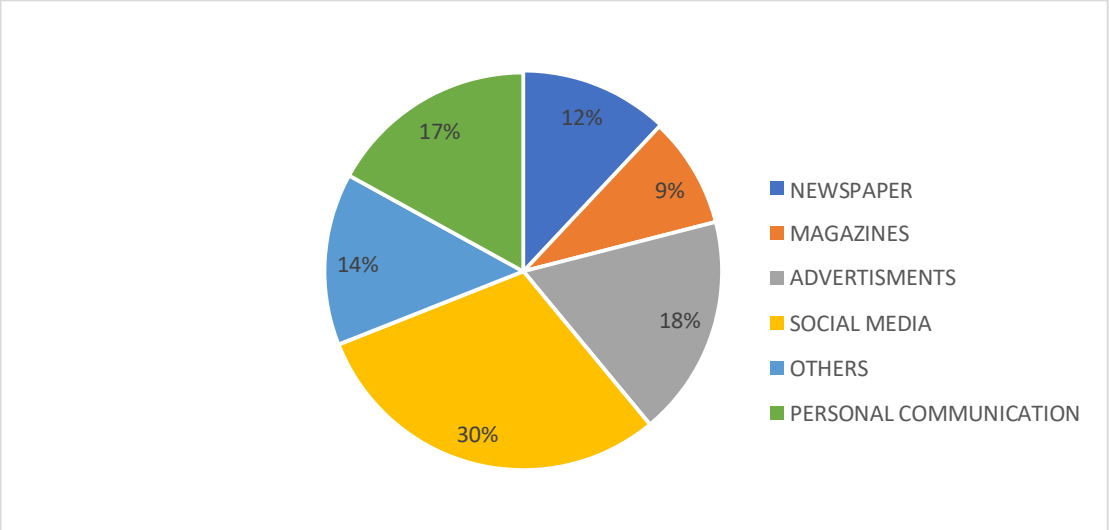
From 4.4 it is analyzed that majority of the respondents prefer both scooter and car as electric vehicle model. 43 of the total respondents chose scooter, and another 43 respondents chose car. Out of the total respondents 14 respondents prefer bike as the model. It is clear from the table that majority of the respondents prefer both scooter and car as e-vehicle model.

TABLE 4.5 AWARENESS REGARDING E-VEHICLES

SOURCE	NUMBER OF RESPONDENTS	PERCENTAGE
NEWSPAPER	24	12
MAGAZINES	16	9
ADVERTISMENTS	37	18
SOCIAL MEDIA	58	30
OTHERS	27	14
PERSONAL COMMUNICATION	34	17
TOTAL	196	100

(Source: Primary Data)

FIGURE 4.5 AWRENESS REGARDING E-VEHICLES



Inference:

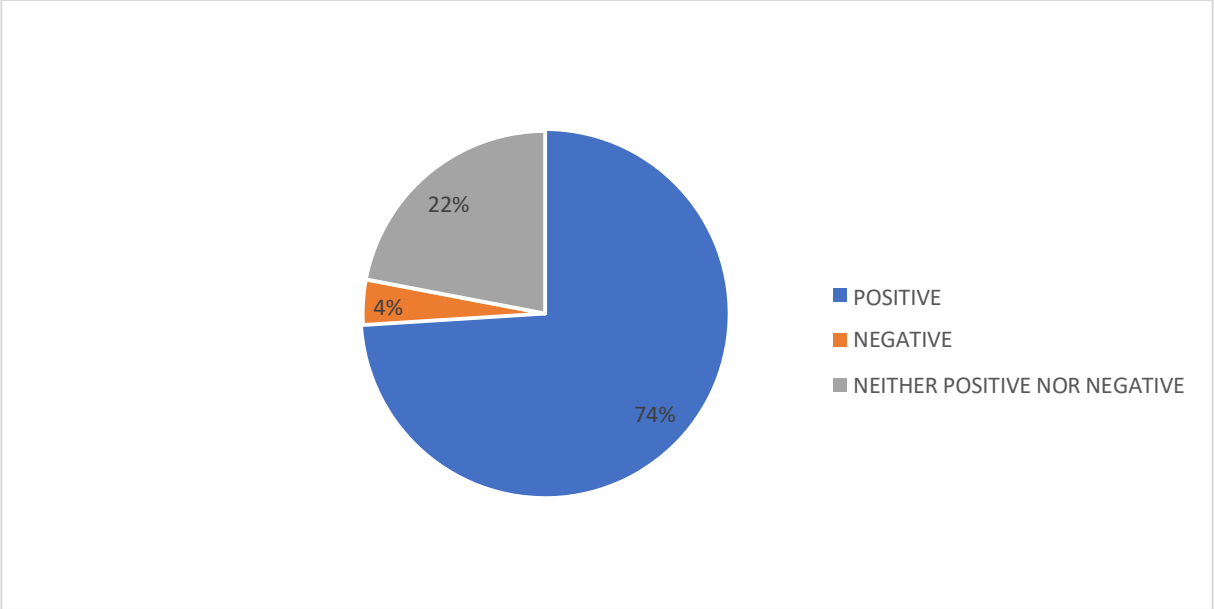
Fig 4.5 shows, majority of the respondents chose social media as the source of awareness regarding e-vehicles. They accounted for 30% of the total respondents, whereas 18% of the respondents are aware about e-vehicles through advertisments,17% through personal communication, 14% through other sources and 12% through newspapers and a very few respondents of 9% are aware through magazines. From this majority are aware about e-vehicles through social media.

TABLE 4.6 ATTITUDE TOWARDS E-VEHICLES

ATTITUDE	NUMBER OF RESPONDENTS	PERCENTAGE
POSITIVE	74	74
NEGATIVE	4	4
NEITHER POSITIVE NOR NEGATIVE	22	22
TOTAL	100	100

(Source: Primary Data)

FIGURE 4.6 ATTITUDE TOWARDS E-VEHICLES



Inference:

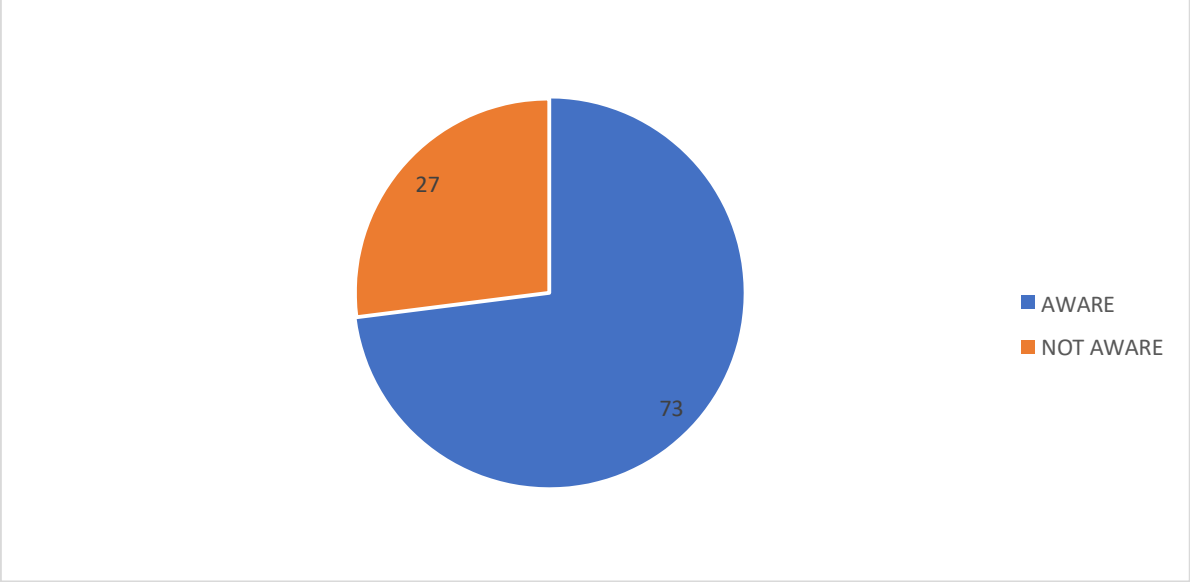
From fig 4.6 it is inferred that majority of the respondents have positive attitude towards e-vehicles. They accounted for 74% of the total respondents.22% have neither positive nor negative attitude towards e-vehicles whereas 4% of the total respondents has negative attitude. It is clear from the table that majority of the respondents have a positive attitude towards e-vehicles.

TABLE 4.7 AWARENESS ABOUT CHARGING STATIONS

ATTRIBUTES	NUMBER OF RESPONDENTS	PERCENTAGE
AWARE	73	73
NOT AWARE	27	27
TOTAL	100	100

(Source: Primary Data)

FIGURE 4.7 AWARENESS ABOUT CHARGING STATIONS



Inference:

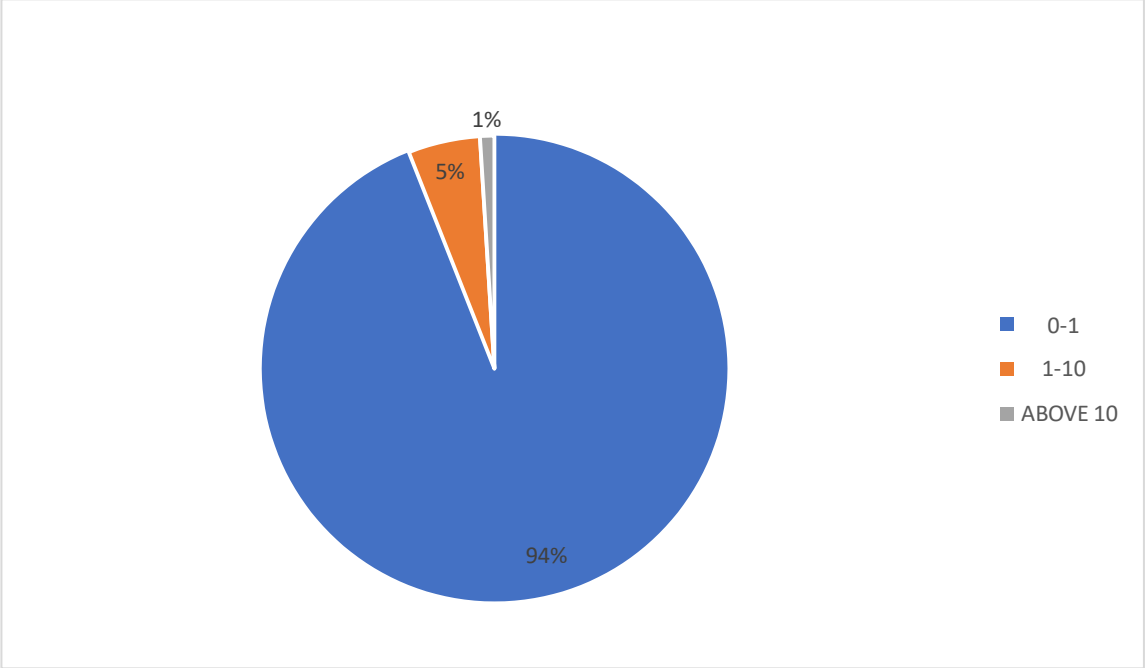
Fig 4.7 shows that, majority of the respondents are aware about the charging stations near their locality, They accounted for 73 of the total respondents ,whereas 27 of the respondents are not aware of the charging stations near their locality. It is clear from the table that, majority of the users are aware of the charging stations.

TABLE 4.8 USAGE OF E-VEHICLES (YEARS)

YEARS	NUMBER OF RESPONDENTS	PERCENTAGE
0-1	94	94
1-10	5	5
ABOVE 10	1	1
TOTAL	100	100

(Source: Primary Data)

FIGURE 4.8 USAGE OF E-VEHICLES (YEARS)



Inference:

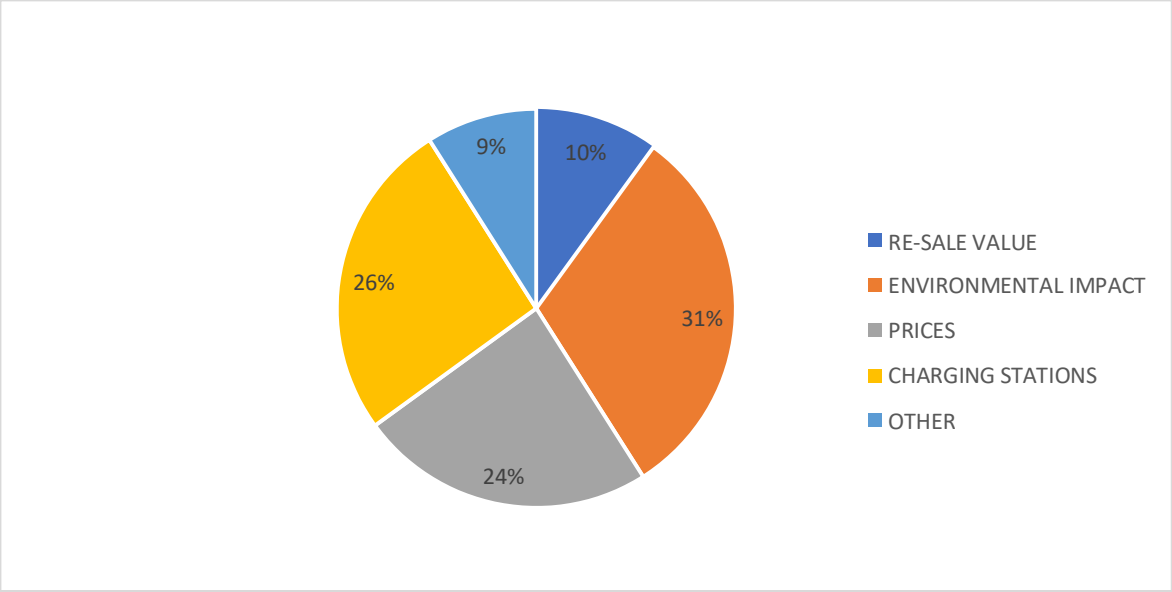
Fig 4.8 shows that majority of the respondents have been using e-vehicles from 0-1 year. They accounted for 94% of the total respondents. whereas 5% of the respondents have been using e-vehicle from 1-10 years, and only a small percentage of respondents comprising of 1% have been using e-vehicle more than 10 years. It is found that majority of the respondents either have no electric vehicles or have been using them not more than 1 year.

TABLE 4.9 FACTORS CONSIDERED WHILE BUYING E-VEHICLES

FACTORS	NUMBER OF RESPONDENTS	PERCENTAGE
RE-SALE VALUE	19	10
ENVIRONMENTAL IMPACT	62	31
PRICE	48	24
CHARGING STATIONS	52	26
OTHER	18	9
TOTAL	199	100

(Source: Primary Data)

FIGURE 4.9 FACTORS CONSIDERED WHILE BUYING E-VEHICLES



Inference:

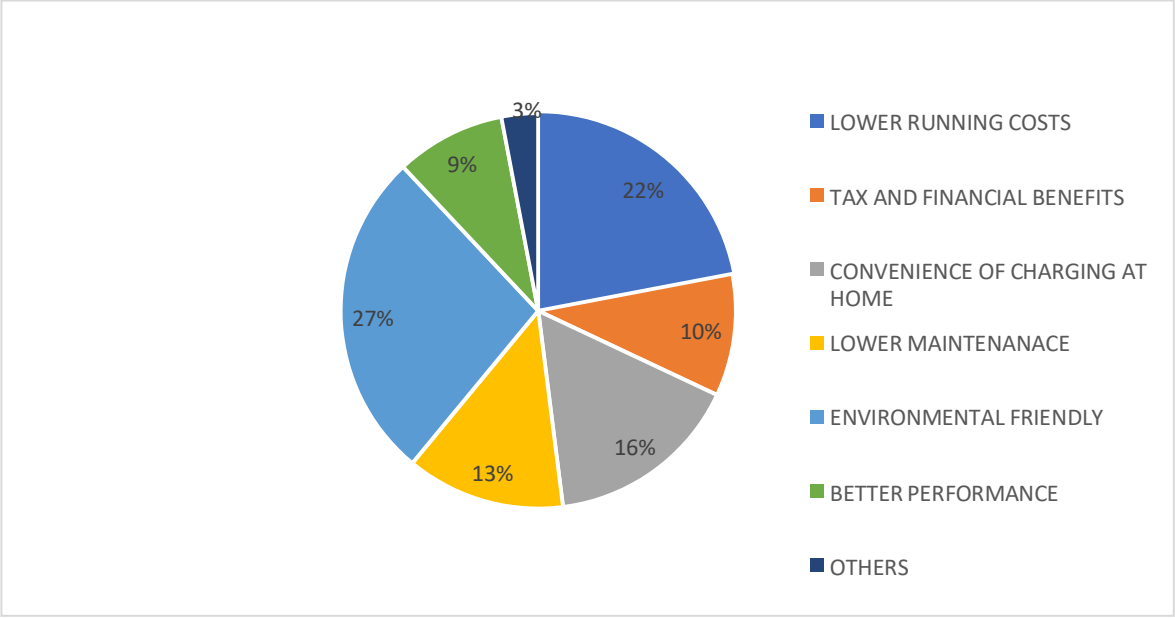
Fig 4.9 shows, majority of the respondents considered the factor environmental impact while buying e-vehicles, they accounted for 31% of total respondents, whereas 26% considered the factor of charging stations. 24% of the respondents considered price as a factor whereas 10% considered the re-sale value of e-vehicles while purchasing, and 9% considered other factors while buying an e-vehicle. It is clear that most of the respondents considered environmental impact rather than prices while buying e -vehicles.

TABLE 4.10 BENEFITS OF E-VEHICLES OVER FUEL VEHICLES.

ATTRIBUTE	NUMBER OF RESPONDENTS	PERCENTAGE
LOWER RUNNING COSTS	60	22
TAX AND FINANCIAL BENEFITS	27	10
CONVENIENCE OF CHARGING AT HOME	45	16
LOWER MAINTENANACE	36	13
ENVIRONMENTAL FRIENDLY	73	27
BETTER PERFORMANCE	25	9
OTHERS	7	3
TOTAL	273	100

(Source: Primary Data)

FIGURE 4.10 BENEFITS OF E-VEHICLES OVER FUEL VEHICLES



Inference:

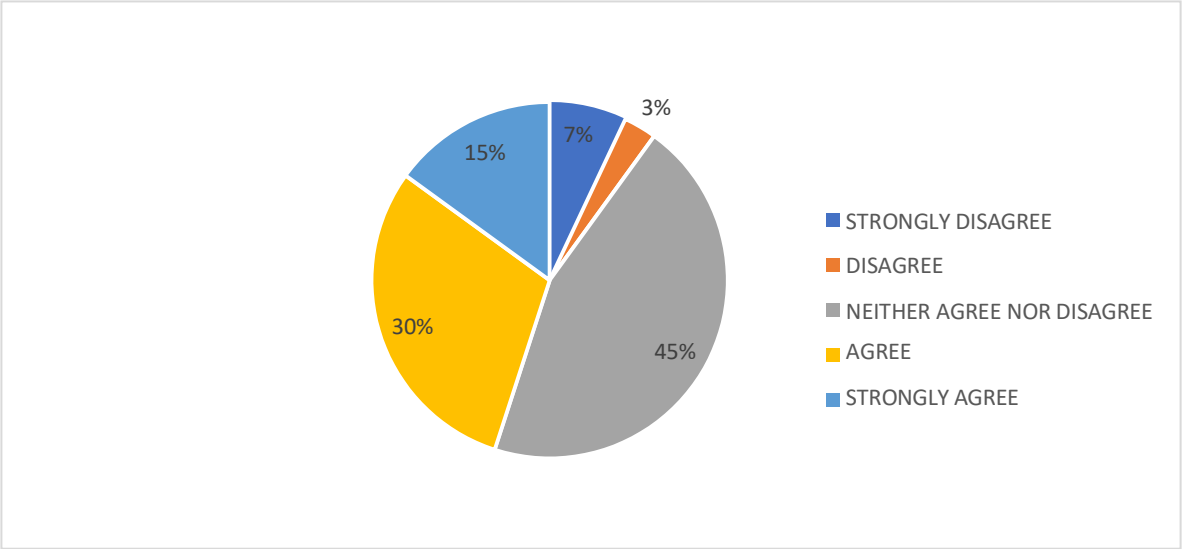
Fig 4.10 reveals that majority of the respondents considered the advantage of environmental friendly. They accounted for 27% of the total respondents whereas, It was found that 22% of the respondents considered the advantage of lower running costs of e-vehicles.16% of the total respondents consider the advantage of convenience of charging at home while 13% of the respondents chose the advantage of lower maintenance as the advantage whereas 10% considered the advantage of tax and financial benefits, and 9% considered the advantage of better performance and 3% of the respondents chose other. Majority of the respondents chose environmental friendly as the advantage rather than all other factors.

TABLE 4.11 OPINION ABOUT E-CARS CAN SAVE A LOT OF MONEY TO THE OWNER.

ATTRIBUTES	NUMBER OF RESPONDENTS	PERCENTAGE
STRONGLY DISAGREE	7	7
DISAGREE	3	3
NEITHER AGREE NOR DISAGREE	45	45
AGREE	30	30
STRONGLY AGREE	15	15
TOTAL	100	100

(Source: Primary Data)

FIGURE 4.11 OPINION ABOUT E-CARS CAN SAVE A LOT OF MONEY TO THE OWNER.



Inference:

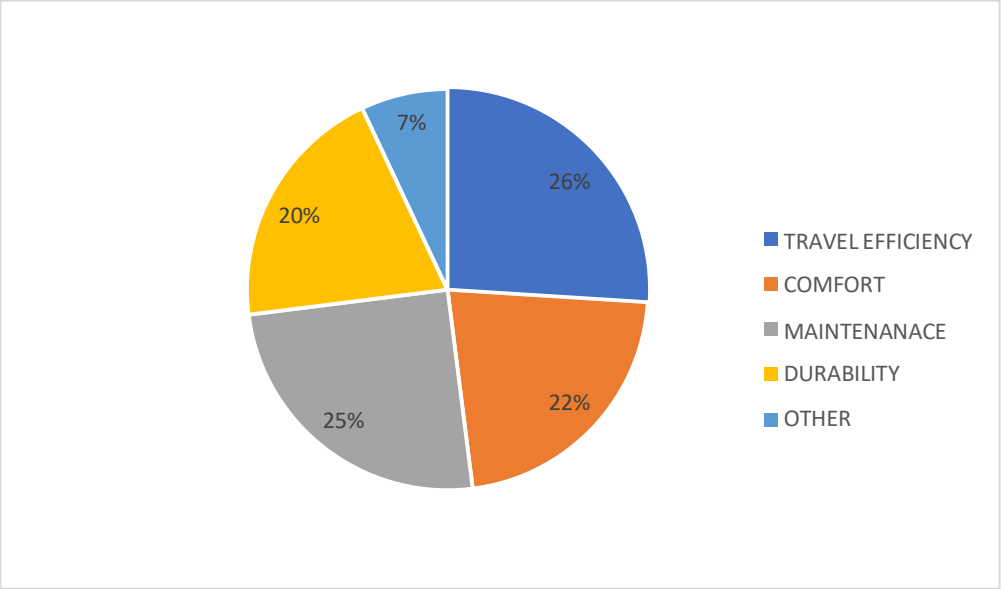
Fig 4.11 shows that 7% of the respondents strongly disagree to the statement (electric cars can save a lot of money to the owner), whereas 3% disagree,45% is neither agree nor disagree, 30% agrees and 15% strongly agrees. It is clear from the chart that majority of the respondents have neutral response towards this statement.

TABLE 4.12 EXPECTATION OF RESPONDENTS ABOUT ELECTRIC VEHICLES

CHANGES EXPECTED	NUMBER OF RESPONDENTS	PERCENTAGE
TRAVEL EFFICIENCY	41	26
COMFORT	36	22
MAINTENANACE	40	25
DURABILITY	32	20
OTHER	12	7
TOTAL	161	100

(Source: Primary Data)

FIGURE 4.12 EXPECTATION OF RESPONDENTS ABOUT ELECTRIC VEHICLES



Inference:

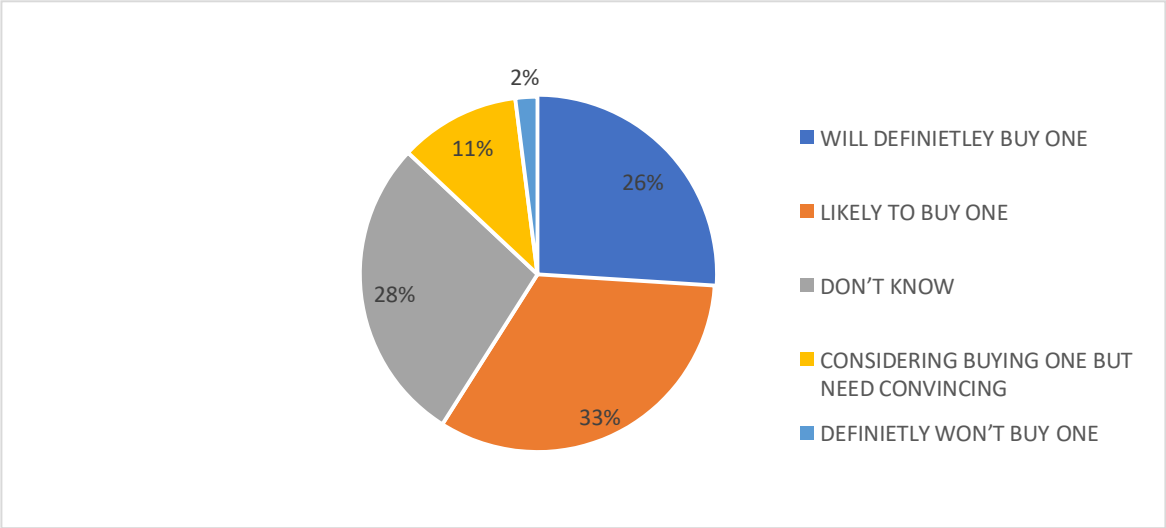
Fig 4.12 shows that 26%of the respondents chose travel efficiency, 22% chose Comfort, whereas 25% chose Maintenance, 20 % chose Durability and 7% of the respondents chose other factors.

TABLE 4.13 ADOPTION OF ELECTRIC VEHICLES IN FUTURE

ATTRIBUTES	NUMBER OF RESPONDENTS	PERCENTAGE
WILL DEFINIETLEY BUY ONE	26	26
LIKELY TO BUY ONE	33	33
DON'T KNOW	28	28
CONSIDERING BUYING ONE BUT NEED CONVINCING	11	11
DEFINIETLY WON'T BUY ONE	2	2
TOTAL	100	100

(Source: Primary Data)

FIGURE 4.13 ADOPTION OF ELECTRIC VEHICLES IN FUTURE



Inference:

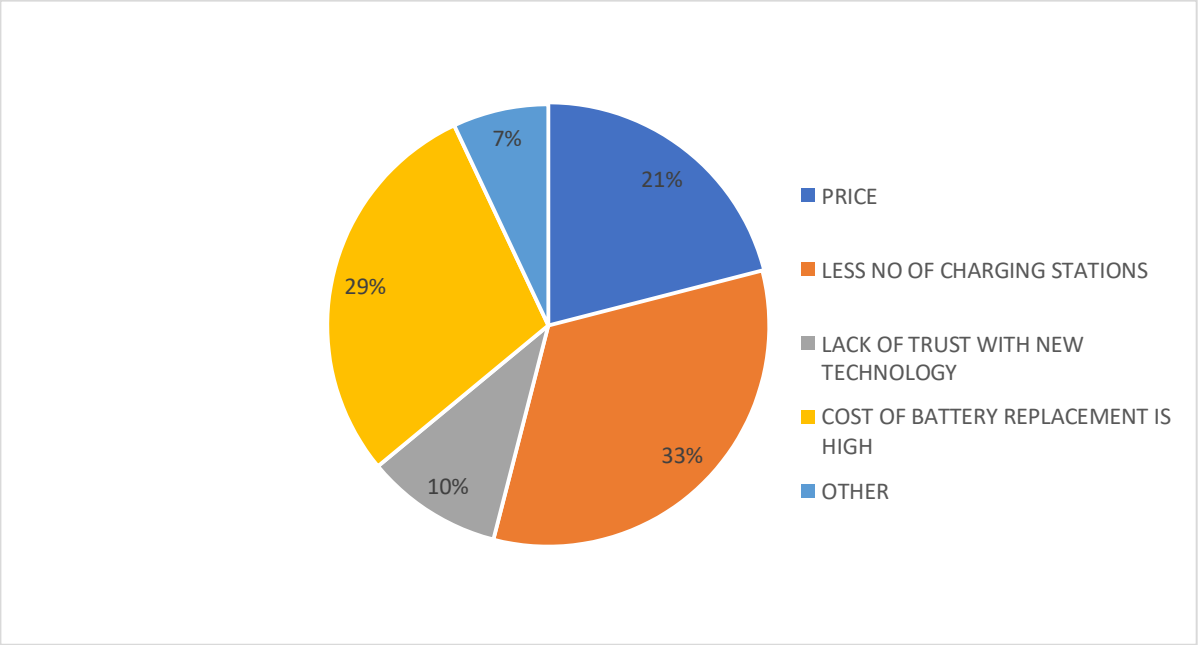
Fig 4.13 shows that 26% of the respondents considered buying one, 33% likely to buy one, 28% does not consider buying one, 11% consider buying one but need convincing, 2% do not consider buying one. It is clear from the table that, Majority of the respondents are considering buying an e-vehicle.

TABLE 4.14 FACTORS DISCOURAGING FROM USING E-VEHICLES.

FACTORS DISCOURAGING	NUMBER OF RESPONDENTS	PERCENTAGE
PRICE	32	21
LESS NO OF CHARGING STATIONS	51	33
LACK OF TRUST WITH NEW TECHNOLOGY	16	10
COST OF BATTERY REPLACEMENT IS HIGH	46	29
OTHER	11	7
TOTAL	156	100

(Source: Primary Data)

FIGURE 4.14 FACTORS DISCOURAGING FROM USING E-VEHICLES.



Inference:

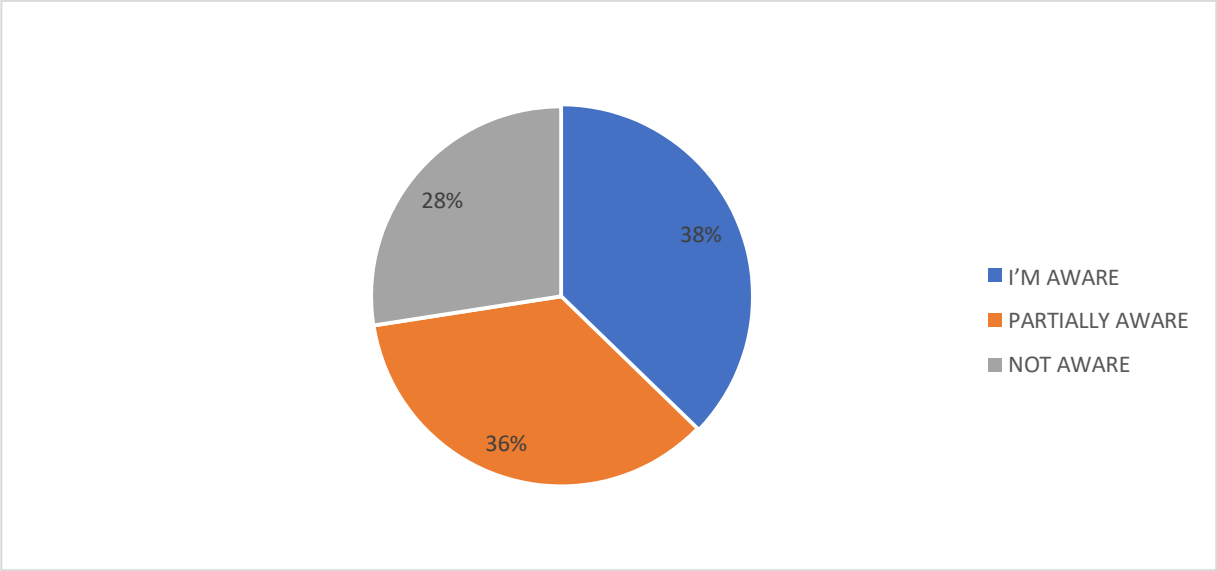
Fig 4.14 shows that 21% of the total respondents chose price as the discouraging factor while purchasing e-vehicle, whereas 33% of the respondents chose less no of charging station as a discouraging factor, 10% of the respondents find it difficult to trust the new technology and hence are discouraged in buying, 29% states that the cost of replacement is high, and 7% of the respondents chose other factors as discouraging**.** So lesser no of charging stations and high replacement cost is the most discouraging factors.

TABLE 4.15 AWARENESS ABOUT THE SUBSIDIES PROVIDED BY THE GOVERNMENT FOR PURCHASING E- VEHICLE

ATTRIBUTES	NUMBER OF RESPONDENTS	PERCENTAGE
I'M AWARE	38	38
PARTIALLY AWARE	36	36
NOT AWARE	28	28
TOTAL	100	100

(Source: Primary Data)

FIGURE 4.15 AWARENESS ABOUT THE SUBSIDIES PROVIDED BY THE GOVERNMENT FOR PURCHASING E- VEHICLE.



Inference:

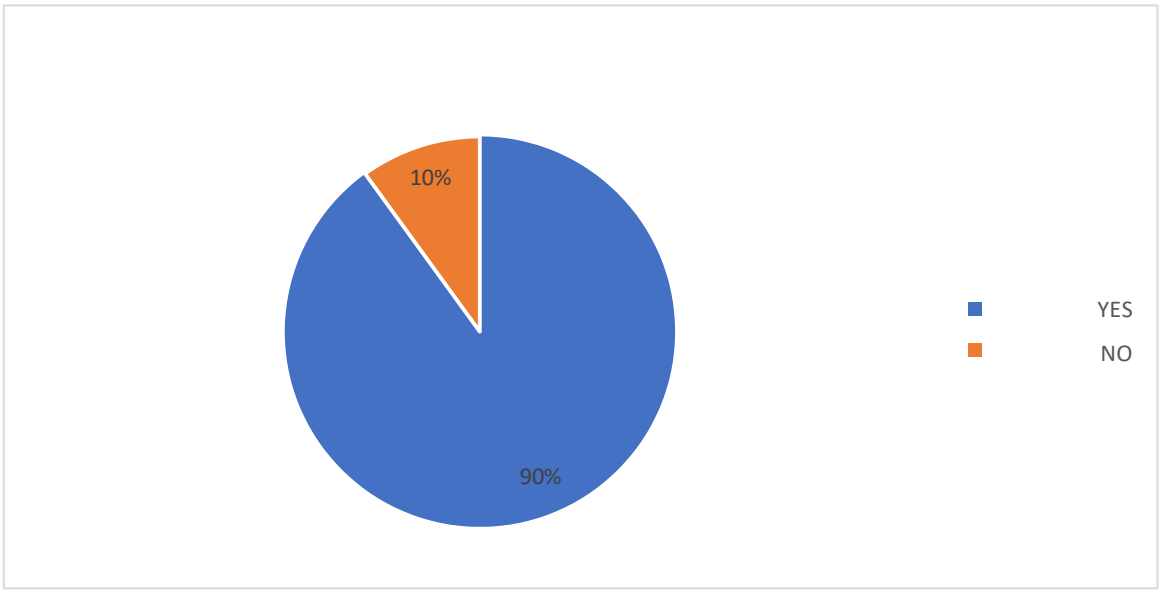
Fig 4.15 shows that 38% of the total respondents are aware of the subsidies provided by the government, whereas 36% are partially aware and 28% of the respondents are not aware. It is clear that Majority of the respondents are aware of the subsidies provided by the government while making an e-vehicle purchase.

TABLE 4.16 AWARENESS REGARDING THE 50% TAX DISCOUNT OR DEDUCTION FOR THE FIRST FIVE YEARS

AWARENESS	NUMBER OF RESPONDENTS	PERCENTAGE
YES	34	34
NO	66	66
TOTAL	100	100

(Source: Primary Data)

FIGURE 4.16 AWARENESS REGARDING THE 50% TAX DISCOUNT OR DEDUCTION FOR THE FIRST FIVE YEARS



Inference:

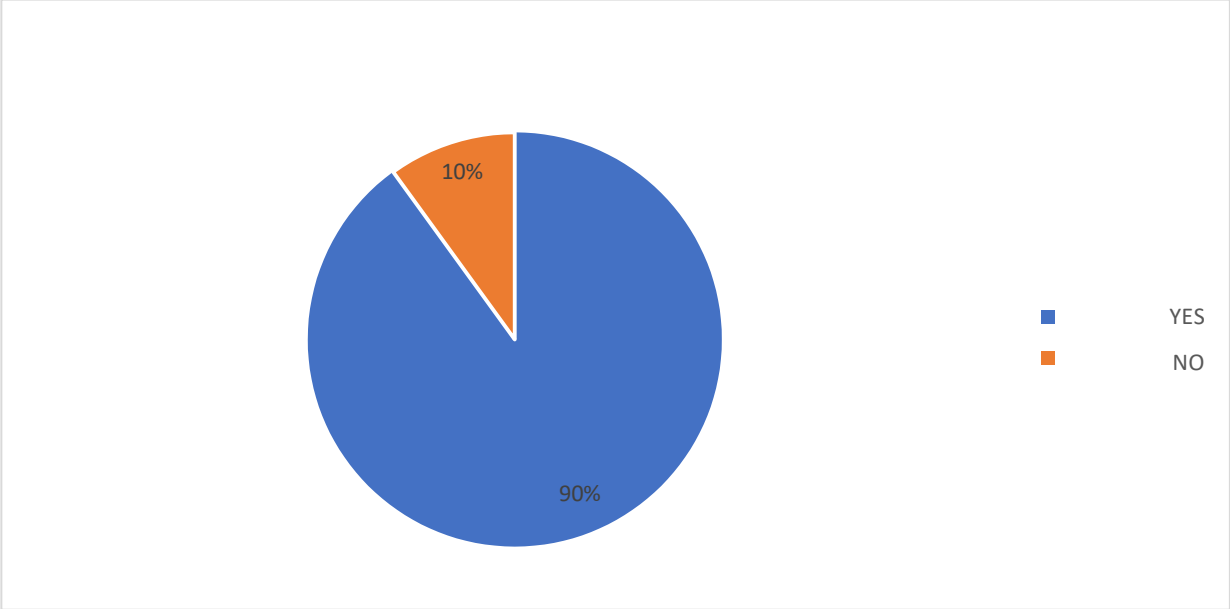
Fig 4.16 shows that 66% of the total respondents are not aware regarding the 50 percent tax discount rate which is provided for the first five years by the government to the e-vehicle users, whereas 34% of the respondents are aware.

TABLE 4.17 INTENTION OF PURCHASING E-VEHICLE ON GETTING SUBSIDIES

OPTIONS	NUMBER OF RESPONDENTS	PERCENTAGE
YES	90	90
NO	10	10
TOTAL	100	100

(Source: Primary Data)

FIGURE 4.17 INTENTION OF PURCHASING E-VEHICLE ON GETTING SUBSIDIES



Inference:

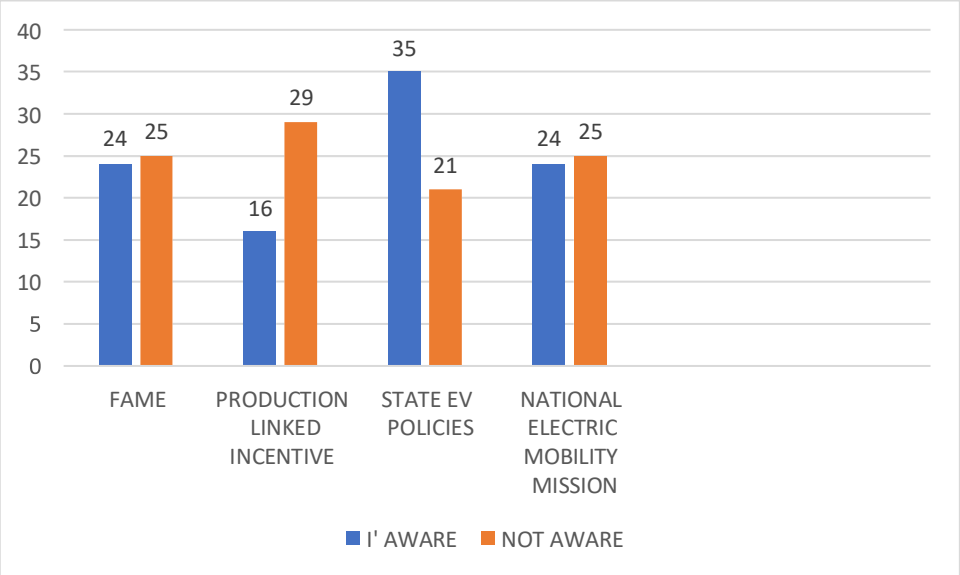
Fig 4.17 shows that 90% of the total respondents consider buying an e-vehicle if subsidies are provided, whereas 10% of the respondents do not consider buying an e-vehicle even though subsidies are provided.

TABLE 4.18 AWARENESS REGARDING THE VARIOUS GOVERNMNET INITIATIVES.

NAME OF INITIATIVES	ATTRIBUTES		PERCENTAGE	
	I'M AWARE	NOT AWARE	I'M AWARE	NOT AWARE
FASTER ADOPTION AND MANAFACTURING OF HYBRID VEHICLES(FAME)	30	70	24	25
PRODUCTION LINKED INCENTIVE	20	80	16	29
STATE E-VEHICLE POLICIES	43	57	35	21
NATIONAL ELECTRIC MOBILITY MISSION PLAN(NEMMP)	30	70	24	25
TOTAL	123	277	100	100

(Source: Primary Data)

FIGURE 4.18 AWARENESS REGARDING THE VARIOUS GOVERNMNET INITIATIVES.



Inference:

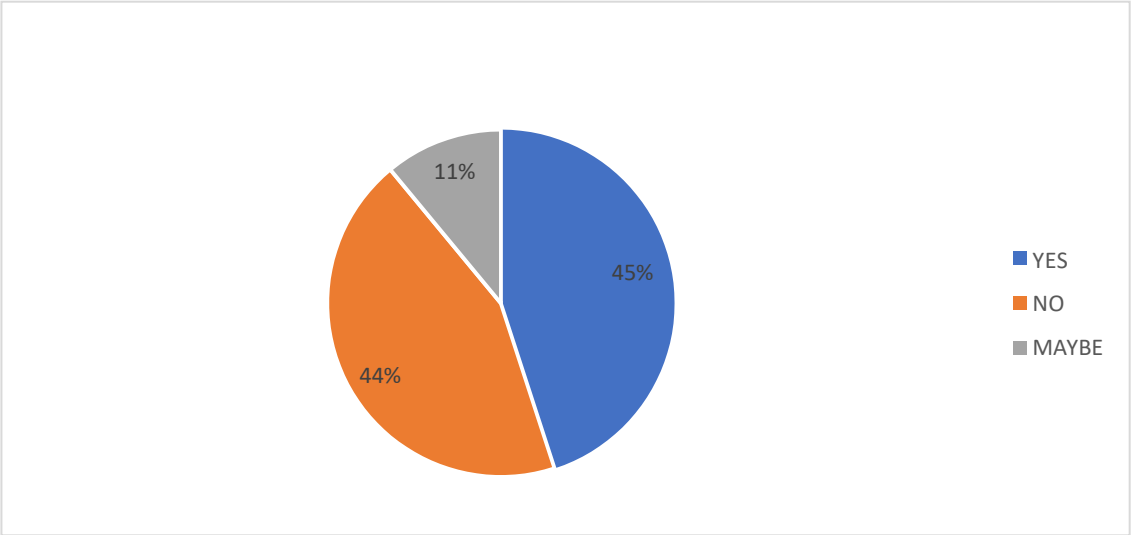
Fig 4.18 shows that 24% of the respondents are aware of the government policy known as "FAME "and 25% are not aware of such policy. It is found that 16% of the respondents are aware of the policy named production linked incentive while a major proportion of the respondents as of 29% are not even aware of such incentive. It is clear from the chart that a majority of the respondents as of 35% are aware of various state e-vehicle policies but 21% of the respondents are not aware of such policy. It is found that 24% are aware regarding the policy named as National electric mobility mission plan (NEMMP) whereas 25% of the respondents are not aware of the same.

TABLE 4.19 E- VEHICLES ARE PREFERRED OVER REGULAR VEHICLES

OPTIONS	NUMBER OF RESPONDENTS	PERCENTAGE
YES	45	45
NO	44	44
MAYBE	11	11
TOTAL	100	100

(Source: Primary Data)

FIGURE 4.19 E- VEHICLES ARE PREFERRED OVER REGULAR VEHICLES



Inference:

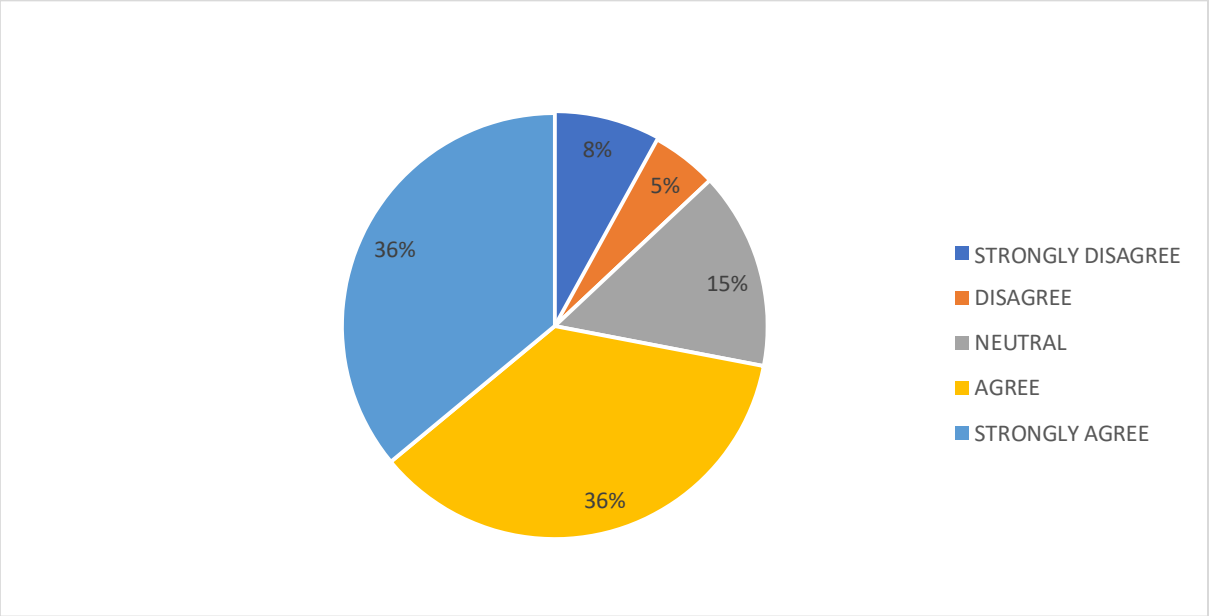
Fig 4.19 shows that 45% of the total respondents consider buying an e-vehicle rather than regular vehicle, 44% of the respondents also chose maybe as the option as they may be considering other factors while buying an e-vehicle and only 11% of the respondents consider not buying an e-vehicle over regular vehicles.

TABLE 4.20 OPTION REGARDING ELECTRIC VEHICLES ARE MORE ECO- FRIENDLY THAN OTHERS.

ATTRIBUTES	NUMBER OF RESPONDENTS	PERCENTAGE
STRONGLY DISAGREE	8	8
DISAGREE	5	5
NEITHER AGREE NOR DISAGREE	15	15
AGREE	36	36
STRONGLY AGREE	36	36
TOTAL	100	100

(Source: Primary Data)

FIGURE 4.20 OPTION REGARDING ELECTRIC VEHICLES ARE MORE ECO- FRIENDLY THAN OTHERS.



Inference:

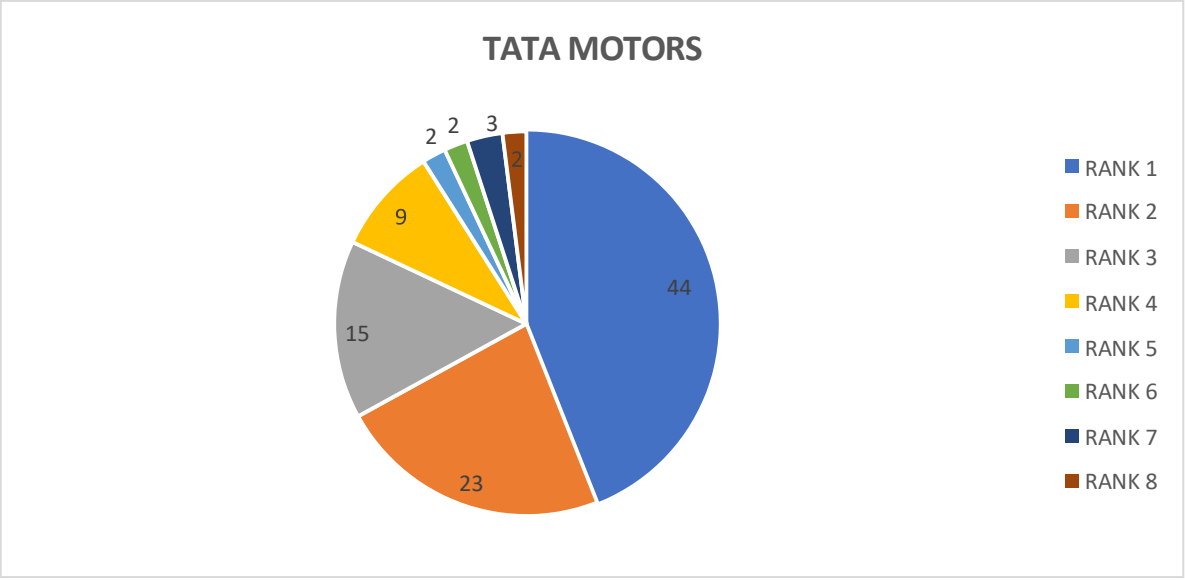
Fig 4.20 shows, that 36% of the respondents both agree and strongly agree to the statement, whereas 8% strongly disagree and 5% of the respondents also disagree and 15% of the respondents neither agree nor disagree towards this statement. It is clear that majority of the respondents agree that electric vehicles are more eco- friendly than petrol and diesel.

TABLE 4.21 RATING OF E-VEHICLE COMPANY BASED ON PREFERENCE OF BUYING.

COMPANY	NUMBER OF RESPONDENTS							
	RANK 1	RANK 2	RANK 3	RANK 4	RANK 5	RANK 6	RANK 7	RANK 8
TATA MOTORS	44	23	15	9	2	2	3	2
HYNDAI	21	33	22	14	4	3	1	2
MG	20	33	27	8	3	5	1	3
MERCEDES	34	22	14	16	4	5	3	2
OLA ELECTRIC	30	23	14	13	10	5	2	3
ATHER	22	34	18	10	2	5	4	5
MAHINDRA ELECTRIC	22	28	17	13	9	0	9	2

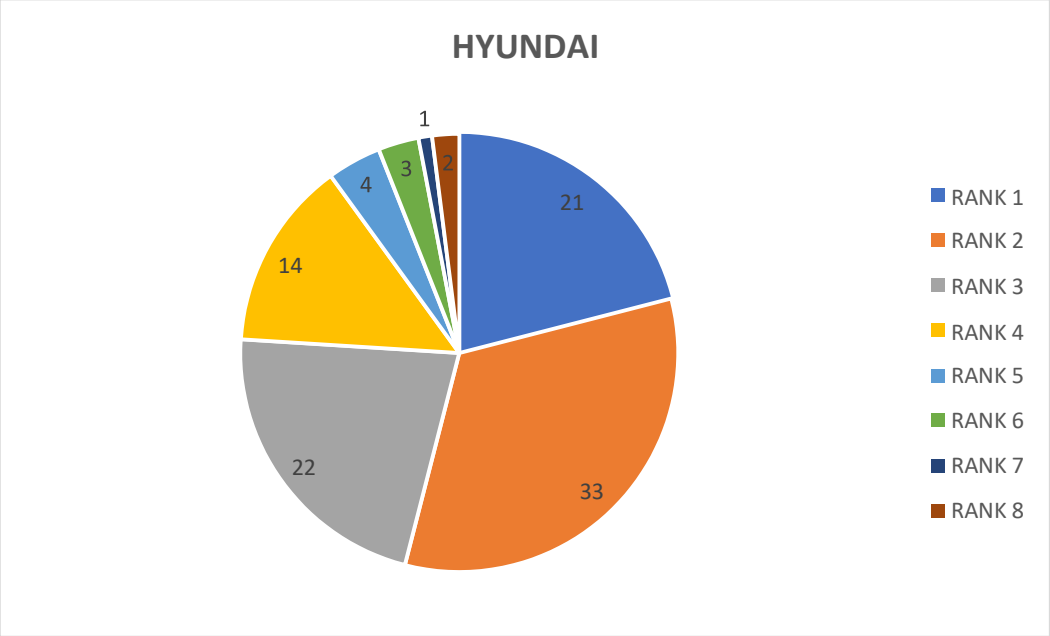
(Source: Primary Data)

FIGURE 4.21 RATING OF E-VEHICLE COMPANY BASED ON THE PREFERENCE OF BUYING



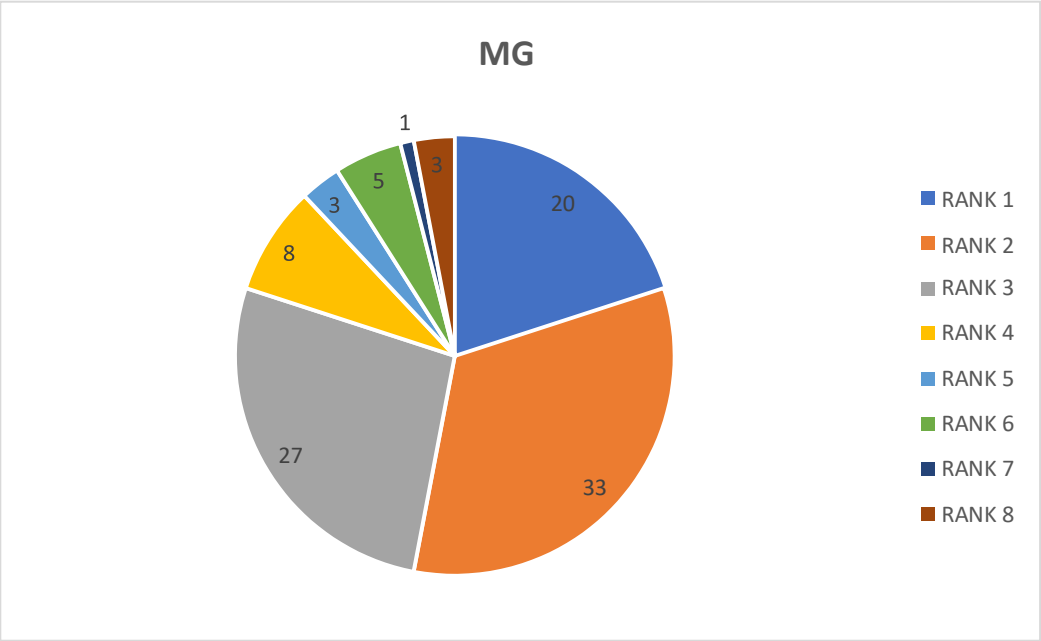
Inference:

Fig 4.21 shows that 44% of the respondents chose to rank 1 which denotes the highest preference of buying, 23% chose rank 2, 15% chose rank 3, 9% chose rank 4, 3% chose rank 7, 2 % chose rank 5, rank 6 and 8 which denotes the least preference of buying of Tata Motors.



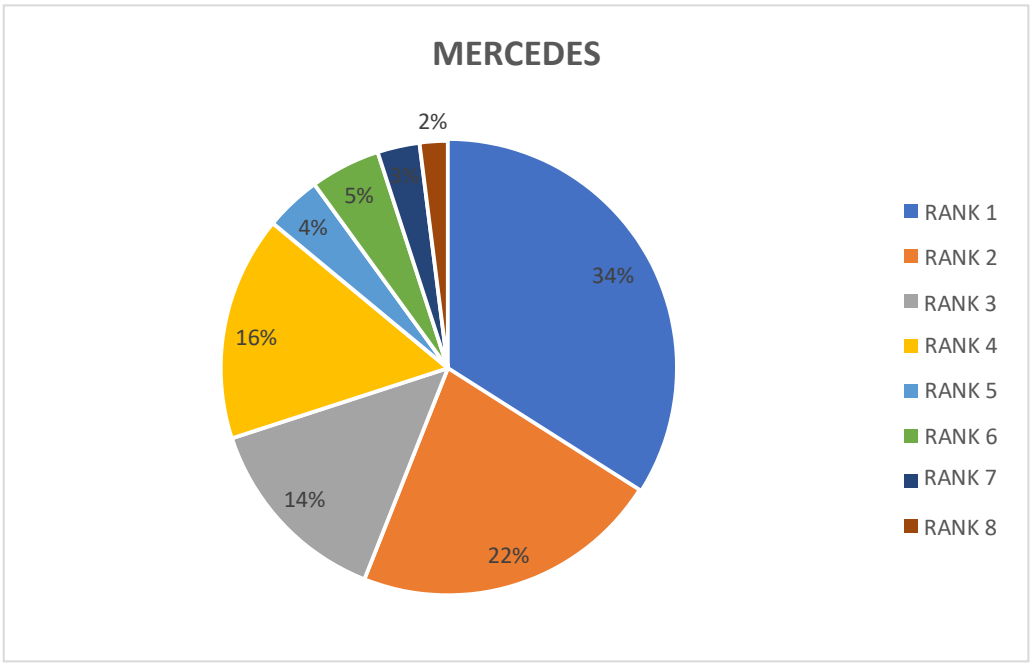
Inference:

Fig 4.21 shows, that 33% of the respondents chose rank 2 which denotes the highest preference in buying of Hyundai, 21% of the respondents chose rank 1, 22% chose rank 3, 14% chose rank 4, 4% chose rank 5, 3% chose rank 6, 2% chose rank 8 and 1% chose rank 7 which is theleast preferred in buying of Hyundai.



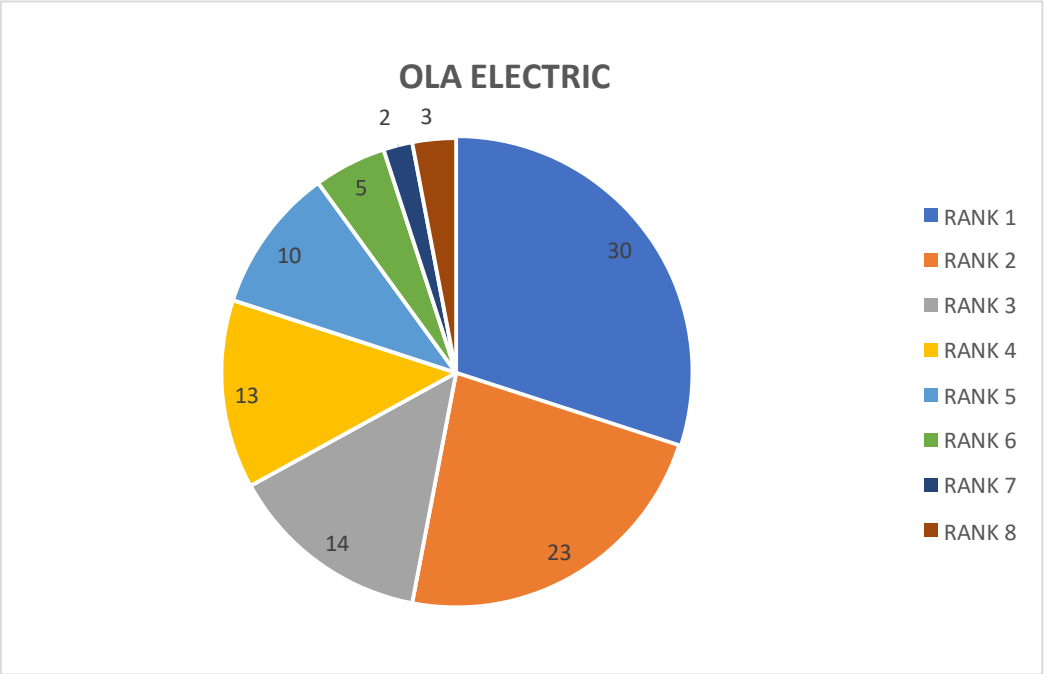
Inference:

Fig 4.21 shows that, 33% of the respondents chose to rank 2 which has the highest preference in buying the electric vehicle from the company MG, 27% chose rank 3 ,20% chose rank 1, 8% chose rank 4, 5% chose rank 6, 3% chose rank 5 and rank 8 ,1% chose rank 7 which has the least preference in buying the e-vehicles from the company MG.



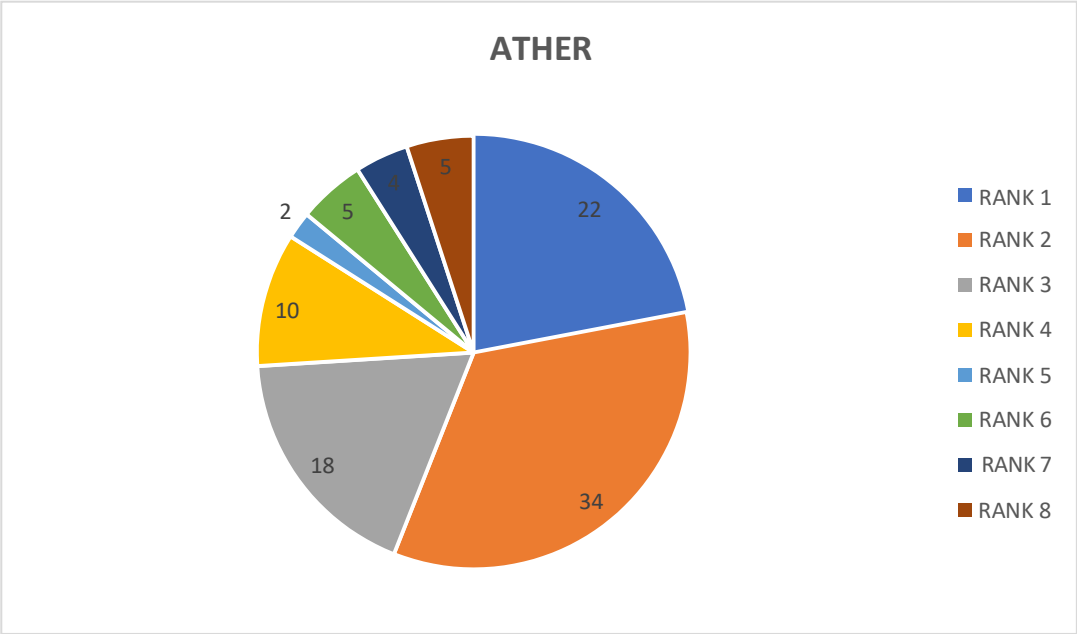
Inference:

Fig 4.21 shows that 34% of the respondents chose rank 1 which shows the highest preference in buying the electric vehicles from Mercedes, 22% chose rank 2, whereas 16% chose rank 4, 14% chose rank 3, 5% chose rank 6, whereas 4% chose rank 5, 3% chose rank 7 and 2% chose rank 8 which shows the least preference in buying the electric vehicles from Mercedes.



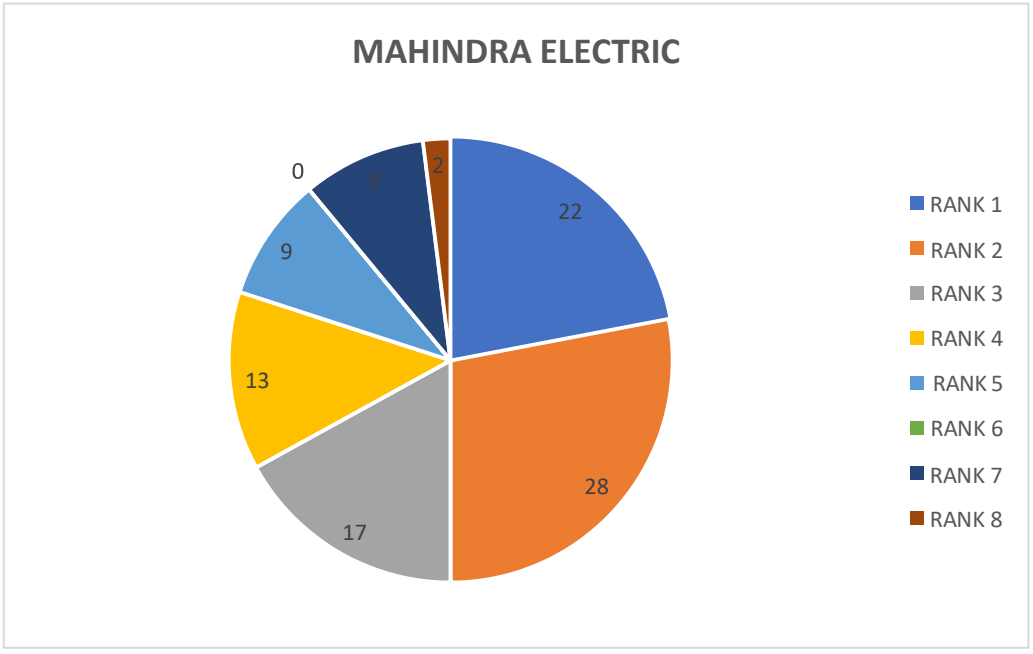
Inference:

Fig 4.21 shows, that 30% of the respondents chose rank 1, which has the highest preference in buying the Ola electric vehicle, whereas 23% chose rank 2, 14% chose rank 3, 13% chose rank 4, 10% chose rank 5, 5% chose rank 6, 3% chose rank 8 and 2 % chose rank 7, which shows the least preference in buying the Ola electric vehicle.



Inference:

Fig 4.21 shows, that 34% of the respondents chose to rank 2 which is the highest preference in buying electric vehicles of Ather, 22% chose to rank 1, 18% chose to rank 3, 10% chose rank 4, 5% chose rank 6 and 8, 4% chose rank 7 and 2% chose rank 5 which is the least preference in buying the e-vehicle of Ather.



Inference:

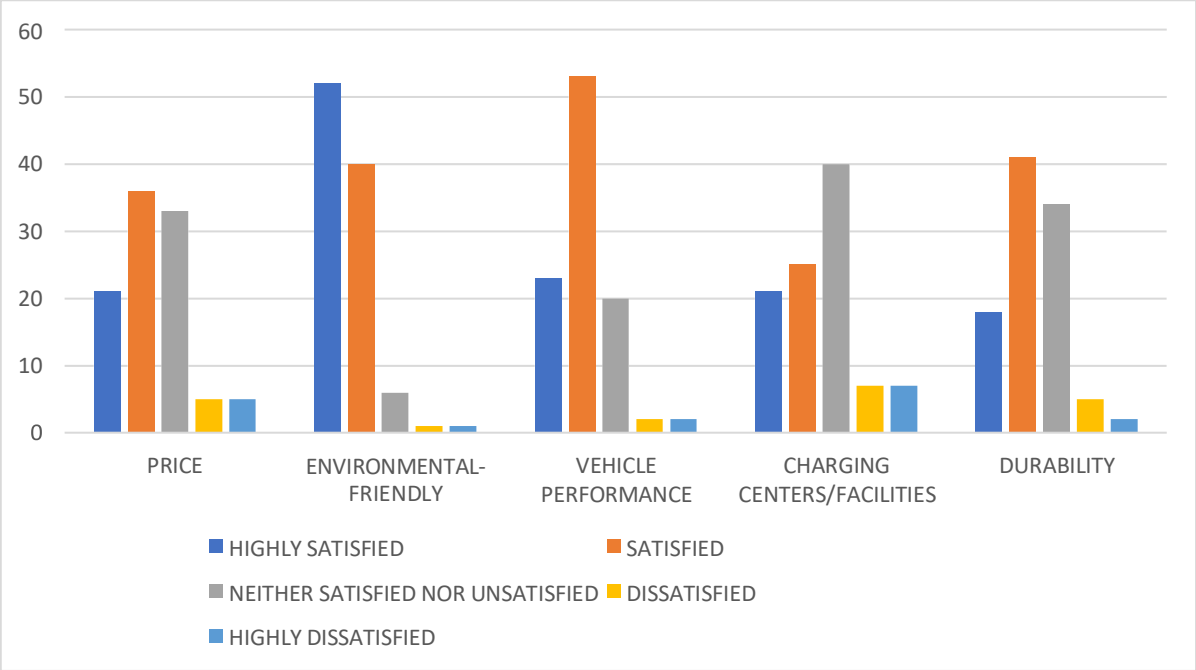
Fig 4.21 shows, that 28% of the respondents chose to rank 2 which is the highest preference in buying the Mahindra electric vehicles ,22% chose rank 1, 17% chose rank 3 ,13% chose rank 4, 9% chose rank 5 and 7 whereas 2% chose rank 8, and 0 % chose rank 6. which is the least preference in buying the Mahindra electric vehicle.

TABLE 4.22 LEVEL OF SATISFACTION OF CUSTOMERS

ATTRIBUTES	NUMBER OF RESPONDENTS				
	HIGHLY SATISFIED	SATISFIED	NEITHER SATISFIED NOR UNSATISFIED	DIS-SATISFIED	HIGHLY DIS-SATISFIED
PRICE	21	36	33	5	5
ENVIRONMENTAL-FRIENDLY	52	40	6	1	1
VEHICLE PERFORMANCE	23	53	20	2	2
CHARGING CENTERS/FACILITIES	21	25	40	7	7
DURABILITY	18	41	34	5	2

(Source: Primary Data)

FIGURE 4.22 LEVEL OF SATISFACTION OF CUSTOMERS



Inference:

Fig 4.22 shows, that 36% of the total respondents are satisfied with the factor price, whereas 21% of the respondents are highly satisfied with price, whereas 33% of the respondents are neither satisfied nor unsatisfied and 5% of the respondents are seems to be both dissatisfied and highly dissatisfied with the factor price of electric vehicles.

52% of the total respondents seems highly satisfied with environmental -friendly factor of electric vehicles and also 40% seems to be satisfied, only a very few percentages of respondents comprising of 6% is neither satisfied nor unsatisfied regard to the factor of environmental -friendly aspect of electric vehicles.1% of the respondents is dissatisfied and also another 1% of the respondents are highly dissatisfied with regard to this factor.

As for the level of satisfaction regarding the vehicle performance of e-vehicles 53% of the respondents seems satisfied. Whereas only a very few respondents comprising of 23% are highly satisfied with regard to this factor. It shows that 20% of the respondents are neither satisfied nor unsatisfied with the factor vehicle performance and 2% seems dissatisfied and other 2% of the respondents seems to be highly dissatisfied with regard to the aspect of vehicle performance of e-vehicles.

It is analyzed that 21% of the total respondents are highly satisfied with the factor charging centers/facilities of e-vehicles and 25% seems to be satisfied with regard to this aspect. Majority of the respondents comprising of 40% is neither satisfied nor unsatisfied with this factor and 7% of the respondents are dissatisfied and other 7% seems to be highly dissatisfiedwith the factor charging facilities of e-vehicles. The graph shows that a high proportion of respondents comprising of 40% is neither satisfied nor unsatisfied.

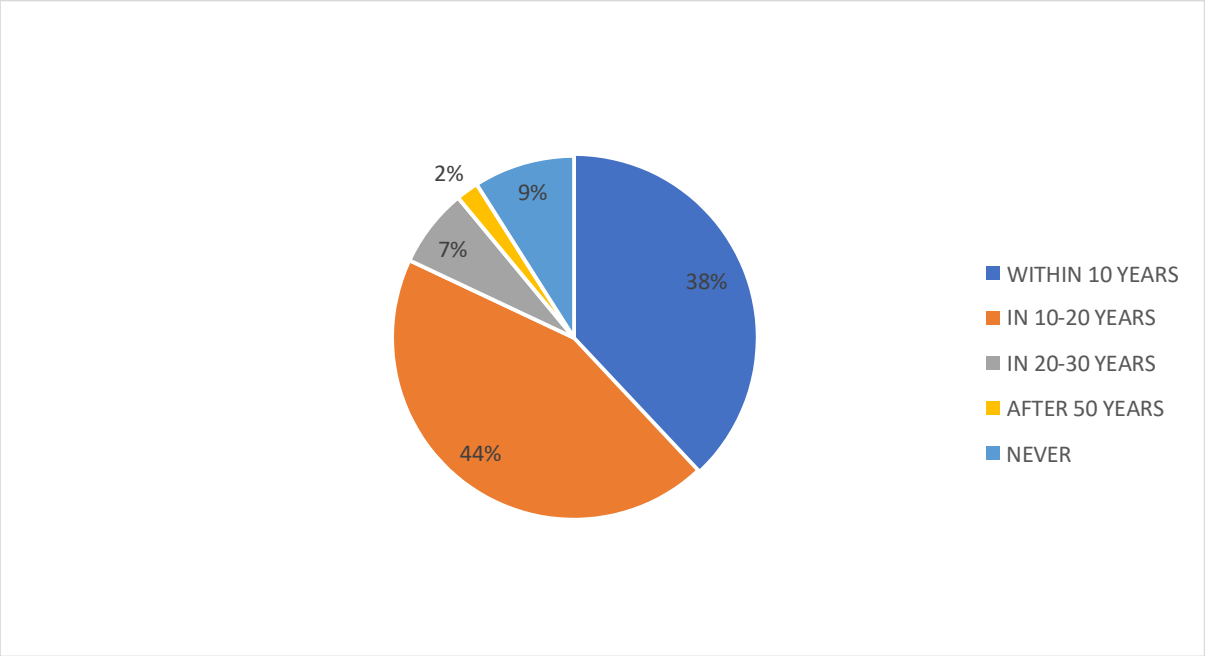
The graph shows that 41% of the total respondents are satisfied with the factor "durability" regard electric vehicles, whereas 18% seems to be highly satisfied with regard to this aspect of e-vehicle. A majority of the respondents comprising of 34% seems to be neither satisfied nor unsatisfied with this factor, 5% of the respondents are dissatisfied and 2% seems to be highly dissatisfied. It is clear from this that majority of the total respondents are satisfied with regard to this aspect in electric vehicles.

TABLE 4.23 OPINION REGARDING ELECTRIC CARS WILL COMPRISE MAJORITY OF THE TOTAL CARS OWNED IN FUTURE

ATTRIBUTES	NUMBER OF RESPONDENTS	PERCENTAGE
WITHIN 10 YEARS	38	38
IN 10-20 YEARS	44	44
IN 20-30 YEARS	7	7
AFTER 50 YEARS	2	2
NEVER	9	9

(Source: Primary Data**)**

FIGURE 4.23 OPINION REGARDING ELECTRIC CARS WILL COMPRISE MAJORITY OF THE TOTAL CARS OWNED IN FUTURE



Inference:

Fig 4.3 shows, that 38% of the total respondents think that within 10 years majority of the total cars owned will comprise of electric cars, whereas 44% of the respondents think that it will happen within 10-20 years and only 7% of the respondents chose the option of 20-30 years. Only a very few of the respondents consisting of 2% chose the option after 50 years, and 9% of the respondents chose the option never. It is clear from the chart that majority of the respondents think that within 10-20 years majority of the total cars owned will comprise of electric cars.

5.1 FINDINGS OF THE STUDY

The study aims to find the consumers preferences towards electric vehicles with the special reference to cochin corporation. Findings were based on the collected data and information.

- Majority of the respondents were females
- Majority of the respondents are in the age between 18-30 and 5% in the age above 30-50.
- Electric vehicles are seen positively by respondents. Majority of respondents areaware about electric vehicles.
- It is clear that majority of the respondents preferred both scooter and car as electric vehicle model, whereas only a very few of the respondents preferred bike.
- Most of the respondents came to know about E-vehicles from social media.
- Above 70% of the respondents are aware of the charging stations nearby their locality.
- It is clear that majority of the respondents chose environmental impact as the key factor while buying e -vehicles rather than the prices which highlights the fact that e-vehicles are environment friendly.
- The majority of the respondents have neutral response towards the statement that electric cars can save a lot of money to the owner.
- Most of the respondents are considering buying electric vehicles in the future.
- Most of the respondents are expecting a change in travel efficiency and better maintenance of E vehicles in its coming years.
- Most respondents find a smaller number of charging stations and cost of battery replacement as the discouraging factor in buying e vehicles.
- The majority of the respondents are aware of the subsidies provided by the government while making an e-vehicle purchase. The respondents believe that the government should provide incentives to encourage people to adopt electric vehicles.
- It is found that 90% of the total respondents are considering buying an e-vehicle if subsidies are provided.
- Clear majority of the respondents agree that electric vehicles are more eco-friendly than petrol and diesel.
- Respondents are satisfied with the environmental friendliness of electric vehicles
- Majority have a satisfactory opinion about the high performance of EV's.

- Majority agrees that electric vehicles will gain more popularity in future. It is clear from the chart that majority of the respondents think that within 10-20 years majorityof the total cars owned will comprise of electric cars.

5.2 SUGGESTIONS OF THE STUDY

- Petrol prices are steadily rising, the problem of rising petrol prices can be addressed with electric vehicles. The government's promotion of electric vehicles will aid the country's future progress
- By increasing the number of charging stations, more people will be interested in purchasing electric vehicles.
- People should place a greater emphasis on electric vehicles in order to reduce pollution and greenhouse gas emissions.
- More awareness regarding subsidies should be provided to employees so as to motivate them to purchase E-vehicles.
- Reduced tax rates can attract buyers to buy electric vehicles to a certain extent.
- Electric vehicle promotion also aids the government in reducing the cost of crude oil and thereby to reduce its price.

5.3 CONCLUSION

In India, there is a need for energy transition in automobiles due to the depletion of fossil resources and the steady rise in fuel prices. The government has taken steps to reduce pollution levels by promoting electric vehicles and providing purchasing subsidies. The government has relaxed FDI rules in order to promote output. EVs are being introduced in India by a number of new brands. Governments and manufacturers should work together to construct the infrastructure and create a favorable climate for electric vehicles.

If sufficient infrastructure is available, respondents are willing to accept EVs as a future buying option. The initial cost of purchasing, the limited number of charging stations, and the time it takes to recharge the battery are all factors that limit consumer confidence. The study helped in analyzing the awareness of the consumers about E-vehicles. Its provided information regarding the consumer preferences, the factors driving the consumers to purchase e-vehicles, Government schemes and incentives for e-vehicles. It helped in analyzing the satisfaction level of e-vehicle users.

WEBSITES

1. www.indianresearchjournals.in
2. Electric vehicle industry in India (Oct 2019). *Retrieved from:* https://en.wikipedia.org/wiki/Electric_vehicle_industry_in_India
3. https://timesofindia.indiatimes.com
4. Transportpolicy.net. *Retrieved from:* https://www.transportpolicy.net/standard/india-regulatory-background/
5. https://www.researchgate.net

NEWSPAPER

• The Hindu, 16/02/2023,01/04/2022,19/03/2022

• The Economic Times, 25/06/2019,28/03/2023

• The Indian Express, 7/03/2023,31/10/2021

JOURNALS

• Janardan Prasad Kesari Y.S. (2019). Opportunities and Scope for Electric Vehicles in India. IJME Journal,8

• Philippe Lebeau C.D. (2015). Conventional, Hybrid, or Electric Vehicles; Which Technology for an Urban distribution Centre? The Scientific World Journal,11.

• Pretty Bhalla I.S. (2018). A Study of Consumer Perception and Purchase Intention of Electric Vehicles, European Journal of Scientific Research,362- 368.

QUESTIONNAIRE

We Athulya Vinod, Dintu Cleetus, Jeffy Patrick have prepared this questionnaire as a part of our project on a comprehensive study on consumer preference towards E Vehicles, with special reference to Cochin Corporation. The information collected will be kept confidential and will not be handed over or be misused and will only be used for study purposes.

1. Email Id
2. Gender
   - Male
   - Female

3.Age

   - 18-30
   - 30-50
   - Above 50

4.Are you aware of E-Vehicles

   - Yes
   - No

4. Which type of vehicle do you prefer the most if electric model is available
   - Bike
   - Scooter
   - Car
5. From where did you came to know about e-vehicles
   - Newspaper
   - Magazines
   - Advertisements
   - Social media
   - Others
   - Personal Communication

7.What sort of attitude do you have towards e-vehicles

   - Positive

- Negative
- Neutral

8. Are you aware of any Electric Vehicle charging stations near your locality

- Yes
- No

9. How long have you been using e-vehicles

- 0-1 year
- 1 to 10 years
- Above 10 years

10. Which of the following factors would you consider while buying an e- vehicle

- Re-sale Value
- Environmental impacts
- Prices
- Charging Stations
- Others

11. Which are the advantages of electric vehicles over fuel vehicles

- Lower running costs
- Tax and financial benefits
- Convenience of charging at home
- Lower maintenance
- Environmental friendly
- Better performance
- Other

12. "Electric cars can save a lot of money to the owner" state your opinion

- Strongly disagree
- Disagree
- Neutral
- Agree
- Strongly agree

13. Which of the following changes do you expect from e-vehicle rather than regular vehicle

- Travel efficiency
- Comfort
- Maintenance
- Durability
- Other

14. Do you consider buying an EV in the coming years

- Will definitely buy one
- Am likely to buy one
- Don't know
- Am considering buying one, but need convincing
- Definitely won't buy one

15. What factors discourage you to consider buying an electric vehicle

- Price
- Less number of charging stations
- Lack of trust with the new Technology
- Cost of Battery replacement is high
- Other

16. Are you aware of the subsidies provided by the government while purchasing an electric vehicle

- I'm aware
- Partially aware
- Not aware

17. Are you aware of the 50% tax discount provided by the government for the e- vehicle users for the first five years

- Yes
- No

18. Will you consider buying an Electric Vehicle if subsidies are provided

- Yes
- No

19. Are you aware of the following government initiatives*

	Yes	No	Maybe
FAME (Faster Adoption and Manufacturing of Hybrid and Electric Vehicles			
Production linked Incentive (PLI) Scheme			
State EV policies			
The National Electric Mobility Mission Plan (NEMMP)			

20. If given a choice would you rather prefer e-vehicles over regular vehicles

- Yes
- No
- Maybe

21. "Electric vehicles are more ecofriendly than petrol and diesel". State your opinion*

- Strongly disagree
- Disagree
- Neutral
- Agree
- Strongly agree

22. Rate the following e- vehicle company based on your preference of buying (rank 1denotes the most prefered and rank 8 least prefered)

	Rate 1	2	3	4	5	6	7	8
ϒ Tata Motors								
ϒ Hyundai								
ϒ MG								
ϒ Mercedes								
ϒ Ola electric								
ϒ Ather								
ϒ Mahindra Electric								

23. State your level of satisfaction on the following factors of e- vehicles

- ϒ Price
- ϒ Environmental friendly
- ϒ Vehicle performance
- ϒ Charging centers/facilities
- ϒ Durability

24. When do you think electric cars will comprise the majority of the total cars owned?

- ϒ Within 10 years
- ϒ In 10-20 years
- ϒ In 20-30 years
- ϒ After 50 years
- ϒ Never